

**LEAN SIX SIGMA AND BAGGAGE HANDLING EFFICIENCY AT KENYA AIRWAYS**

**BY:**

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**A RESEARCH PROJECT PRESENTED IN PARTIAL FULLFILMENT OF THE  
REQUIREMENTS OF THE DEGREE OF MASTER OF BUSINESS  
ADMINISTRATION, UNIVERSITY OF NAIROBI**

**2021**

## DECLARATION

This research project is my original work and has not been submitted for examination in any other university:

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## **DEDICATION**

I dedicate this project to my family for their unconditional encouragement throughout my education. I also dedicate it to my friends with who played a key role in encouraging me to take my Master's program and in turn became my accountability partners during the course by always following up to check on how the study was coming along.

## **ACKNOWLEDGEMENT**

I deeply acknowledge my project supervisor Ms. Angela Kagwara for her constructive guidance, support and great patience in the development of this study. I am grateful to her for offering her time and being readily available to assist in this study process. I also thank to my moderator Mrs. Zipporah Kiruthu for her availability and willingness in the moderation of this study.

I also acknowledge the Kenya Airways staff members who took their time to give their responses in my interview sessions with them. Their insights are what have made this project whole.

I extend my gratitude to fellow MBA classmates. I specifically acknowledge Mohamud Abdi and Elizabeth Koikai, my colleagues and friends with whom we started the course together and have kept each other accountable to the end. I am also grateful to Charles Barasa who has been supportive in the journey by always giving the rest of us constant updates on matters arising. Thank you all.

## **ABSTRACT**

The objective of the study is the establishment of the relationship between Lean Six Sigma (LSS) and baggage handling efficiency at Kenya Airways. There are various techniques that are used in the Lean Six Sigma implementation. The techniques that have been of focus for the interest of the study are the Voice of the Customer, DMAIC cycle and DMEDI cycle.

The research also shows previous studies on how LSS has been applied by other airlines to improve their baggage handling process and the ways in which baggage handling efficiency can be measured for airlines. The study shows why Kenya Airways is identified as the airline of interest. The data collection methods and the findings of the research are also indicated. In addition to secondary data, primary data was collected through use of an interview guide as the research instrument of choice since this is a case study.

In this study, the lack of proper handling of baggage for the customers will be the main Critical to Quality (CTQ) factor that is considered. The introduction of Lean Six Sigma therefore improves the productivity and overall effectiveness in baggage handling processes by KQ. The study has revealed that the LSS methodology has enabled KQ to identify the main root causes resulting in baggage connectivity delays and this enabled them to carry out pilot cases.

The study reveals that there is need to identify and embark on other initiatives that will lead to more customer satisfaction from the data gathered from the Voice of the Customer process. This will assist to better align the discrepancy in the key performance indicators between the teams that manage the baggage handling process at Kenya Airways.

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## **ABBREVIATIONS**

TOC – Theory of Constraints

LSS – Lean Six Sigma

KQ – Kenya Airways

GDP – Gross Domestic Product

IATA - International Air Transport Association

USD – United States Dollar

KES – Kenyan Shillings

IoT – Internet of Things

SDAIS - Strategy-Design-Activate-Improve-Sustain model

DMAIC - Define-Measure-Analyze-Improve-Control cycle

VOC - Voice of the Customer

DMEDI - Define-Measure-Explore-Develop-Implement cycle

DMADV - Define-Measure-Analyze-Design-Verify cycle

DFLSS - Design-for-Lean-Six-Sigma process

QFD - Quality Function Deployment

CTQ – Critical to Quality

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background of the study**

Airlines globally have been working hard towards continuous improvement and meeting global standards by being notable competitors. Due to this, there has been need to streamline service delivery so as to gain competitive advantage and quicken quality services to not only meet the customer demands but to exceed their expectations. It is in this regard that there has been an increase in demand for the application of Lean Six Sigma. Lean Six Sigma is an improvement methodology that is contemporary and is intended for companies that strive for excellence in their operations (Arnheiter & Maleyeff, 2005).

Lean Six Sigma has a focus on customer satisfaction and organizational efficiency by creating continuous improvement, the Kaizen principle, and streamlining an organization's performance. This method relies on collaboration and teamwork by eliminating problems through reducing process defects, reducing inefficiency, reducing wastes and improving working conditions which in turn translate to improved profitability for organizations. The Lean Six Sigma practitioners should not be looked at as a bunch of firefighters, they are instead fire preventers (Anthony, Vinodh and Gijo, 2016).

The theory used in Lean Six Sigma is the Theory of Constraints (TOC). This theory is an approach driven by logic which focuses on the improvement of systems. It sees the system as being made up of a chain of links which are interdependent links and work together. The main goal of these links is the transformation of inputs into outputs which brings about an increase in throughput, which is the production rate. This theory seeks to show that the weakest link in the

entire system is the limiting factor which is known as the constraint. Improvement efforts are aimed at this constraint in five steps. The steps are; identifying the constraint, exploiting the constraint, subordination to exploiting the constraint, elevating the constraint and the final step is repeating the cycle (Renard, 2010.) In the case of Kenya Airways, the theory of constraints is narrowed down to service delivery on the baggage handling process which this study has identified as the constraint that the airline was and still is suffering from.

### **1.1.1 Lean Six Sigma (LSS)**

The Lean Six Sigma methodology traces back to both the Lean approach as well as the Six Sigma approach. In 2001 Lean Six Sigma became its own unique process. The combination of Six Sigma methodology and Lean methodology creates the Lean Six Sigma (LSS) methodology. Both approaches work together to establish the full potential for improvement in processes. Lean Six Sigma values defect prevention over defect detection. This is the prevention is better than cure approach (Harvey, 2006).

According to Arnheiter and Maleyeff (2005), when either Lean or Six Sigma is implemented in isolation in a competitive environment, this may lead to returns being diminished. Their argument is that an organization that applies Lean Six Sigma would include three key approaches of Lean management with the first one being incorporating a philosophy that seeks to maximize value-added activities of all the organization's operations. Secondly, the organization would constantly measure all incentive systems in place to make sure that they result in global instead of local optimization. The third tenet is that the organization would incorporate a decision making process by management that focuses on its effect on the customer by offering quality products and services.

Lean Six Sigma pushes customer satisfaction and company competitive advantage by decreasing disparity, waste, and turnaround time. The principles of Lean Six Sigma therefore help to improve the effectiveness and quality of the process. This methodology focuses on three key elements which are customers, processes and employees. Lean Six Sigma therefore helps in improving optimization of resources, process efficiency as well as growing customer fulfillment while increasing profits and reducing cost (Arnheiter & Maleyeff 2005).

LSS applies the philosophy of continuous improvement which rests on the belief that it is worthwhile to constantly strive to be the best at what you do through dedicating time and resources to the task. Getting started on the virtuous cycle of continuous improvement is difficult because it requires patience and the fortitude to maintain course (Harvey, 2006). As a methodology applied in businesses today, LSS increases process performance which results in enhanced customer satisfaction and improved bottom-line results in terms of cost savings and an increase in profits (Anthony et al., 2016).

### **1.1.2 Baggage Handling Efficiency**

In 2013, the number of passengers globally increased by 5.1%. This translated into 3.31 billion due to the growth of passenger and air traffic and this number has been progressively growing since then. This in turn caused an increase in the baggage amount handled by airlines and hence made baggage handling more important. A baggage handling system that is well-organized with reduced transfer durations for the baggage attracts new airlines to the airports that provide these services and in turn motivates passengers to use the air transport more often. An efficient baggage handling process also leads to cost savings when it comes to labour (Kolisch and Artigues, 2014).

When it comes to air transport, it is custom to separate passengers and the baggage that they have checked in. It is essential that the separation and reuniting of passengers and their baggage be carried out efficiently. This process of separation creates a challenge to airport operators, due to the fact that unloading of passengers is customarily administered faster than unloading of baggage. Airlines should work with airports to ensure that the distance from the baggage claim area to the end point is small. In the event where this is not possible, good coordination must be provided for those unacquainted with the terminal (Correia and Wirasinghe, 2010).

The process of a Baggage Handling System (BHS) is a joint effort between both airports and airlines. BHS includes a varied number of stakeholders such as airport managers, operation planners, schedulers, airlines and ground service operators. All these teams together play a role in the journey of a customer's bag, from the check-in counters at the source, to the reclaim area in the destination. The organizing and control of the flow of baggage at the input points and exit points of the baggage handling system are prearranged by skilled workers called dispatchers. Their duty is usually to organize the baggage handling in a mode that the available resources are used in an efficient manner. Their manual planning nevertheless usually takes a time-consuming approach and at times yields poor solutions with a lack of optimization of the existing resources (Kolisich and Artigues, 2014).

The role of the dispatchers comes in two parts; the first role is that they are meant to confirm the number of volumes, weight and baggage destination. They then place the check-in tags on the baggage and inform the passenger where it should be collected. When it comes to cabin and

cargo baggage, the dispatchers confirm the number of volumes, weight and dimensions, when applicable. The cabin baggage tag should be placed on the bag revealing passenger's name, flight number and date. The efficiency of this process is measured through how much time it has taken for the process to be streamlined as well as whether the customer is able to collect their baggage on arrival, at the time and place that they were advised (Kolisch and Artigues, 2014).

### **1.1.3 Kenya Airways**

Kenya Airways (KQ) is the first airline in Kenya having been founded in 1977. It was named Africa's Leading Airline in 2019 by the World Travel Awards and still remains among the top ten airlines in Africa (Kenya Airways, 2020). The breakdown of the ownership is that the government of Kenya with 48.9% ownership, followed by 38.1% which is owned by a consortium of banks. KLM, the oldest airline in the world owns 7.8% of Kenya Airways. The rest of the shareholders are private owners who trade in the securities exchange.

Kenya Airways gives a big contribution to the economy of the country. According the International Airport Review (2019), aviation contributes up to 4.6% of Kenya's Gross Domestic Product (GDP). In 2017, passenger journeys of over 4.7 million were made to Kenya with an increase in the number of tourists. In this regard, the International Air Transport Association (IATA, 2017) reported that this led to USD 3.2 billion dollars in Gross Domestic Product in which this income supports 410,000 jobs. Kenya Airways being the largest locally owned airline, is responsible for around 50% to 60% of overall traffic at Jomo Kenyatta International Airport and thus contributed to a huge percentage of this income.

According to Investor Relations Analyst (2019), Kenya Airways revenues up to 41% of KES.114 billion heightened by growth in passenger proceeds, ancillary and cargo services. In order for



Kenya Airways to continue on the upward trajectory, the airline has chosen to find ways in which they can improve on baggage related delays which has proved to be their main constraint, in line with the Lean Six Sigma Theory of Constraints.

## **1.2 Research Problem**

Airlines operate in complex environments which can be affected by many issues that can lead to disruptions in the baggage process. It causes a challenge when airports and airlines without plans in place to handle such disruptions end up dealing with a baggage mountain. A baggage mountain is the surplus of unhandled bags caused by a disruption event. Disruption to a baggage process can be categorized into two. The first type are avoidable disruptions. The second type are unavoidable disruptions which are disruptions over which stakeholders have no control. However in general, the avoidable cases become unavoidable when the correct steps are not followed (IATA, 2014).

There is also a challenge in the fact that manual handling of baggage cannot be avoided by aircrafts, hence, more innovative approaches are needed. Globally, airlines are looking at leveraging the Internet of Things (IoT) for operational areas such as baggage management. Plummeting overcrowding and delay in the air transportation system has become more crucial in recent years as air travel demand has increased (Pikaar, 2016).

There is need to try to identify the impact of a proper baggage handling systems to the performance of airlines, since every traveler's biggest concern is lost or mishandled baggage. When it comes to the global arena, Ryanair broadcasts it's lost or mismanaged baggage statistics in their annual report. In 2013, Ryanair misplaced and average of less than 1 bag for every 3,000 passengers as per their annual report. This is marginal in comparison to traditional carriers where

a passenger can have as high as a one in 60 chances of having a bag missing (Walker, 2008). Gambo (2016) carried out a study in Nigeria which revealed that there is a substantial correlation between baggage handling services and customer satisfaction in Nigeria for the domestic airlines. On the other hand, the aviation industry in East Africa is becoming extremely competitive with Rwanda Airways and Ethiopian Airways being the biggest local competitors for Kenya Airways. At Kenya Airways many of their customers complained about poor baggage handling processes. This was the main contributor to turnaround delays of Kenya Airways which led to the need for kaizen, which as the name indicates, uses an approach to improving performance that adopts many small incremental improvement steps (Kastle, 2003).

The purpose of this study is therefore is to answer the questions; has Kenya Airways improved on their baggage handling processes? Has the improvement of these processes, if any, led to a reduction in their operational costs which had proven to be their largest expense? What method has the airline chosen to improve its baggage handling process?

### **1.3 Research Objective**

The general objective of the study is to establish the relationship between Lean Six Sigma and baggage handling efficiency at Kenya Airways.

### **1.4 Value of the Study**

The study will provide value to the aviation industry in Kenya as it will reveal the benefits of the effective application of Lean Six Sigma not only in Kenya Airways but the same could be adopted for other existing airlines in the country as well. These stakeholders will be able to identify the dos and don'ts when it comes to the application and implementation of Lean Six

Sigma. The effect of this will be the influence on policy changes and implementations to better the industry performance at large.

Kenya Airways employees will benefit as they will have better working environments due to improvement in process flows as well as continuous training. Customers will also get to enjoy their flying experience without the constant worry of what might go wrong as they will get value for their money. In addition, all the shareholders will get to enjoy an increase in the value of their shares as well as the dividends paid to them.

The study will also be of value to fellow researchers as it will pick their brains on the fact that for all existing and future methodologies, there needs to be continuous improvement and commitment in order to attain results. They will also be able to learn about Lean Six Sigma and how it is applied in baggage handling at airlines. Finally, the study will be of value to the Lean Six Sigma trainers in the country as they will have more chances to train more people and spread knowledge on the concept. This will increase the number of Lean Six Sigma certified practitioners in the country.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

The purpose of this chapter is to assess and review literature on Lean Six Sigma and the theories that are tied to it. The two theories that have been chosen for this study are the Theory of Constraints and Queuing Theory. The chapter will also reveal the measurement of baggage handling efficiency as well as how Lean Six Sigma is tied to baggage handling as well as the techniques that are applied.

### **2.2 Theory of Constraints (TOC)**

The Theory of Constraints is a methodology that looks at processes through the cause-and-effect logic. The cause-and-effect logic is also known as the logical Thinking Process (TP). This is how TOC focuses on the management of system constraints, variability, and interdependencies. Through the theory, it is stated that constraints are anything that limit a system from attaining a high performance when compared to what its goal is, and therefore TOC determines the performance of a system. The methodology helps to determine where in a process, control should take place, which is usually where the bottleneck is as explained by Goldratt. The theory's basic concept is usually introduced through the chain analogy due to the explanation that a chain can only be as strong as its weakest link. Therefore TOC looks for the main conflict that holds the root causes (Goldratt, 1988).

The way in which TOC is integrated with Lean Six Sigma in service companies is done through the SDAIS (Strategy-Design-Activate-Improve-Sustain) model. Strategy stage has the focus on optimizing the organization wide performance as opposed to that of individual functions separately. The Design step involves alignment of business processes in order to get achievement

of bottom-line results as per the strategy. Activate step is where the newly defined measurements are implemented and the, policies, roles and responsibilities of the design stage occurs. The Improve step focuses on improvement efforts of the operational system in order to drive it to attain the anticipated effects and strategic objectives. The final step is Sustain, where the organization makes sure that they have continuous capability to maintain expertise in the areas that achieve high efficiency in their processes and thus translate these into results to achieve real, sustainable breakthrough performance (Jacob, Bergland, and Cox, 2009).

### **2.3 Queuing Theory**

The Queuing Theory was founded by Erlang who was a mathematician and a scientific adviser for the Copenhagen Telephone Company in the years 1878-1929. His discovery was inspired by telephone network congestion problems. In the Queuing Theory, the description of customer arrivals is given in terms of a rate of service and the duration spent on it. Therefore, Queuing Theory is simply the study of waiting lines. There are four characteristics of a queuing system and these are the modes in which customers arrive, the time needed for these customers to be served, the determination of the order of service and the number and configuration of servers in the system as per priority (Laguna and Marklund, 2011).

Queuing theory is used as a tool in Lean Six Sigma that reduces bottlenecks in the form of customer arrival rates and waiting times. The DMAIC cycle (Define-Measure-Analyze-Improve-Control) in LSS can be used to manage the queuing process. The administration of queuing systems encompasses efforts to not only manage the views of customers, but their expectations as well. The seven principles that impact how customers observe time spent in waiting are; the perception that time spent in idleness is lengthier than if the customer was occupied, the wait

before one is served is supposed to be more tiring than if the customer was already within the service process, lack of certainty and anxiousness increases the perception that time used up in waiting is longer than it might actually be, waiting for a duration that is unknown is translated as more tiring than waiting for a known a duration. According to a customer, a wait that is unexplained is believed to be more tiresome than an explained wait, the customer will bear to wait longer if the value of the service is seeming as high quality and finally, waiting when one is alone is more tiresome than waiting when one is in a group (Tanenbaum and Bos, 2015).

## **2.4 Lean Six Sigma (LSS) Techniques**

Lean Six Sigma (LSS) is a business improvement methodology for service industries which is involved in capitalization of the value of shareholders by achieving the fastest improvement rate when it comes to the speed of processes, the satisfaction of customers, cost, quality, and the capital invested (George, 2003). The relevant Lean Six Sigma techniques that will be used in this study are the Voice of the Customer (VOC), Kano analysis, DMAIC cycle, DMADV/DMEDI cycle, Pareto charts, regression analysis and Cause and Effect matrix.

### **2.4.1 Voice of the Customer (VOC)**

Voice of the Customer (VOC) technique involves collecting feedback about the organization's products and services from the customers. VOC can be collected either through reactive methods or proactive methods. Reactive methods mean that information comes to the company from the initiative of a customer such as customer grievances, commendations or enquiries. Since customers are more likely to contact the organization when they have problems or questions, reactive methods are better at determining product or service flaws as opposed to their strengths (George, Rowlands, Price and Maxey, 2005).

Proactive methods on the other hand mean that the organization takes the initiative to contact customers. Proactive VOC can be collected through; interviewing the customers. The interview method is recommended for any organization that desires to develop a profound understanding of customer requirements and how these customers use the product or service. The second way to collect VOC is through point-of-use observation which allows team members to observe a procedure in action. This gives them an in-depth understanding of reality and can stimulate and encourage ideas about developmental opportunities and solutions. Observation is best suited as the organization is able to plot what they want to do and how they will use the all insights that their people come up with. The fourth method is through carrying out surveys which are the best way used to confirm or quantify theories developed after other customer contacts and this method is good for gathering quantitative information (George et al., 2005). Voice of the customer is important in various areas such as making strategic business decisions, the evaluation of a product or service design, process improvement, problem solving and influencing job descriptions and skill sets around client needs (George, 2003).

#### **2.4.2 Kano Analysis**

Another technique that is used in LSS is Kano analysis. This is a system that helps one to appreciate changing levels of value that customers place on different features of an organization's product or service. Kano analysis is achieved via the collection of VOC data through as many diverse ways as the organization can, since they cannot identify all customer needs through only a single method. This data will then assist the organization to identify known or presumed customer needs and requirements. The customers are then asked to give feedback on how they would feel if their needs were or were not addressed. Based on customer responses,

each need is then classified in three levels as either a dissatisfier (when a customer is not happy with the results), satisfier (when a customer receives exactly what they were expecting), or delighter (when the organization not only meets the customer's expectations, but exceeds them). This information is then incorporated into the service development efforts (Sauerwein, Matzler, Bailom and Hinterhuber, 1996).

### **2.4.3 DMAIC Cycle**

The Define-Measure-Analyze-Improve-Control (DMAIC) cycle is a technique handled by Black Belts, as per the Martial Arts analogy, within an organization as an improvement process. The use of DMAIC boosts creative thinking within limitations such as keeping the basic procedure, product, or service (George, 2003). This sequence starts with definition of the problem to aid in understanding the magnitude of what needs to be done and also to explain the requirements of the process improvement. At this step is where a formal objective or target for the improvement is established. This stage is followed by the measurement stage which encompasses authenticating the problem to make sure that it is a problem worth solving. This is done through the use of data to refine and measure exactly what is happening in the problem (Slack, Chambers and Johnston, 2010).

The established measurements are then analyzed in the third step. The analysis stage develops hypotheses to show what the source of the problems actually are. Once the foundations of the problem are known, the fourth stage which is the improvement process begins. In this stage, thoughts are established to remove the root causes of problems, solutions are tried and those solutions that work are formalized and applied and effects measured. The process is improved then to be constantly examined and controlled to make sure that the upgraded level of



performance is continued in the organization. At this point, the sequence starts again to establish a continuous improvement philosophy (Slack et al., 2010).

#### **2.4.4 DMADV/DMEDI cycle**

The preferred improvement technique used in Lean Six Sigma is known by a number several names which are DMEDI (Define-Measure-Explore-Develop-Implement), DMADV (Define-Measure-Analyze-Design-Verify), or Design-for-Lean-Six-Sigma (DFLSS). This approach mainly concentrates on the development of a new service, product or process instead of improving one that previously existed. The acronym DMEDI is broken down into; Define which is where the project team together with its sponsor, come together to cultivate a well-defined charter that has clear ties to the strategy of the business and line-of-sight connection to significant financial benefits (George, 2003). The define stage involves defining and explaining the project's goals and deliverables. In this approach, the measure stage is next and it measures the project's factors that are critical to the quality of its deliverables (Slack et al., 2010).

Measure stage is where the team concentrates on the Voice of the Customer so as to collect material that will be used to design products and services that are best-in-class. This step is used to transform the Voice of the Designer from the Voice of the Customer. Quality Function Deployment (QFD) is what the method to do this is called. QFD is a greatly organized and effective approach that translates customer needs into design requirements. It follows a chain of five steps as follows; pinpointing customer needs from the VOC data collected by the organization, ranking those needs in order of importance, creating design requirements that consider all customer needs, prioritizing the design requirements established to focus on the design effort and finally creating performance targets (George, 2003).

In the Explore stage the team applies innovation in the development of multiple solutions and substitutes and afterwards selects the most favorable concept to confirm a high level design. This is followed by the Develop stage that the team uses LSS tools and simulation to create a robust design. The final step is the Implement step whereby the design is piloted, a control plan is developed, and the new product or service is launched by the organization (George, 2003).

#### **2.4.5 Pareto Charts**

Pareto charts are a technique of bar charts which are specialized and help an organization to focus on the few critical sources of trouble. These charts usually then lead the organization to focus their energy on the areas in which their work will have the highest effect. Through the arrangement of the bars from the largest to the smallest, a Pareto chart will help the organization identify which classifications will yield the highest returns when they are addressed, and which classifications are only slight contributors to the problem. They assist the organization to identify which are the Critical-to-Quality (CTQ) customer requirements (George, 2003).

#### **2.4.6 Regression Analysis**

Regression Analysis is another scientific technique that is used in combination with scatter plots and correlation calculations to forecast performance based on past results. Regression however describes the relationship more specifically than correlation coefficients alone. It checks what contributions or possible causes will be studied, what output variables are key so as to execute analysis and remove insignificant variables. Thereafter a refined model is developed and validated. Regression analysis applies data on important variables to develop a mathematical model or a prediction equation [ $Y = f(x)$ ]. It is therefore suitable as a forecasting tool (George et al., 2005).

#### **2.4.7 Cause and Effect Matrix**

The Cause and Effect Matrix is an LSS technique used to pinpoint the few important process input variables that need to be addressed so as to improve the important process output variables. The Cause and Effect matrix is similar in purpose to the *ishikawa* diagram, however it allows the organization to realize what influence various inputs and outputs have based on the priorities that the customers have ranked them on. It can be used in the Measure stages to assist in prioritizing inputs that are considered for data collection. This matrix can also be used in the Improve stages to pinpoint the focus of improvement efforts by the organization. The matrix is created through the identification of key customer requirements from the VOC process (George et al., 2005).

#### **2.5 Measurement of Baggage Handling Efficiency**

In baggage handling, qualitative indicators of services in the baggage handling system should be developed according to the airline's preference to provide the opinion of passengers. Data is usually collected to measure the processing time. Processing time data should also be collected to measure the average time of each passenger and his baggage in the system. The flight schedule data and number of passengers can then be obtained to find the pattern of passengers' arrival distribution. Arrival distribution of passengers measures when and how many passengers come into the airline system (Novrisal, Mhamedi, Hamani and Soemardi, 2013).

Due to the fact that the aviation industry is greatly susceptible to activities such as terrorism and smuggling, all baggage is vetted at the entry point. This process measures the security aspect. In the first step in the BHS, the X-ray screening mechanisms check all the baggage entered to guarantee that no unsafe products or threats are loaded onto a plane. When baggage is being loaded, their barcodes are scanned to admit their loading and to provide an audit trail. This

process measures the performance and supervision of every concern for successfully effecting different tasks, such as sending and tracking bags, and also the assembly and sharing of information. Data is registered on several places in the baggage handling system by radars mounted along conveyors or by operatives in order to give immediate response to operators and to update each baggage's situations in real time (Nahavandi and Creighton, 2009).

Measurement of baggage handling efficiency can also be determined by looking at three areas. The first one is the processing time which is the period from when a passenger arrives at the baggage claim area, until the time all of their bags are collected. The second determinant is the claim frontage for each passenger which is the quantity of time the passenger spends at the claim device. The final determinant is the baggage claim area for every passenger throughout the time the passenger is at the claim device. The choice of causes is based on the criteria of being computable and their importance to passengers (Correia and Wirasinghe, 2010).

The check-in options that airlines make available are part of the efficiency when it comes to baggage handling. Some of the available options include check-in, through the airline's call center, web check-in through the airline's website and mobile check-in through the customer's mobile phone. This greatly reduces the amount of time that would have been spent queuing by the customer if the check-in process was only physical (Kenya Airways, 2020).

## **2.6 Lean Six Sigma and Baggage Handling Efficiency**

George (2003) explained Lean Six Sigma for service industries as a methodology for business improvement. Baggage handling is a service offered by airlines to their customers when it comes to their baggage. The baggage handling process is separated into four sub processes. The first

one is check-in baggage handling which is determined by the passengers incoming at the airports. The second one is outbound baggage handling which either originates from first time arriving passengers through the check-in or from arriving flights. The third type is transfer baggage handling which is baggage gotten from an arriving flight that is dispatched to a linking flight headed to a different destination. The fourth type is inbound baggage handling which plans the relocation of baggage from arriving flights to passengers (Frey, 2014).

The use of Lean Six Sigma in the improvement of baggage handling processes can be demonstrated with a global example of Alaska Airlines who carried out Lean initiatives in the entire organization that continue to produce performance improvements to date. The airline recorded that at the close of their first year of LSS application, instead of the usual 45-minute time lag for baggage, they attained a 20-minute wait. In addition to this, the cancellation of their flights and missing bag rates reduced and they became the first on-time airline in the United States of America. Joe Bowers the director of the airlines Lean Six Sigma office stated that three years later, the airline is consistently rated among the top three in the country (Harvin, 2014).

The second example is in Xiao Shan airport where the speed of check-in service was slow. The major cause of the slowness was caused by the check-in of customers' baggage which led to long waiting times during the check-in process. The DMAIC (Define, Measure, Analyze, Improve and Control) process in Lean Six Sigma was used as an improvement to the quality of the check-in service through the reduction of delivery times as well as mishandled baggage (XinHui, 2011).

Locally, Kenya Airways' application of LSS was deployed in 2009 through Delta Blade Consultants. The airline has had a full-fledged World Class Organization programme since 2012. Kenya Airways has used Lean Six Sigma to improve performance when it comes to time management in the reduction of connecting baggage related delays. One of the applications used to improve their baggage handling process was the introduction of the Online Booking Engine whereby customers would check-in together with their baggage in advance. This application together with the Business Process Mapping and Standard Operating Model led Kenya Airways to gain a financial benefit of KES. 267M in the financial year 2013 to 2014 (Delta Blade Consultants, 2015).

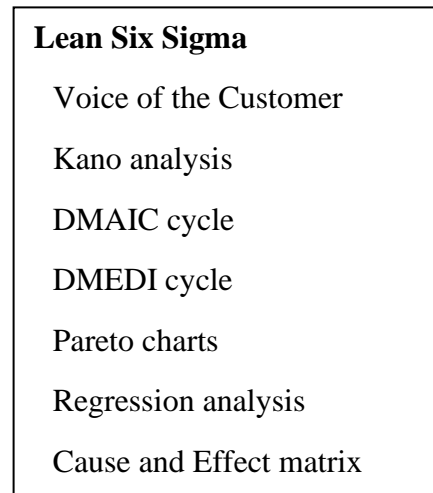
In conclusion, LSS can be used to enable airlines to control the necessary inputs to drive process improvements. The method is used to improve the on-time performance by improving baggage connectivity through reducing load connection delays. This therefore leads to improved delivery by the airline which translates to improved service to the customer (Agifors, 2016).

## **2.7 Conceptual Framework**

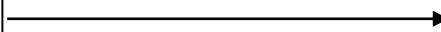
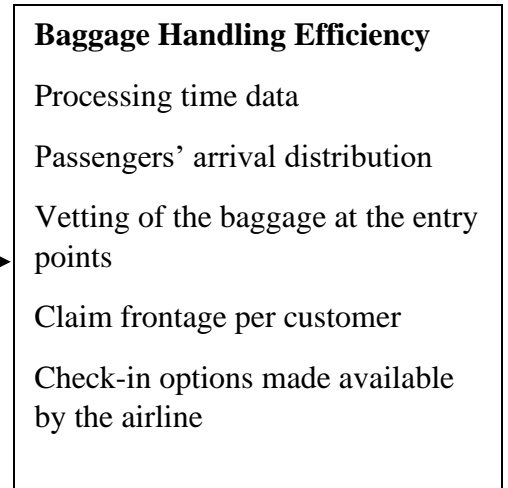
The conceptual framework demonstrates the interconnection between the independent variable which is Lean Six Sigma and the dependent variable which is baggage handling efficiency at Kenya Airways. The implementation of LSS to baggage handling at the airline is determined by several indicators which are the techniques that are used in the process. If these three categories are well handled, they can then create a competitive advantage for the airline as well as allow room for continuous improvement.

**Figure 0-1: Conceptual Model**

**Independent variable**



**Dependent variable**



**Source: Author, (2021).**

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter will deliberate the method of conducting the research that is being studied as well as the targeted population. It gives the processes and procedures that will be followed in the study. The aspects that will be covered are the research design, data collection methods and data analysis respectively.

### **3.2 Choice of Study Area**

Airlines are one of the most critical service organizations in Kenya through which customers are continuously facing dissatisfaction. Kenya Airways is one of the leading Sub-Saharan airlines and operates in domestic routes within the country, regional routes in East Africa, Southern Africa as well as Central and Western Africa. In addition, the airline also makes intercontinental trips to Europe and Asia. Kenya Airways is operating in an industry which is continually infiltrated by non-locally owned advanced airlines as well as local low-cost airlines. This is a situation in which the loyalty and satisfaction of customers is a need that is indispensable (Kamau & Stanley, 2015). This therefore means that the organization has a lot to lose in terms of customer satisfaction index if customers categorize it as not being capable to provide value for money. In this regard, the company has recognized the important need for it to heighten customer loyalty as a main strategy to increase their profitability and maintain a competitive advantage in comparison to their peers in the global airline market (Riwo-Abudho, et al, 2013).

The airline prides in safeguarding a customer's baggage while the baggage is in their care. They have dedicated various resources to ensure baggage is secure and delivered on time. However,



the airline admits that occasionally there may be some irregularities and thus they assure the customer that every effort will be made to ensure the safe return of your baggage in such a scenario. Tracing of missing baggage continues for up to a maximum of 45 days. As soon as the baggage is located, the customer is contacted and arrangements are made for it to be delivered to them. It is in line with this assurance from Kenya Airways to their customers why the need to achieve efficiency in baggage handling is important. (Kenya Airways Customer Service Charter, 2013).

This study focuses on improving the quality management in baggage handling efficiency at Kenya Airways. In spite of a lot of research being conducted to measure the factors affecting customer satisfaction in different industries, minimal focus has been given to the analysis of such aspects in the airline industry particularly in a developing country such as Kenya (Kamau & Stanley, 2015). Therefore this study therefore show weaknesses in previous studies.

There exists a limited number of previous studies on the application of Lean Six Sigma for baggage handling efficiency at Kenya Airways. One of the studies that have been done in relation to this topic include Gichira (2007) who studied the challenges of globalization and their impact on Kenya Airways. When it comes to Kenya Airways there has been a lack of a scientific method and modern management to determine the quality of service. Wamucii (2009) did a research that sought to investigate the factors affecting customer satisfaction in the airline industry with a special focus on Kenya Airways. However, there are other factors that may influence or affect customer satisfaction in public organizations which the researcher did not dwell on. Wafukho (2009) laid emphasis on the effectiveness of Lean Six Sigma strategy on

continuous improvement in GlaxoSmithKline manufacturing plant, which left the gap of the application of the same methodology in a service organization, in which this study will cover that aspect through Kenya Airways.

### **3.3 Research Design**

A research design is explained as a plan for steering a study, with concentrated control over aspects that may inhibit the validity of the findings (Burns and Grove, 2003). The research design chosen for this study is the case study method. A case study is a thorough and methodical investigation of a lone individual, community, group or any other entity in which the researcher inspects in-depth data relating to numerous variables (Hamel, 1993). In the study, the single unit that is being focused on is Kenya Airways and the research seeks to find the impact that the application of Lean Six Sigma has had in the airline's baggage handling process. The use of this method will make it easy to obtain in-depth data on the area of study.

### **3.4 Data Collection**

Data collection is the method of gathering practical evidence in order to gain fresh insights about circumstances as well as provides answers to questions that prompt the need to undertake a research (Flick, 2009). In this study, there will be the use of both primary and secondary data collection methods. Primary data collection will be carried out through the use of an interview guide to gather in-depth feedback. Secondary data will also be collected through the review of different significant publications, case studies, reports and review of the customer feedback given through the various social media platforms about Kenya Airways upon which the content analysis will be built on.

### 3.5 Data Analysis

Content analysis be used as the analytical tool of choice to carry out a desk review of the relevant documents and social media data that the researcher will compile in order to identify the thematic areas of study. Bryman (2011) described content analysis as the process in which social scientists study documentation that contains texts of various formats such as photographs, audio or film to examine patterns in a replicable and methodical manner.

**Table 1: Data Collection and Data Analysis Methods**

<b>Objective</b>	<b>Purpose</b>	<b>Data Collection Method</b>	<b>Data Analysis Method</b>
Challenges faced by Kenya Airways in their baggage handling process	To identify the Customer Satisfaction Index when it comes to the airlines baggage handling processes	Interview guide to gather the Voice of the Customer	Content analysis to identify patterns causing inefficiencies
Influence of Lean Six Sigma on baggage handling at Kenya Airways	To determine the On-Time-Performance and root causes for delays that the baggage reconciliation system has	Interview guide to gather the impact of LSS application	Content analysis to determine the CTQ factors

**Source: Author, (2021).**

## **CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND DISCUSSIONS**

### **4.1 Introduction**

This chapter presents the data that was collected from the study as per the research objectives. It covers the summary of the findings on the effectiveness of Lean Six Sigma in baggage handling efficiency at Kenya Airways (KQ). The Jomo Kenyatta International Airport (JKIA) is the airport of focus on the KQ baggage handling process for the benefit of this study. This data collection was achieved through interviewing some of the employees and customers of the airline. Social media records and secondary data was also availed to the researcher which aided in the content analysis of the study. Some of the documents that were provided to aid in the study included the 2016 published presentation during the airline operations annual symposium in Chile, the 2015 Sky Team customer research executive and a 2012 company report on improving quality of information and communication in the final stage before flight operation. In addition to this, old newspapers and company magazines were made available to the researcher.

### **4.2 Demographics of the respondents**

The target number of people to be interviewed was meant to be seven. A total number of five which included three KQ customers and two KQ employees was interviewed. The Customer Service Department currently has an Acting Head of Department who has been holding fort for the incumbent who unfortunately passed on earlier in the year. This therefore proved a challenge to gain primary insight from one of the people who were part of the Lean Six Sigma implementation process when it was introduced to the airline.

### **4.3 Data collected from the Interview Guide**

In a research project, a minimum of 50% response rate is sufficient for analysis and reporting (Mugenda and Mugenda, 2003). This therefore rendered the information given by the interviewees suitable to proceed as it was a response rate of 71% of the targeted number.

#### **4.3.1 Responses from KQ employees as per the interview guide**

The two employees that were interviewed were the Cabin Manager who has been an employee of the organization since the year 2001. The other employee was the Manager Network Strategy who has worked for the organization for close to ten years. Both of them are aware that the objective of baggage handling efficiency at the organization is to reduce the time spent in the process as well as the costs that are tied to the delay in the process. Some of the costs mentioned included reimbursement costs to customers for mishandled or lost baggage as well as overtime costs for employees who had to work extra hours to clear the backlog. The study has also identified that the other main objective for the introduction of Lean Six Sigma in KQ's baggage handling process is to increase customer satisfaction in the process by focusing on the Critical to Quality (CTQ) factors which will increase the organizations Net Promoter Score.

In regards to the challenges faced by KQ employees on the baggage handling process, they both agreed on the overtime aspect whereby employees are sometimes called upon to work for extra hours or more shifts than would have been the case so as to manage the baggage mountain. This was how the airline would manage the challenge in the past. They also stated that initially there was a constant push and pull between the ramp and the dispatch team as they had different process flows on how to manage baggage. It was identified that the largest root cause was the lack of an alignment of the key deliverables between the ramp team and the dispatchers. The

team at the ramp section are responsible for baggage off-loading and they use the First Bag - Last Bag (FiBa/LaBa) principle on the airport arrival belt principle. On the other hand, the dispatching team are evaluated using the Bags Misconnections process. This caused major delays in the baggage handling process since the two teams conflicted on each other's process flows and thus resulting in a significant process waste in terms of too much baggage movements, trolley steering and sorting of baggage.

Both managers were not part of the leadership in implementing LSS when it was introduced to KQ in 2009. However, they were non-management employees of the airline at the time and therefore they were able to detect the positive change that came with this implementation and how much easier it made some of their processes. The Cabin Manager stated that he knew LSS was introduced to the organization since KQ wanted to meet international standards and be a competitor in the global arena, a strategy that he believes put them better on the map. As for the Manager Network Strategy, he knew that LSS was introduced to the team to create a better interlink between the different departments so that they would all work towards the same goal which is to be the leading airline in not only Africa but the world and he believes that they are headed there.

When it comes to the improvement of baggage handling efficiency due to the introduction of LSS, both managers agreed that it had improved. The examples they gave was the team synergy that now exists between the ramp and the dispatch teams. They have also praised the turnaround time taken in completing the loading as well as offloading of customer baggage. The airline can now manage the connecting baggage process from the controls put in place. This is achieved through monitoring both the connecting baggage accessibility and the loading sequence communication compliance.

The management pointed out that initially the airline focused on the Lean Six Sigma process improvement efforts but in recent times they are not fully devoted to that process and that in turn the zeal has slowed down. The airline's efforts have become overtaken by other current events such as emerging partnerships with other airlines, changes in some members of the executive committee as well as too much focus on the Covid-19 pandemic. They highlighted the need to carry out refresher trainings on the LSS process or train other marshals to keep up to date on the improvement journey. The research therefore gathered that due to this, the major challenge faced in the changeover process from the old method to the LSS method is need for buy-in from other colleagues and management support so that the process can be refreshed once more and followed to avoid history repeating itself.

The two managers gave their examples on situations where they each interacted with a customer who felt that their baggage was mishandled. The Cabin Manager gave an example about a customer who was traveling to South Africa. The client did not want their baggage placed in the overhead bin. The bag was however too big to be considered as hand baggage and at the same time it was too small to be placed in the cargo segment. Unfortunately, in the process of the hostess lifting the bag to lock it in the overhead bin, it slipped and fell down before it was finally properly locked in. The passenger was upset as she said that she had fragile material in the bag and went ahead to launch a formal complaint upon landing. The case was however closed after it was discovered that nothing had been damaged. She however highlighted the fact that her baggage was mishandled and that the hostess insisted on squeezing it in the overhead cabin which according to the customer, was already full at the time. KQ apologized for the inconvenience to the client and assured her of better customer service moving forward.

The Manager Network Strategy on the other hand gave a referral to a published article and he remembers it as one of the most publicized customer complaints in the history of the airline. In this incident, the airline was sued over lost baggage in 2011. KQ was taken to court in Sierra Leone over the lost baggage. The aggrieved passenger was claiming for KES. 577,229 as the value of her baggage as well as payment for breach of contract by KQ for their negligence and unprofessionalism. It is such scenarios among others that led to the need to improve the process efficiency at the airline (Wainainah, 2011).

#### **4.3.2 Responses from KQ customers as per the interview guide**

The customers that were interviewed were meant to address the questions on how KQ responds to negative feedback when an inefficiency is pointed out on how they handle customer baggage and whether they address the concerns in a timely manner. One of the customers admitted that she has used the flight only to travel within the country and that she did not have experience in mishandled baggage. She however mentioned that she once missed a meeting as the flight delayed for about forty minutes without a clear explanation why.

Another customer stated that she was coming to Kenya from Dubai and that there was a mix-up whereby someone accidentally picked her suitcase without confirming the name tag on it since they were similar in design and color. She however managed to rush to the KQ counter within JKIA and fortunately through the collaboration between the KQ team and the airport security, she was able to recover her suitcase. She was therefore of the opinion that the name tags can be improved in terms of font size so that it is easy for someone to identify their property. She was however impressed on how quickly the matter was closed.



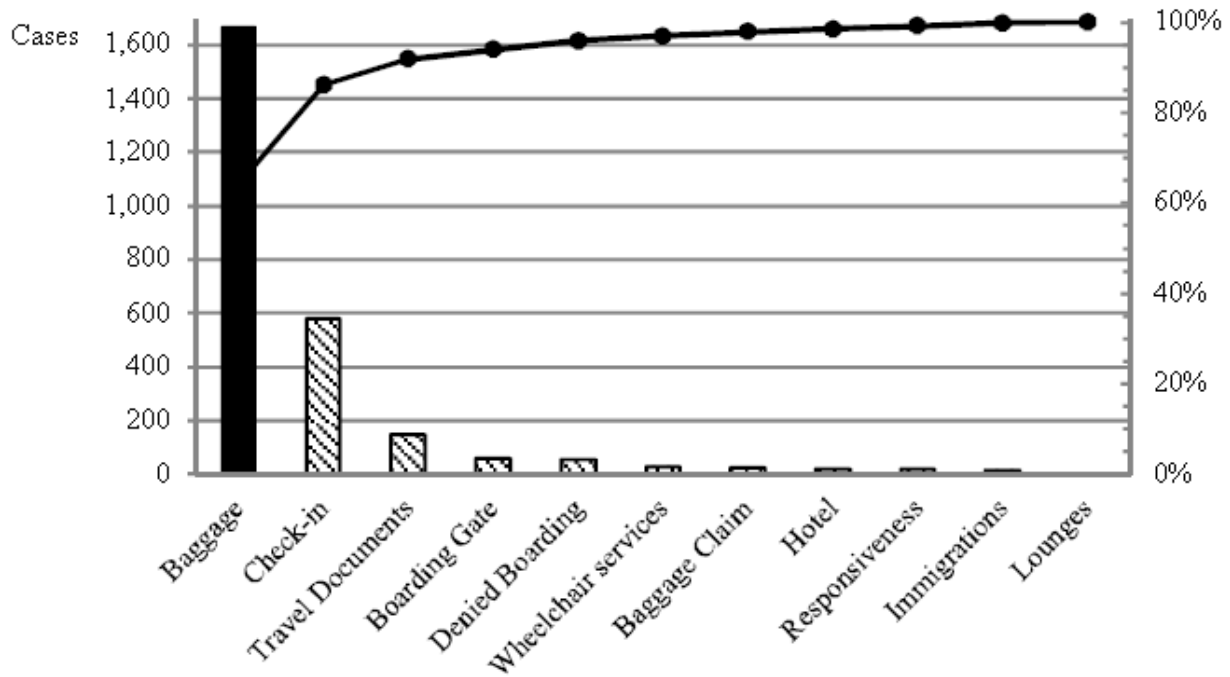
As for the third customer, he felt that the response rate from KQ was inadequate. He was also in an international flight and was not able to identify his baggage at the ramp section. After several days of unanswered calls and emails as well as updates on the websites that work with KQ to trace lost bags, his baggage was finally traced and he was advised on where to collect it a week later. This therefore makes him not trust the airline.

#### **4.4 Discussion**

In 2011, KQ increased costs in baggage since the handling process proved to be more expensive than was expected. Passengers from East Africa who were enjoying subsidized rates from the airline, were informed that they would only be allowed one piece of baggage weighing 23 kilograms as check-in baggage. This amount was reduced into half from the original baggage limit which initially was 46 kilograms. Any passenger who wished to carry more baggage would have to do so at an additional cost of KES. 2,060 as per a memo from Kenya Airways that was shared to its managers and sales officers. This model made room for the airline to make more revenue as opposed to the previous revenue stream that was being made from ticket sales only (Wainainah, 2017).

In 2016 a survey was carried out on the possible causes of dissatisfaction that KQ customers were facing. It established that baggage handling was the main cause of dissatisfaction among both employees and customers as indicated in Figure 0-2.

**Figure 0-1: Survey on areas that KQ needs to improve on**



**Source: Agifors, (2016).**

This data was gathered from the Voice of the Customer Technique and the feedback was collected in all areas that customers interact with in their flight experience as shown in Figure 0-2. The areas that were focused on were baggage handling processes which revealed a 64% complaints rate making it the biggest pain point for customers. This was followed by check-in process with a 39% complaint making it the second highest. Travel documents had a complaint rate of 8% and minimal complains were raised on the other factors such as boarding gate, denied boarding, wheelchair services, baggage claim, hotel responsiveness, immigrations and finally lounges which recorded the least complaint rate.

In Lean Six Sigma, the Measure stage of the DMAIC cycle is where data is collected and tested on the security and accuracy of the information gathered. The results of this stage therefore determined that the major reason to baggage delays are caused by the load connection delays by the airline. In addition to this, the manner in which connecting baggage is handled leads to double the time spent as compared to the positioning of departing bags.

Top five reasons were identified as the causes for baggage related delays at Kenya Airways. The first one was the manner in which load connection was handled. The second reason was inadequate turnaround time for the baggage handling process from the starting point to the finishing point. A third reason was identified as late completion of loading baggage. This is followed by the fourth reason which is late positioning of connecting bags and the fifth reason is rotation due to baggage related delays. These five reasons amount to 702 hours spent yearly and represents 87% of the total baggage delays. Out of the five reasons, load connection has proven to be the largest delayer with 536 hours spent annually which amounts to 67% of the total baggage delays. However, the load connection delays are directly affected by both passengers and the connection baggage team.

The research on social media platforms was carried out on both Facebook and Twitter. The study focused on baggage complains towards KQ in the year 2008 when KQ joined social media to 2015. This mapped a seven year span putting into allowance one year before LSS implementation and six years after it was introduced to KQ. The other reason for this choice of duration was for objectivity purposes as within the year 2015 onwards, majority of people joined various social media platforms due to internet access availability. In the early years however, this was very limited hence the social media presence was very low. The missing complains from

social media in the earlier years may not necessary mean that the customers were satisfied. It simply means that they had other modes of raising the issues. On the same note, the increase in social media complains in the recent years may not necessarily mean that the problem has gotten worse, it simply means that customers now have direct online channels to raise their concerns.

Table 2 below shows the variation in Kenya Airways customer complaints over the years.

**Table 2: Social Media Complains towards baggage handling at KQ**

<b>Year</b>	<b>Percentage of complains</b>
2007 to 2011	0%
2012	50%
2013 to 2014	0%
2015	50%

**Source: Author, (2021).**

## **CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

In this chapter, the study provided the summary of the findings drawn from chapter four. This is followed by the conclusions, recommendations and limitations which are drawn from the research. The final part of the chapter discusses suggestions on areas where further study can be done from the research gaps gathered.

### **5.2 Summary of the Findings**

The objective of the study is the establishment of the relationship between Lean Six Sigma and baggage handling efficiency at Kenya Airways. The study shows the origin of the Lean Six Sigma (LSS) methodology which evolved from the combination of both Six Sigma methodology and Lean Management methodology. The two methodologies still are still in existence and can be applied as they are in other improvement processes. However this study focuses on LSS and it also shows that the two theories that are applicable to the research are the Theory of Constraints and Queuing Theory. The Theory of Constraints focuses on identifying the bottle necks in a system that causes the constraint and this is where LSS is applied to either improve on or dismiss these constraints. Queuing Theory on the other hand focuses on the time spent waiting in line and LSS comes in as an improvement process to reduce the time spent in waiting.

There are various techniques that are used in the LSS implementation. The techniques that have been of focus for the interest of the study are the Voice of the Customer (VOC), DMAIC cycle and DMEDI cycle. VOC was mainly used for collecting feedback from the customers on how they felt about the services offered to them by Kenya Airways. This was followed by the Define-Measure-Analyze-Improve-Control (DMAIC) cycle which is an improvement process whereby

the airline has to relook at its existing processes and identify what the bottle necks are. In the event that these bottle necks are manageable then they can be improved. However in some cases, the bottle necks tend to be constraints that need to be removed for manageability of the process flow. In such a scenario then the Define-Measure-Explore-Develop-Implement (DMEDI) cycle is introduced which is an approach that mainly concentrates on the development of a new service, product or process instead of improving an existing one.

The research also shows previous studies on how LSS has been applied by other airlines to improve their baggage handling process. One of the airlines that has applied it successfully in the management of their baggage processes is Alaska Airlines. In Asia, Xiao Shan airport has made collaborative measures with the airlines that operate at this airport and has improved the baggage handling management as they have incorporated LSS in their processes. The study goes to show the ways in which baggage handling efficiency can be measured which is done in five ways. These are processing time data, passengers' arrival distribution, vetting of the baggage at the entry points, claim frontage per customer and check-in options made available by the airline.

The research also shows why Kenya Airways is identified as the airline of interest for the study which is mainly due to the fact that it is the only locally owned airline that has embraced the application of LSS. This is then followed by the data collection methods and the findings of the research. Aside from secondary data, the primary data was collected through use of an interview guide as the research instrument of choice since this is a case study.

The target population comprised a total of five people with two of them being employees and three being customers of KQ. The respondents revealed that the implementation of the methodology was a success in how the baggage handling process has improved from it. The interviewees clearly elaborated the challenges that were faced in the baggage handling process

by the airline before the LSS introduction. The customers revealed that the main challenge was time wasted in the offloading or loading of their baggage. They also revealed that another challenge was the mismanagement of their baggage such as when it comes to misplaced baggage especially in the transfer process from one area to another.

As for the employees, the biggest challenge with baggage handling was also the time spent on the process. It was however identified that the reason for this was that the ramp team and the dispatch team were meant to achieve the same goal but were however using different methods on how to go about the process. This was because they had different key performance indicators in their roles that contradicted with each other. The general takeaway from the data collected has revealed that Lean Six Sigma application been successful in achieving the intended results by reducing the mismatch between the two teams and in turn improving the processes. It has also enabled the airline to come up with new ways to better serve their customers in addition to improvement of the already existing processes.

### **5.3 Conclusions**

The conclusion of the study is that the customer perception of Kenya Airways was a significant matter in which the airline has been working towards improving from the data that they gather through the Voice of the Customer (VOC). In this study, the lack of proper handling of baggage for the customers was the main Critical to Quality (CTQ) factor that was being considered. The introduction of Lean Six Sigma therefore improved the baggage connectivity process by making a significant reduction of load connection delays. This in turn improved the productivity and overall effectiveness in order to offer quality baggage handling to the customers.

The study has revealed that the LSS methodology has enabled KQ to identify the main root causes resulting in baggage connectivity delays and this enabled them to carry out pilot cases in the initial stages. These pilot cases were used to improve the teamwork between the Ramp and Baggage Reconciliation teams. The implementations were evaluated for inbound flights from specific countries with Dubai being the first country where the pilot test was carried out and once success was recorded, the process was rolled out to all flight arrivals and departures. The results have been positive and a 65% reduction of baggage connection delays has been recorded since LSS implementation. This study marks a key step in the kaizen effort for baggage handling by the airline.

#### **5.4 Recommendations**

From the data collected, it was evident that there was a slowed down intake of the Lean Six Sigma approach within the organization. There is therefore need for the management to carry out refresher trainings to the airline's employees so that they can have more master black belts, black belts and green belts within the organization. This will increase engagement and also create room for further improvement of the processes where need be as the employees will be able to identify the manner in which the methodology ties to the company strategy. It will also create room for employees to share information and in turn this creates engagement within the organization.

There is also need to identify and embark on other initiatives that will lead to more customer satisfaction since the data gathered from the VOC process must have indicated more areas that the customers needed improvements in. Improvement in customer concerns will make them feel valued and therefore increase their loyalty to the brand. They are therefore turned into repeat clients and can market KQ to other prospective customers through word of mouth.



The study has revealed that Kenya Airways will need to create a balance between the connecting and terminating baggage handling process which is where the biggest bottleneck in the process is. The proposition for additional improvement is to explore the introduction of a First Connecting Bag - Last Connecting Bag (FiCo/LaCo) process as opposed to the existing First Bag - Last Bag (FiBa/LaBa) principle on the airport arrival belt principle. This will assist to better align the discrepancy in the key performance indicators between the team at the ramp and the dispatchers to be able to achieve the strategy matching the business model at Kenya Airways.

### **5.5 Limitations of the Study**

The emphasis of the study is on how effective Lean Six Sigma has been in the baggage handling process at KQ. However finding some of the employees to interview proved to be a challenge from their busy schedules. This was specifically affected by the introduction of shift working to reduce interactions as part of the Covid-19 safety measures. It therefore meant that for the team that was on duty, there were many interruptions experienced during the interviews as some of them had to step away to handle some matters then get back to the interview rendering the process very time consuming.

Another limitation was the fact that secondary data was made available to assist in answering some of the queries where the interview answers may not have been fully satisfactory. This data was collected from both internet sources such as KQ website, social media and some publications on the organization and also proved to be time consuming as well as costly as some of the secondary data was too wide while the study was interested in to gathering data on the specific area of interest.

## **5.6 Area for Further Research**

There is room for research to be carried out on other factors that could be causing customer dissatisfaction towards KQ aside from the baggage handling process as gathered from the VOC data. The study can also be expanded to other airlines so that a comparison can be made on whether the challenge is unique to only Kenya Airways.

There is also a need to identify other factors that have led to the inefficiencies in the baggage handling process outside the airline. As discussed earlier in this study, the process is a joint effort between both airlines and airports. This therefore reveals the need for coordination from the two teams for streamlining of the processes holistically as the burden should not only be borne by the airline.

Lastly, Lean Six Sigma as an improvement process is very dynamic and can be used in various processes within the organization. It would be useful for a study to be carried out to show how the process is applied in the organization as a whole in their various processes.

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## **APPENDIX 1: INTERVIEW GUIDE**

This section seeks to understand your views as an employee of Kenya Airways in regards to the baggage handling efficiency and the impact that it has on the customer satisfaction due to the introduction of Lean Six Sigma in the organization.

### **SECTION A: KENYA AIRWAYS EMPLOYEES**

1. Please mention the department in which you work.....
2. Please mention your length of service at Kenya Airways.....
3. What position do you hold in Kenya Airways?
4. What are the objectives of the baggage handling efficiency process at Kenya Airways to the best of your knowledge?
5. What do you think are the main challenges that the inefficiency in the baggage handling process brings and how have they been managed in the past?
6. How have the employees been affected during the process to improve the baggage handling challenges?
7. What would you say are some of the costs tied to inefficient baggage handling processes at Kenya Airways?
8. What do you think are some of the reasons why these challenges existed? Kindly elaborate in case they still exist.
9. Were you part of the team that was working with the airline when the implementation of Lean Six Sigma was done? Explain your answer.

10. Did you know or understand the reason why Lean Six Sigma was introduced to Kenya Airways? Explain your answer.
11. Do you think the introduction of Lean Six Sigma has aided in the improvement of baggage handling processes? Explain your answer.
12. Does the organization devote the correct amount of resources in terms of time, money, and man hours to the Lean Six Sigma process application to date?
13. Have you interacted with a Kenya Airways customer who felt that their baggage was mishandled? What was their major concern and how did you manage the situation?

**SECTION B: KENYA AIRWAYS CUSTOMERS**

14. How does the management deal with negative feedback when it comes to customer complains on how their baggage was handled?
15. Do you feel that customer complains about baggage inefficiencies are addressed in a timely manner? Explain your answer.

Any additional comments:

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Thank you for your feedback and participation.