AVIATION SAFETY STANDARDS, MONITORING AND EVALUATION PROCESS AND PERFORMANCE OF AIR TRANSPORT IN KENYA: A CASE OF AIRPORTS IN NAIROBI COUNTY

BY

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A Thesis Submitted in Fulfillment of the Requirements for the Award of the Degree of Doctor of Philosophy in Project Planning and Management of the University of Nairobi

2019

DECLARATION

This doctoral thesis is my original work and has not been presented for academic award in any other University.

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DEDICATION

This doctoral Thesis is dedicated to my beloved late parents, David Mwikya Ngwae and Kalondu Mwikya for being my first teachers, introducing me to formal education and being my role models during my formative years. I also dedicate this thesis report to my family for their support and bearing with me during this process. I will remain grateful forever.

ACKNOWLEDGEMENT

My sincere gratitude goes to my supervisors Dr. Angeline Mulwa and Dr. John Mbugua for the intellectual advice and guidance that they have given me. Thank you for your patience and care. Special thanks go to the lecturers who took us through the PhD course work. Specifically I salute Prof. Christopher Gakuu, Prof. Harriet Kidombo, Prof. Charles Rambo, Professor G. Polkarial, Prof. Raphael Nyonje, Prof. Dorothy Kyalo, Dr. Lilian Otieno, Dr. Lydia Wambugu, Dr. Timothy Oketch, Dr. Elisha Opiyo and Dr. Stephen Luketero who passionately taught and guided me through my PhD course. I wish to thank all my classmates for keeping the fire burning at times when I felt like deferring my studies.

Am deeply indebted to my study group especially Joseph Sawe, Lawrence Nduva, Richard Orengo, Hamisi Mwanguni, Dr. Peninah Mbuva, Frida Gakii,, Morris Githui ,Dr. Steve Lelegwe, Dr. Anthony Githinji among others. Further, I wish to thank the entire staff of the Department of Open Learning for their support and timely dissemination of information about fees payments, timetables and any change of program that occurred during this endeavor.

I am deeply indebted to many others whom I have consulted in the course of preparing this thesis. Thank you for being supportive and co-operative in various ways. Last but not least I acknowledge the invaluable contribution of my family members in different ways especially for creating a conducive environment for learning during my studies and other sacrifices they made to ensure I get quiet time for my private studies every evening.

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ABBREVIATIONS AND ACRONYMS

ACI	**-**	Airport Council International
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AMEs	**-**	Aircraft Maintenance Engineers licensing
AMOs	**-**	Aircraft Maintenance Organizations
AOCs	**-**	Air Operators Certificates
AQP	**-**	Alternative Qualification Program
ATAG	**-**	Air Transport Action Group
ATOs	**-**	Aviation Training Organizations
ATQP	**-**	Alternative Training and Qualification Programme
AU	**-**	African Union
CAA	**-**	Civil Aviation Authority
CASA	**-**	Civil Aviation Safety Authority
CIS	**-**	Commonwealth of Independent States
DoD	**-**	Department of Defense
DASSR	**-**	Directorate of Aviation Safety and Security Regulation
EASA	**-**	European Aviation Safety Agency
FAA	**-**	Federal Aviation Administration
GDP	**-**	Gross Domestic Product
IATA	**-**	International Air Transport Association
ICAO	**-**	International Civil Aviation Organization
JKIA	**-**	Jomo Kenyatta International Airport

KAA	**-**	Kenya Airports Authority
KCAA	**-**	Kenya Civil Aviation Authority
LCCs	**-**	Low-Cost Carriers
MIL	**-**	Military
MRO	**-**	Maintenance, Repairs and Overhaul
NAAs	**-**	National Airworthiness Authorities
NACOSTI	-	National Commission for Science, Technology and Innovation
PWC	**-**	PricewaterhouseCoopers
RBV	**-**	Resource based view
SARPS	**-**	Safety-related standards and recommended practices
SMS	**-**	Safety Management Systems
SPSS	**-**	Statistical Package of Social Sciences
SSA	**-**	Sub-Saharan Africa
STD	**-**	Standard
TLS	**-**	Target Level of Safety
UNECA	**-**	United Nations Economic Commission for Africa
UNESCO	**-**	United Nations Educational, Scientific, and Cultural Organization
US$	**-**	United States Dollar
USOAP	**-**	Universal Safety Oversight Audit Program
VIP	**-**	Very Important Person
WSG	**-**	Worldwide Slot Guidelines

ABSTRACT

The purpose of conducting this study was to determine the influence of aviation safety standards on performance of air transport in Kenya and the extent to which this influence is moderated by monitoring and evaluation process. The objectives of the study were to establish how: compliance with aviation training standards, compliance with aircraft airworthiness certification process standards, compliance with resolution of safety concern standards, compliance with airport infrastructure standards influences performance of air transport in Kenya. Further, the combined influence of compliance with aviation safety standards on performance of air transport in Kenya was determined and lastly, the extent to which the relationship between compliance with aviation safety standards and performance of air transport is moderated by monitoring and evaluation process was established. Descriptive cross-sectional survey and correlational research design within a pragmatic paradigm to support a mixed method approach on a sample size of 224 respondents selected using Research Advisor Table from a target population of 269. The respondents comprised of Kenya Civil Aviation Authority staff there after referred to as regulators and air operators. Data were collected using semi-structured questionnaires, interview guide, and observation guide and document analysis. Responses in the questionnaires were analyzed by use of a computer Statistical Package for Social Science (SPSS) version 20.0 Program. Descriptive statistics were analyzed using frequencies, percentages, mean and standard deviation whereas inferential statistics were analyzed using Pearson's Product Moment Correlation analysis(r) and multivariate regression analysis was used to test the relationship between variables. F-test was used to test the hypotheses. Tests of statistical assumptions were carried out before analysis. Results for objective one indicate $r = 0.401$, $R^2 = 0.160$, $F(3.163)=10.034$ at $P = 0.001 < 0.05$, therefore, H_0 was rejected and concluded that aviation training standards significantly influence performance of air transport. For objective two $r = 0.316$, $R^2 = 0.100$, $F(5.349)= 6.288$ at $P = 0.000 < 0.05$, therefore, H_0 was rejected and concluded that aircraft airworthiness certification process standards, significantly influence performance of air transport. For objective three $r = 0.354$, $R^2 = 0.126$, $F(6.929)= 7.963$ at $P = 0.000 < 0.05$, therefore, H_0 was rejected and concluded that resolution of safety concern standards, significantly influence performance of air transport. For objective four $r = 0.276$, $R^2 = 0.076$, $F(4.007)= 4.918$ at $P = 0.004 < 0.05$, therefore, H_0 was rejected and concluded that, aircraft infrastructure standards significantly influence performance of air transport. For objective five $r = 0.776$, $R^2 = 0.587$, $F(8.044)= 9.203$ at $P = 0.000 < 0.05$, therefore, H_0 was rejected and concluded that, combined aviation safety standards significantly influence performance of air transport. For objective seven $r = 0.427$, $R^2 = 0.182$, $F(10.854)= 11.870$ at $P = 0.000 < 0.05$, therefore, H_0 was rejected and concluded that the strength of the relationship between aviation safety standards and performance of air transport significantly depend on monitoring and evaluation process. The study findings therefore indicate that performance of air transport depends heavily on aviation safety standards. Therefore issues revolving around compliance with aviation safety standards need to be given urgent attention. It is recommended that competency based training for aviation personnel, continuous monitoring and evaluation, provision of expansion space and construction of additional aircraft runway in all airports need to be prioritized as a strategy to improve performance in air transport. Further research can be conducted on human factor and compliance with aviation safety standards.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Air transport and the entire aviation industry play a vital role in the globalized world economy. It facilitates the growth of international trade, tourism and international investment by connecting people across continents. The aviation industry itself is a major direct generator of employment and economic activity in airline and airport operations, aircraft maintenance, air traffic management, head offices and activities directly serving air passengers, such as check-in, baggage handling, on-site retail, cargo and catering facilities (Air Transport Action Group-ATAG, 2014). Airlines around the world carry over three billion passengers a year and 50 million tons of freight. Providing these services generates 8.7 million direct jobs within the air transport industry and contributes $606 billion to global Gross Domestic Product (GDP). Airports Council International (ACI) projects that 9 billion passengers will use air transport each year by 2025(Layton, 2012).

While air transport is among the safest means of transport, risk is a constant reality as is true of any human activity and in effect aviation operations are prone to accidents (Larcel, Steckel, Mondello, Carr, & Patankar, 2011). A key factor to maintaining the vitality of civil aviation is to guarantee safe, secure, efficient and environmentally sustainable operation at the global, regional and national levels (Dillingham, 2007; Ombasa & Ngugi, 2014). The global nature of the aviation industry and the complex and dynamic aviation environment requires that aviation regulators, air operators, and service providers cooperate to maintain a safe air transport system (Dannatt, 2006). In 1992, during the 29th Session of the International Civil Aviation Organization (ICAO) Assembly, a concern was on the apparent inability of some Contracting States to carry out their safety oversight functions. Major reasons cited for this included lack of regulatory, Technical and financial resources to carry out the minimum requirements of the Chicago Convention. As a result, the Assembly adopted Resolution A29-13: Improvement of Safety oversight, reaffirming individual State's responsibilities for safety oversight as one of the tenets of the Convention and calling on Contracting States to reaffirm their safety oversight obligations under the Chicago Convention (ICAO, 2006). The ICAO aviation standards and recommended practices is the cornerstone of safety and are mandatory for all contracting states (Durge, 2011). It is worth noting that safety is built on proper attitudes and requires good communication as noted by Foyle (2007).

Several authors have come up with different definitions of the word safety although all mean the same. Manuele (2003) and (Reason, 2001) define safety as that state at which risks are termed to be acceptable while Maguire (2006), notes that the term safety is derived from the Latin ‘salvus’, which means ‘uninjured’. Safety according to the United Stated (US) Department of Defense is freedom from those conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment (DoD MIL-STD-882D, 2000). Redmill & Rajan (1997) further define safety as a state where the perceived risk is acceptably low. Safety can therefore be defined as a state in which the risk of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management. Aviation safety is becoming more important with the increasing demand for transport by air of both passengers and cargo (Lu, Wetmore & Przetak, 2006).

Aviation safety is the concern of the whole world whose importance is unanimously recognized (Franke & John, 2011). While air transportation is by far the safest mode of travel, as measured by the ratio between the number of accidents and that of passenger/ kilometers, it is susceptible to inherent risks of flight, the use of force, and, more dangerously, terrorist acts (Beer, 2005). The ICAO Air Navigation Commission defined “aviation safety” as the state of freedom from unacceptable risk of injury to persons or damage to aircraft and property” (ICAO, 2001). Liou, J., Yen, L.,& Tzeng, G. (2008). contends that improving air safety has always been the top priority for the airline industry, and having an acceptable air safety record is important to an airline’s growth and success. Safety problems in aviation can be seen as developing when there is a disparity between the demands of the operational task to be performed (that is the flight) and the various factors and support systems which manage these flight risks(Civil Aviation Safety Authority

{CASA},2008). Safety improvement measures are introduced usually to address the identified safety concern (Yueh-Ling, Wen-Chin,& Kuang-Wei, 2010). Due to the nature of the aviation industry, total elimination of accidents or serious incidents is unachievable (Ombasa & Ngugi, 2014). Ranging from operational safety to the prevention of terroristic attacks, safety is a central issue in the aviation industry (Dragomir, 2013). With statistics such as one fatality per 7.1 million air passengers, Michaels and Pasztor (2011) establish that the year of 2011 was by far the best year commercial aviation worldwide ha s encountered regarding safe air travel. Aviation in general is considered to be the safest mode of transportation (Oster, Strong & Zorn, 2013).). According to Moses, N. & Savage, I. (1990) and Flannery (2001) safety is reflected upon as the absence of an accident. Safety is difficult to measure, thus most scientific literature agrees upon using the number of accidents as proxy for measuring safety (Oster et al., 2013; Barnett, 2000; Lofquist, 2010). Even though the airline industry is considered safe, accidents still happened.

ICAO's Safety Report (2014), notes that, while Africa accounted for the lowest percentage of global traffic volume at only 2%, it had the highest regional accident rate at 10% of the global share. Cognizant of the major challenges that Africa faces related to aviation safety, several programs have been developed and implemented by various aviation stakeholders among notable programs developed by ICAO is the Comprehensive Regional Implementation Plan for Aviation Safety in Africa (AFI Plan) established in January 2008 with the aim to support African States in addressing aviation safety deficiencies (Liou et al. ,2008). According to the Global Safety Information Exchange (GSIE) rating contained in the ICAO Safety Report (2014), runway safety related events which include abnormal runway contact, bird strike, ground collision, ground handling, runway excursion, runway incursion, loss of control on ground, collision with obstacle(s), undershoot/overshoot and aerodrome represented 68% of the total number of accidents, 78% of fatal accidents and 80% of all fatalities in 2013.There is need to define performance based on the operationalization of terms in the current study as indicated in 1.1.1.

1.1.1 Performance of Air Transport

The performance of Air Transport has been measured using different parameters by different scholars. For example, Geoffrey (1998) defines a set of aviation performance indicators as accessibility to desired destinations through air transportation, accessibility to airport system, cost effectiveness of air transport, industry sustainability, air transport safety and security and customer satisfaction among other things. The United States Department of Energy (1995) found in Mokaya, Chocho, and Kosgey (2009) also defined a set of system performance indicators, including; system delays, flexibility, predictability, reliability and availability. These indicators have been used to define performance measurement criteria for the civil aviation industry within their states. Aviation performance assessment is for the purpose of improving system operations, determining progress against strategic goals as an integral part of performance-oriented management, to diagnosing constraints within the system and to ascertain the general health of the system (Learmount, 2006). The global nature of the aviation industry, the complex and dynamic aviation environment requires that aviation regulators, air operators, and service providers cooperate to maintain a safe air transport system (Dannatt, 2006; Lu et al., 2006).

In this study, performance is operationalized to mean the increment or decrease in aviation operators, increase or reduction in number of air accidents, on time performance (OTP) for scheduled flights, fleet growth, training of staff, frequency of oversight surveillance and routine audit of AMO's. The assumption behind this definition is that any positive change on these indicators will lead to positive performance of the air transport and vice versa. The year 2015 was termed as an extraordinarily safe year when it came to aviation's safety performance in terms of the number of fatal accidents (Global Claims Review, 2015). The International Air Transport Association (IATA) (2016) released data for the year 2015 safety performance of the commercial airline industry. The data revealed that in 2015 the global jet accident rate which is measured in hull losses per 1 million flights was 0.32, which was the equivalent of one major accident for every 3.1 million flights. However, this performance was not as good as the rate of 0.27 achieved in 2014 but notably a 30% improvement compared to the previous five-year rate (2010-2014) of 0.46 hull loss accidents per million jet flights (IATA, 2016).

In 2015, IATA recorded four major accidents all of which involved turboprop aircraft resulting in 136 passenger fatalities (IATA, 2016). This compares with an average of 17.6 fatal accidents and 504 fatalities per year in the previous five-year period (2010-2014). In the same year, the jet hull loss rate for members of IATA was 0.22 (one accident for every 4.5 million flights), which outperformed the global rate by 31% and which was in line with the five-year rate (2010-2014) of 0.21 per million flights but above the 0.12 hull loss rate achieved in 2014. However two tragedies that occurred in 2015 which are, the loss of German wings 9525 through pilot suicide and Metrojet 9268 in suspected terrorist attacks resulted in the deaths of 374 passengers and crew. The two tragedies are not, however, included in the accident statistics as they are classified as deliberate acts of unlawful interference (Global Claims Review, 2015; IATA, 2016).

IATA (2016) compared safety statistics for 2015 and 2014 and also for the previous 5 years beginning 2010-2014. In 2015, IATA (2016) asserts that more than 3.5 billion people flew safely on 37.6 million flights, in which 31.4 million flew via jet while remaining 6.2 million via turboprop airplanes. The year 2015 had; a total of 136 fatalities compared to 641 fatalities in 2014 and the five-year average of 504; 68 accidents of all aircraft types which was down from 77 in 2014 and the five-year average of 90 per year; four fatal accidents again of all aircraft types in comparison to 12 in 2014 and the five-year average of 17.6; of all accidents only 6% were fatal which was below the five-year average of 19.6%; and 10 hull loss accidents involving jets compared to 8 in 2014 and the five-year average of 13 per year.

Statistics presented by IATA (2016) on Jet hull loss rates by region of operator revealed all regions but one that is North America saw their safety performance improve in 2015 compared to the respective five-year rate 2010-2014. The improvements per region compared to a five-year rate of 2010-2014 are as follows: Africa (3.49 compared to a five-year rate of 3.69), Asia-Pacific (0.21 compared to 0.56), Commonwealth of Independent States- CIS (1.88 compared to 3.14), Europe (0.15 compared to 0.18), Latin America and the Caribbean

(0.39 compared to 0.92), Middle East-North Africa (0.00 compared to 1.00), North America (0.32 compared to 0.13), North Asia (0.00 compared to a 0.06).

IATA (2016) statistics further revealed that the world turboprop hull loss rate improved to 1.29 hull losses per million flights in 2015 compared to 3.95 in the five years 2010-2014. The following regions saw their turboprop safety performance improve in 2015 when compared to the respective five-year rate: Africa (4.53 compared to a five-year rate of 18.20); Asia-Pacific (2.07 compared to 2.36); CIS (0.00 compared to 17.83), Europe (0.00 compared to 1.63); Latin America and the Caribbean (0.00 compared to 5.38), Middle East-North Africa (0.00 compared to 13.88); North America 0.51 compared to 1.38). The statistics further showed that North Asia region had the worst performance (25.19 compared to 5.90), reflecting two regional hull losses, one of which was fatal.

In Africa, although IATA (2016) affirms that African aviation safety is moving toward the right direction with the year 2015 seeing improvements compared to the 2010-2014 five-year accident rates for both jet and turboprop aircrafts. Globally Africa remains lowest in the performance of air transport in terms air safety. African Governments need to accelerate implementation of ICAO’s safety-related standards and recommended practices (SARPS), according to the Universal Safety Oversight Audit Program (USOAP). By the end of January 2016, only 21 African States, Kenya included, had accomplished at least 60% of implementation of the SARPS (IATA, 2016). Performance in the current study is defined as increase in the number of registered air operators, reduction in of reported air accidents, and adherence to time schedule, fleet growth, continuous staff training, frequent oversight surveillance and routine audit of Approval Maintenance Organizations

1.1.2 Compliance with Aviation Safety Standards

The complexity of today’s aviation environment requires that safety improvements move beyond simple compliance through prescriptive rules. The new compliance philosophy requires each organization to identify multiple avenues to compliance that suits their unique needs and come with an approach that allows both the inspectors and those being inspected work together to see how supervisee processes and practices are quantifying and improving safety (Johnson, 2016). It is a policy to comply with all laws, rules and regulation that are related to aviation safety in the individual states in the United States. This is done through numerous policies and procedures that are reviewed regularly and updated as deemed necessary as related to certification procedures. Continuous monitoring is done by operators on pending regulations so that associated policies and procedures can be modified to maintain compliance as required (Southwest Airline Report, 2012).

Safety is concerned with protecting human beings from injury or death, including indirect effects resulting from environmental damage. The use of standards has become a vital part in regulating any industry where the operations can affect safety (Yueh-Ling, Wen-Chin & Kuang-Wei, 2010). People can be affected directly or indirectly through the environment. In order to ensure safety, there exist a large number of standards dealing with safety issues (Sobieralski, 2013). In 1944, a specialized agency of the United Nations, the International Civil Aviation Organization (ICAO) was created to promote the safe and orderly development of international civil aviation throughout the world (ICAO, 2012). The organization is responsible for facilitating collaboration in the development of international civil aviation Standards and Recommended Practices (SARPs) and ensuring harmonized application of the SARPs to facilitate the continued growth of aviation (ICAO, 2013). ICAO sets the Standards and Recommended Practices necessary for aviation safety, security, efficiency and environmental protection on a global basis (Oderman, 2002; Squalli and Saad, 2006). It serves as the primary forum for co-operation in all fields of civil aviation among its 191 Member States of which Kenya is a member.

Ranter (2004) contends that the survival of any country's aviation industry is dependent on its ability and authority to fly into other countries' airspace. This 'privilege' must be earned and maintained through adherence to procedures, safety standards and training standards, as well as pro-active safety programmes. Accordingly, these procedures and standards need to be aligned with international regulations, in accordance with, amongst others the International Civil Aviation Organisation (ICAO) (Beer, 2005; Reiling, 2005). The main objective of ICAO, which was created with the signing of the Convention on International Civil Aviation at Chicago on 7 December 1944, is to ensure safe, regular, efficient, and economical air transport. Its mechanisms of achieving this goal are a comprehensive series of international rules (standards and recommended practices), which member states agree to follow (ICAO, 2012). All standards and recommended practices are periodically reviewed and revised, as necessary, to keep abreast with technological and other developments affecting the aviation industry (Learmount, 2004; Reiling, 2005; Partridge, 2003). ICAO's vision is the safe, secure and sustainable development of civil aviation through cooperation amongst its member States (ICAO, 2001; 2005).

There are also other international organisations to which a country must align its standards, such as the International Air Transport Association (IATA), which was established in 1945. It is the prime vehicle for inter-airline co-operation in promoting safe, reliable, secure and economical air services for the benefit of the world's consumers (IATA, 2005). Code-share agreements between airlines also provide certain authorization and benefits to airlines, subject to the adherence (and proof) of safe procedures. The host country must be convinced that an airline wanting to operate there, adheres to all relevant safety requirements set by ICAO (amongst others), as well as the host country's own requirements. This provides the authorization to operate in another country. ICAO contracted countries carry out surveillance inspection on foreign airline carriers, flying into their airspace and airports, to evaluate their ability to comply with safety standards.

Beer (2005) in his thesis on 'developing an aviation safety strategy' gives an example of the USA's Federal Aviation Authority (FAA), which launched an International Safety Assessment Programme (IASA) in August 1992. McSweeny (2000) and Chalmers (2005) state that the purpose of the IASA programme is to assess and ensure that all foreign air carriers operating to or from the USA are properly licensed, with oversight provided by a competent civil aviation authority (regulatory authority), in accordance with ICAO standards. Results of IASA assessments up to February 1998 revealed that a substantial number of countries were not fully complying with ICAO standards. The deficiencies from the results included elements such as: inadequate regulatory legislation; shortage of experienced airworthiness staff; lack of control on important airworthiness related items; inadequate proficiency check procedures; inadequately trained cabin attendants; and lack of, or shortage of, adequately trained flight operations inspectors. The IASA programme results depicts that a country must provide proof that, amongst other things, it has an effectively functioning civil aviation authority (regulatory authority) before its airlines are allowed to fly into any country's airspace (Beer, 2005; Conlyn, 2003; Baissac, 2005; Learmount, 2004). Compliance to aviation safety standards in this study is operationalized to mean conformity to aviation standards that concern training, certification, and resolution safety concern as well as airport infrastructure.

1.1.3 Monitoring and Evaluation Process

Monitoring and evaluation is a process that helps program implementers make informed decisions regarding program operations, service delivery and program effectiveness using objective evidence. It involves an on-going and routine gathering of information that is used to asses if the program is on track by focusing on program efficiency on use of resources and the extent to which the program has reached its objectives in terms of outputs (program activities) and outcomes and impact on the intended population. Monitoring and evaluation (M&E) is a process that helps improve performance and achieve results. Its goal is to improve current and future management of outputs, outcomes and impact. It is mainly used to assess the performance of projects, institutions and programs set up by governments, international organizations and NGOs (Conyers and Huls, 2013). Monitoring and evaluation falls under the control function of project management. It provides regular feedback that helps the organization track costs, personnel, implementation time, and organization development, economic and financial results and compare what was planned to actual performance (Emanuel, 2015). Evaluation is a systematic process that attempt to determine objectively relevance, efficiency effectiveness and impact of the activities in relation to objectives intended to achieve so as to provide insights to the future performance of the program. Monitoring and evaluation mechanisms are integral part of aviation safety program. The set standards must be adhered to in order to ensure safety and security of air transport users, cargo and environment. A Monitoring and evaluation mechanism in this study means the continuous process of information gathering, analyzing and disseminating the information for corrective action. Monitoring and Evaluation mechanisms are the practical ways used for information gathering. The areas of focus include: development of M&E work plan, designing M&E indicators, engaging in site visits, Stakeholder meetings and presentation of terminal report (Rooyen, 2013). A monitoring and evaluation (M&E) plan describes how the whole M&E system for the program works. This includes the indicators, who are responsible for collecting them, what forms and tools will be used, and how the data will flow through the organization. Data collection on deficiencies, analysis and dissemination refer to the whole research process. Lastly, sustainability of corrective actions will be defined through trend analysis to quantify the behavior of the organizations as far as carrying on with the corrective actions are concerned for a period of time.

1.1.4 Air Transport in Kenya

Air transport in Kenya does not operate in isolation but it is linked to other international Aviation industries. Kenya is number four in Africa and number one in East Africa in air transport development (Abbamonte, 2013). Kenya has three international airports in Nairobi, Mombasa, and Eldoret and four main domestic airports at Wilson, Malindi, Kisumu, and Lokichogio (Irandu, 2006). Air transport has, in the recent past, gained popularity among the residents of Kenya and is no longer considered as a reserve for rich foreigners and senior government officials (Irandu, 2006). There are new trends in the country, as elsewhere in Africa, which will create opportunities for aviation to thrive. Currently, domestic air transportation in Kenya serves the tourism industry by transporting tourists to and from Mombasa, Nairobi and other tourist sites such as the Maasai Mara, Mt. Kenya, Malindi, Western Kenya and Lake Turkana region Air passenger services are operated to and from Nairobi, Mombasa, Kisumu, Eldoret, Malindi, Lokichogio and Maasai Mara among other destinations. The growth of air traffic in Kenya after independence has led to rapid development of airport infrastructure. Numerous airports and airstrips have been developed. Today, the country has about 568 aerodromes spread all over the country, including national parks and game reserves. About 160 of them are public aerodromes manned by Kenya

Airports Authority (KAA), a parastatal that was established by an Act of Parliament in 1991 (KAA, 2015). There are different categories of airports, with each having different requirements for communications, navigation, surveillance and air traffic management facilities and equipment (Irandu, 2006).

Although Air transport in Kenya has grown tremendously in the last two decades, there are some factors such as industry competitiveness and many others that affect the transportation business in aviation industries in Kenya, the costs of running such business is enormous (Kamau, 2015). According to the Kenya Transport Sector Support Project (2013), the aviation industry in Kenya has recorded major growth over the last 10 years. For instance, in 2004, about 5.5 million passengers were handled at Kenyan airports. This figure rose to 6.9 million in 2009 and to 8.6 million in 2012. The growth and increased importance of the aviation sector in the development of Kenya can be attributed to Kenya Civil Aviation Authority-KCAA's safety oversight and regulatory functions.

In October 2004 ICAO adopted the comprehensive systems approach for audits conducted under USOAP (KCAA, 2016, ICAO, 2013). This broadened the ICAO Oversight Audit Programme to cover all safety related ICAO SARPs. In an effort to improve safety, KCAA started undertaking various safety measures including a review of legislation related to safety. KCAA developed all the relevant safety regulations and guidance materials and recruited and trained flight safety inspectors. KCAA will undertake a continuous implementation of the Corrective Action Plans agreed after audits to improve the level of compliance (KCAA, 2016).

According to the Ministry of Transport (2013), Air Accident Investigation records reveal that aircraft accidents have continued to rise despite Kenya Civil Aviation Authority having strengthened its safety oversight by recruitment, training, developing safety procedures and enforcement. A number of safety oversight program have also been conducted by US Federal Aviation Administration (FAA) through its program Safe Sky for African initiative and World Bank to both the aviation regulator and the industry (Ministry of Transport, 2013).

Kenya has experienced a number of air accidents particularly with light aircrafts and helicopters in the recent years, and preventing accidents has remained a major challenge (Ombasa and Ngugi, 2014). Even though Kenya is experiencing challenges in terms of air accidents, the growth of air transport evidenced by increased number of passengers through the airports, increase in number of operating aircrafts, increased license registrations and increased importance of the aviation sector in the development of Kenya cannot go unnoticed. There is need for a study to understand the underpinning relationships between compliance to aviation safety standards and performance of the air transport industry in Kenya, and also the moderating influence of monitoring and evaluation process on the two variables.

1.2 Statement of the Problem

Globally, air transport has achieved a remarkable safety record, with fewer than 4 accidents experienced per million departures worldwide (Roelena & Klompstraa, 2012). Nonetheless, runway-related event categories consistently represent a large percentage of accidents on a yearly basis. According to Roelena & Klompstraa (2012), improvements in aviation safety such as runway safety is essential for achievement of the overall objective of continually reducing the global accident rate, as well as related fatalities. ICAO adopted a new Training Policy in 2010 to better support implementation and standardization efforts through courses, workshops and seminars on emerging issues. The organization has also implemented a more formal assessment process addressing the following critical areas affecting the provision of effective aviation training: organizational and official certifications, facilities and technology supporting training, training delivery, instructor qualification, training design and development, training quality systems as an effective tool to implement competency-based and cost effective training (ICAO, 2014).

In Kenya, the Kenya Transport Sector Support Project (2013) affirms that the aviation industry has recorded major growth over the last 10 years. For instance, in 2004, about 5.5 million passengers were handled at Kenyan airports. This figure rose to 6.9 million in 2009 and to 8.6 million in 2012. However it is worth noting that Kenya has experienced a number of air accidents particularly with light aircrafts and helicopters in the recent years, and preventing accidents has remained a major challenge (Njeru, 2015; Ombasa and Ngugi, 2014). Even though Kenya is experiencing challenges in terms of air accidents, the growth of air transport evidenced by increased number of passengers through the airports, increase in number of operating aircrafts, increased license registrations and increased importance of the aviation sector in the development of Kenya cannot go unnoticed. The growth and overall performance in the air transport industry can be attributed to KCAA's safety oversight monitoring and regulatory functions. There is desire to establish the influence of compliance with aviation safety standards and performance of the air transport industry in Kenya and also the moderating influence of monitoring and evaluation process on the two variables.

A few studies attempting to shade some light on the subject under study are more general or give limited insights and analysis on the influence of compliance with aviation and performance of air transport in Kenya and how this is influence by the moderating variable monitoring and evaluation process. In her study Njeru (2015) attempted to establish factors influencing aviation safety in Kenya where she focussed on the activities of Kenya Civil Aviation Authority. The study established that professional qualification has a major effect on aviation safety at the KCAA as the authority had few qualified technical inspectors and technical safety staff in the safety management system. The study also revealed that the percentage of training execution in the organization was very low as the organization was somewhat committed towards staff development. The recruitment and retention policy were not efficient and it had a negative effect on the morale of the safety officers subsequently compromising the overall safety of the industry.

In their study, Mokaya and Nyaga (2009), sought to find out the challenges experienced in the successful implementation of Safety Management Systems (SMS) in the Aviation Industry in Kenya. The study findings revealed an unsatisfactory implementation of SMS as per the ICAO standards. The implementation was mainly affected by a weak safety culture, inadequate human capacity, lack of clear policy guidelines, poor management support and commitment. The results manifested a weak institutional implementation capacity which required immediate attention. Further the study found that players in the aviation industry did not have documented safety management systems and had no defined roles in implementation. Therefore, implementation was below the prescribed ICAO standards.

Ombasa and Ngugi (2014) carried out an empirical study to determine the effects of reporting safety concerns on aviation safety in the general aviation industry a case study of Wilson Airport Kenya. The findings revealed that the organizational commitment on reporting systems was the most significant factor that affects aviation safety, followed by the level of implementation of reporting systems at Wilson airport. The study focused on employees working at Wilson airport and how their organizations handled aviation safety occurrences. The results suggested an improvement on the level of implementation of reporting systems and organizational commitment on reporting systems, however there is need to further improve aviation safety.

A number of scholars in their studies related to the air transport industry in Kenya did not delve into the moderating influence of monitoring and evaluation process on the relationship between compliance with aviation safety standards and performance of the air transport in Kenya. Some of the studies include; Mwikya (2013) who established the relationship between relational factors and on-time service delivery at Kenya Airways, Wang'ondu (2009) established factors affecting customer satisfaction in airline industry with reference to Kenya Airways Ltd and Kamau (2015) studied factors affecting strategic choices in airlines in Kenya focusing on Kenya Airways. Looking at areas of interest in these studies, there is a clear indication that there is a scarcity of published work on compliance with aviation safety standards and performance of the air transport industry, particularly in the context of developing countries in the dynamic African region and specifically in Kenya. Equally, there is paucity of information on the moderating effect of, monitoring and evaluation process on the relationship between compliance with aviation safety standards and performance of air transport.

Therefore this study was grounded on hypothesis theory that, it is compliance with aviation safety standards that enhances performance of the air transport industry in Kenya and for the strength of the relationship between compliance with aviation safety standards and performance of the air transport industry to be rigorously established the moderating influence of monitoring and evaluation process must be determined. This was therefore the focus of this study.

1.3 Purpose of the Study

The purpose of this study was to establish the influence of compliance with aviation safety standards and performance of air transport in Kenya, and how this influence is moderated by monitoring and evaluation process used by regulators with a view to come up with findings and recommendations that will address M&E issues in the air transport and the paucity of literature in aviation safety standards, monitoring and evaluation process and performance of air transport.

1.4 Objectives of the Study

The study was guided by the following objectives;

i) To establish how compliance with aviation training standards influence performance of air transport in Kenya.

ii) To determine how compliance with aircraft airworthiness certification process standards influence performance of air transport in Kenya.

iii) To establish the extent to which compliance with resolution safety concern standards influence performance of air transport in Kenya.

iv) To determine how compliance with aircraft infrastructure standards influence performance of air transport in Kenya.

v) To determine the combined influence of compliance with aviation safety standards on performance of air transport in Kenya

vi) To establish how monitoring and evaluation process influence performance of air transport in Kenya

vii) To establish the extent to which the influence of compliance with aviation safety standards on performance of air transport is moderated by monitoring and evaluation process.

1.5 Research questions

The study sought to answer the following questions:

i) How does compliance with aviation training standards influence performance of air transport in Kenya?

ii) How does compliance with aircraft airworthiness certification process standards influence performance of air transport in Kenya?

iii) To what extent does compliance with resolution safety concern standards influence performance of air transport in Kenya?

iv) How does compliance with aircraft infrastructure standards influence performance of air transport in Kenya?

v) How does combined compliance with aviation safety standards influence performance of air transport in Kenya?

vi) How does Monitoring and Evaluation Process influence performance of air transport in Kenya

vii) To what extent is the influence of compliance to aviation safety standards on performance of air transport is moderated by monitoring and evaluation process?

1.6 Research Hypothesis

This study was guided by the following research hypotheses which are based on the study objectives

i) **H_1:** Compliance with training standards has a significant influence on the performance of air transport in Kenya significantly.

ii) **H_1:** Compliance with aircraft airworthiness certification process standards has a significant influence on performance of air transport in Kenya

iii) **H_1:** Compliance with resolution safety concern standards has a significant influence on performance of air transport in Kenya.

iv) **H_1:** Compliance with airport infrastructure standards significantly influences performance of air transport in Kenya

v) **H_1:** There is significant relationship between combined compliance with aviation safety standards and performance of air transport in Kenya.

vi) **H_1:** Monitoring and evaluation process has a significant influence on performance of air transport in Kenya.

vii) **H_1:** The strength of the relationship between compliance with aviation safety standards and performance of air transport in Kenya significantly depends on monitoring and evaluation process.

1.7 Significance of the Study

The findings from the study would be useful to airline management by revealing the importance of monitoring and evaluation process in the performance of air transport in Kenya. Compliance with aviation safety standards should be monitored and evaluated constantly using approved M&E processes. It also informs management on appropriate safety standards. The findings of the study would make significant contributions to theory, research and practice in regard to air transport and bridge the gap between theory and practice. The findings of the study informs decision makers on the strategies to guide the development of an effective air transport industry in Kenya.

Kenya Civil Aviation Authority (KCAA) the regulator and the policy makers could use the findings as reference for policy guidelines on development and management of air transport in the country. They would be able to use the findings of the study to formulate viable policy documents that effectively would cope with the barriers and challenges faced while enforcing aviation safety standards. Based on the findings, recommendations are made. If followed, these recommendations would be useful to administrators and policy makers in monitoring and evaluation of aviation safety standards. Findings of the study would be of assistance to Kenya Civil Aviation Authority (KCAA) in setting the safety standards that airlines should work towards meeting if our airlines are to fly safe and also for the improvements in service delivery in the industry. The use of M&E process would assist in ensuring compliant air transport operations and more critically, improve the level of safety and security measures under the modern day threat of terrorism and environmental hazards.

It is hoped that the study would contribute in building knowledge in the project management discipline and especially on monitoring and evaluation which is a key component of every project. This is because no successful project management can be achieved without a good monitoring and evaluation system. The study informs current and future aviation safety implementation in the air transport business especially in this digital era.

The study would provide additional information into the already existing body of literature regarding compliance to aviation safety standards, monitoring and evaluation and performance of air transport in Kenya. The findings of this study would enrich existing knowledge and hence will be of interest to both researchers and academicians who seek to explore and carry out further investigations. It provides basis for further research.

1.8 Delimitation of the Study

The study was delimited to establishing the moderating influence of monitoring and evaluation process on the relationship between compliance with aviation safety standards and performance of the air transport industry in Kenya. The moderating monitoring and evaluation process factors include; Preparation of M&E work plans, Data collection on deficiencies, Analysis of deficiencies and sustainability of Corrective action. Also the influence of these factors on performance of the air transport industry in Kenya was also studied.

The study was made successful by easy access of respondents by researcher in gathering information regarding the proposed title. The study was also grounded on a well-researched literature review. The study focused on the compliance with aviation safety standards, monitoring and evaluation process and performance of the air transport industry in Kenya. The respondents were the air operators in Kenya and the air transport regulator that is the

Kenya Civil Aviation Authority, who were sampled and supplied with questionnaires with the aim of getting their views regarding the subject matter of the study.

1.9 Limitations of the Study

In the course of the study, some of the challenges and constraints that were experienced included: limited availability of information and literature, inaccurate data, poor cooperation by respondents, gathering and interpreting background research and difficulties with getting appointments with interviewees. The study handled the challenge by working extra hours so as to finish up the project in time. The problem of limited availability of literature when developing the background research was overcome by conducting extensive and detailed research from various sources such as aviation manuals, air transportation journals, monitoring and evaluation journals Kenyan journals, airlines newsletters, reports and websites. During the course of this study, a continuous, detailed and meticulous research was carried out.

A number of limitations related to the research and especially in data collection were also experienced. However, the limitations did not in any way have a significant interference in the outcome of this study. Some of the respondents involved in the study found it difficult to fill the research questionnaire fearing that giving the information might jeopardize their jobs or may get victimized later. This was tackled by assuring the respondents that the information given would not be divulged and would only be used for academic purpose. The respondents were also asked not to indicate their names or organizations names in the questionnaires.

Given the sensitivity surrounding air transport, the researcher was not able to control the respondent's attributes such as self-reported regulation, attitude, level of education, and failure to respond to certain items in the questionnaire which might give limited information. To mitigate against this, the researcher triangulated the data collection instruments by including questionnaires, interview guides, observation guide and document analysis to minimize weakness in one instrument and beef up the questionnaire. Mixed method approach, pragmatism, cross-sectional and correlational design was adopted to manage the limitations. Due to limited time, resources and logistics, the study only covered the opinions and responses of sampled respondents.

There were some uncooperative respondents who were unwilling to participate in the study. This challenge was minimized by assuring the respondents that no names of the participants were used in reference to the study since the purpose of the research is only for academic. The researcher also carried an introduction letter from the university as proof. Some respondents refused to be interviewed claiming they lack time and there was a challenge of getting most of the respondents in the offices to fill the questionnaires since they claimed to be in the field most of the time. The challenges were handled by leaving the questionnaire behind for respondent to fill and collected at an agreed later date as well as finding out the schedules of the respondent and trying to book appointments so as to complete the data collection procedures.

1.10 Assumptions of the Study

This study was based on the assumption that all the respondents would be responsive and conversant with the variables under study, appreciated the significance of the study and therefore provided required data to address the research problem. It was equally assumed that compliance with aviation safety standards and monitoring and evaluation process has an influence on performance of air transport industry in Kenya. Further, it was assumed that the relationship between compliance with aviation safety standards and performance of the air transport industry in Kenya would be effectively moderated by monitoring and evaluation process. Another assumption was that the respondents were easily accessible for the data collection. It was also assumed that the selected respondents cooperated and provided the required information honestly and objectively. Finally, it was assumed that the information obtained from this study would be very useful in highlighting the critical issues that need to be addressed to improve performance of air transport in Kenya.

1.11 Definitions of Significant Terms

Generally key concepts are usually developed through a process where some authors and scholars in distinct disciplines agree to give a phenomenon a particular name and meaning. The following are the key concepts that are used in the study.

Aircraft certification process : International obligations on implementation of processes and procedures to ensure aircraft are airworthy as per guidance materials and requirements.

Airport infrastructure: Refers to vital component of the overall air transportation network, number of runways as level one, level two or level three airports, aircraft ramp parking space, aircraft movement space and Facilities construction space.

Airworthiness: Refers to the measure of an aircraft's suitability for safe flight.

Air transport: Movement of people and goods by air.

Aviation Safety: Aviation safety is a term encompassing the theory, investigation, and categorization of flight failures, and the prevention of such failures through regulation.

Aviation Safety: The recommended practices for ensuring safe air transport in terms of training, certification, and resolution safety concern and airport infrastructure.

Aviation training: Collaboration in securing the highest practical degree of uniformity in regulations, standards, procedures and organization in relation to aviation basic training,

Customer satisfaction This is used to mean the users contentment with air transport service delivery as indicated by level of customer loyalty to the airline

Monitoring and evaluation process	. Monitoring and evaluation is a process that helps project implementers make informed decisions regarding program operations, service delivery and program effectiveness using objective evidence
Performance of Air transport	. Performance comprises the actual output or results of an organization as measured against its intended outputs (or goals and objectives).
Resolution of safety concerns	This is the provision for the identification of deficiencies of safety concerns and appropriate action required for resolution.

1.12 Organization of the Study

This study is organized into five chapters. Chapter one is introduction of the research which provides the background to the study, statement of the problem, purpose, objectives and research questions, hypotheses of the study, significance of the study, limitations, delimitation and the assumptions of the study, definition of significant terms and organization of the study. Chapter two of the study is the literature review which explores the existing literature relevant to the study as presented by various previous researchers, scholars', and authors. This chapter deals with the review of the relevant literature related to the study topic, theoretical underpinnings, conceptual framework, and summary of research gaps. Chapter three is research methodology. This chapter focuses on the research paradigm, research design, target population, sample size and sampling procedures, data collection instruments, validity and reliability of the instruments, data collection procedures, data analysis, ethical considerations and operational definition of study variables. Chapter four entails data presentation, analysis, interpretation and discussion. The final chapter that is Chapter five covers on summary of the findings, discussion, conclusions, recommendations and suggestions for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter explores the existing literature relevant to the study as presented by various researchers, scholars' and authors. The main focus is on the review of relevant literature regarding the influence of compliance with aviation safety standards and performance of air transport. Further, the moderating influence of monitoring and evaluation process on the relationship between compliance with aviation safety standards and performance of air transport is explored. Theoretical underpinning of the study and a conceptual framework upon which this study is hinged is also discussed. Identified gaps are documented at end of the chapter.

2.2 Performance of Air Transport

Air transport industry plays a major role in world economic activity. One of the key elements to maintaining the vitality of civil aviation is to ensure safe, secure, efficient and environmentally sustainable operations at the global, regional and national levels as this has a great influence on air transport performance (ICAO, 2015). Airline operational performance is impacted in the short-term both by individual carrier issues as well as externalities such as weather and air traffic control decisions (PricewaterhouseCoopers-PWC, 2014). Although 2013 on-time and flight cancellation performance declined compared with 2012's record-breaking performance, United States (US) air operators have measurably improved operating performance over the past five years. These improvements can be attributed in part to the impact of consolidation: as airlines have merged, carriers have removed capacity from the system and increased overall efficiency in their operations (Scuffham *et al*., 2002). Between 2008 and 2013, the number of domestic flights in USA decreased more than the number of domestic passengers driving increasing load factors. This reduced flying has created a better balance between runway and airspace supply and demand, reducing congestion delays and allowing airlines and airports to recover from disruptions and delays more quickly and with less passenger inconvenience (Franke and John, 2011).

Global Claims Review (2015) contends that the long term improvement in global airline safety which in turn has improved the overall air transport performance with time has been attributed to a combination of several drivers. Some of these improvement drivers include: aircraft have become more reliable while safety systems and culture have improved enormously; the standard of training of crew has become notably higher; improved air traffic control technology; and better collision avoidance systems have also impacted. The Global Claims Review (2015) further posits that more improvement drivers include: pilots at present having much more live information at their fingertips, including more accurate and up-to-date weather data; safety inspections now far more effective; aircraft inspections are much more detailed and stringent than in the past since they have been quick to integrate improved technologies. Adoption of improved technologies by aircraft inspectors and operators implies that challenges in aviation safety are increasingly being identified and dealt with long before they become significant issues. Another key safety improvement factor that has had significant impact in reducing accidents has been the increased use of recurrent training, which refreshes the skills of pilots and crew, as well as helping them prepare for unusual or emergency situations.

IATA (2016) identified the IATA's six-point safety strategy, which is a comprehensive data-driven approach to identify organizational, operational and emerging safety issues. The six-point safety strategy include: reducing operational risk such as loss of control in-flight, runway events and controlled flight into terrain; enhancing quality and compliance through audit programs; advocating for improved aviation infrastructure such as implementation of performance-based navigation approaches; supporting consistent implementation of Safety Management Systems; supporting effective recruitment and training to enhance quality and compliance through programs such as the IATA Training Qualification and Initiative; and identifying and addressing emerging safety issues, such as lithium batteries and integrating remotely-piloted aircraft systems (RPAS) into airspace.

A research paper by KPMG Africa (2012) highlights that Africa's air transport is limited compared to the rest of the world. The research paper reveals that in 2010, 62.6 million passengers were carried in Africa, half of which was in North Africa, compared to 457 million in the euro area, a region with less than a third of Africa's population. According to the African Union (AU) found in KPMG (2012), airport infrastructure which includes tracks, lanes and taxiways, parking spaces, and passenger and freight terminals, as well as air navigation facilities are in need of upgrading. Regularly, African airlines have old, poorly maintained and unsafe fleets. As at 2006, more than 20% of African aircraft were more than 30 years old while almost half of all aircraft were more than 20 years old. This makes operational costs high and presents a significant risk to those using the aircraft affecting performance of air transport in general.

Africa region is the poorest performer, with standards in some of the more remote parts of the continent, comparable to those of 50 years ago in the US or Europe. More than one-fifth of the world's air accidents occurred in Africa in 2011. In 2012, 88% of global aviation fatalities that occurred, were in Africa (45%) and Asia (43%). Africa currently uses the highest percentage of second generation aircraft, over 50% of the total fleet analyzed. Upgrading the airline fleet to current generation aircraft is one of the safety initiatives which have lowered the global accident rate. However, Africa was one of the regions which saw its safety performance improve last year compared to 2012 (Global Claims Review, 2015). The improvement in safety performance also improved the general performance of the air transport industry globally. This implies that improvement in air safety performance has a ripple effect on all aspects of air transport performance.

In Kenya, air transport is a success story than other transport sectors, and countries would do well to replicate (KPMG, 2012). The largest airline is Kenya Airways which is among the top three international carriers in Africa (KPMG, 2012). Kenya Airways has an extensive network across the continent and a safety record that is on par with international standards. In terms of airports, The Jomo Kenyatta International Airport (JKIA) in Nairobi is a major international gateway in Sub-Saharan Africa (SSA). Domestic air transport sector in Kenya is also thriving, and is the fourth-largest in SSA according to the World Bank after South Africa, Nigeria, and Mozambique. Key concerns that need to be addressed at the Kenyatta airport include capacity constraints (especially terminals and taxiways), and security issues. Upgrade for JKIA is underway, which will see the addition of a second runway and a new terminal, raising annual passenger capacity to 9.3 million. An improvement in airport security that leads to US Category 1 security clearance will allow for direct flights to the US (KPMG, 2012). To achieve optimal performance of air transport every organization need to invest in monitoring and evaluation of aviation safety standards as specified by ICAO to ensure that they are adhered to by all operators in the air transport sector. Compliance with aviation safety standards are discussed as independent variables in this study as indicated in the next section.

Air transport is by its very nature one of the most international of economic activities. Safety in air transportation requires shared responsibility. The increased sophistication of civil aviation systems at all regulatory levels national, regional, and international pose significant regulatory challenges, and safety measurements are likewise becoming more sophisticated (Norman, 2007). Air travel safety is usually expressed in accidents per 100,000 departures; the rate is now at .022 in the United States (Foyle, 2007).

Regionally in Africa, aviation in general, and more specifically aviation safety, seems much worse than elsewhere in the world (Beer, 2005). According to the United Nations Economic Commission for Africa-UNECA (UNECA, 2003), reform in civil aviation is urgently required. Factors that have hampered effective aviation services are amongst others the lack of cooperation between airlines and airspace regulatory authorities; the existence of the 53 independent countries which has led to the creation of more or less 53 non-physical barriers; lack of adequate training; lack of maintenance of infrastructure and equipment; lack of resources to improve safety and security; small markets; and interference of governments. Very few African airlines have the authorization to operate into Europe or the USA (Beer, 2005).

Ranter of the Aviation Safety Network (2004) asserts that the year 2003 was an extremely safe year for aviation. Despite this fact, Africa was again the most unsafe continent, with 28% of all fatal airliner accidents, while it accounts for only 3% of world aircraft departures. The 10-year average shows a continuous increase in the average number of fatal accidents in Africa over the last ten years, while there was a consistent decrease in all other continents. For example in the whole of 2003, Africa topped the league for serious accidents, suffering three fatal jet crashes (Learmont, 2004).

In 2015, although there were no passenger fatalities on jet transports, there were two accidents with jet aircraft which resulted in loss of life that is one in DR Congo involving a freighter aircraft with eight fatalities on the ground as a result from a runway excursion, one in Senegal whereby a passenger jet and a smaller jet conducting an air ambulance flight collided resulting to deaths of all 7 persons on board the air ambulance. Flight International (2004) reports that, although the first six months of 2004 were amongst the safest in history for Western-operated airlines, the worst single accident in terms of fatalities were in Africa. This involved African based operated airlines which resulted in the deaths of 148 passengers. The number of people who died in this accident constituted almost half of the total worldwide airline fatalities for the year 2004.

2.3 Compliance with Aviation Safety Standards and Performance of Air Transport

Air transport like any other business venture owes its success to the level of discipline that the regulatory bodies exert on the operators. Each state must adopt and enforce the required civil aviation legislation that incorporates all the responsibilities contained in the Chicago Convention for the civil aviation administration and all components of the air transport system. Each standard is discussed in the following sub-themes

2.3.1 Compliance with Training Standards and Air Transport Performance

Britannica (2016) notes that managing civil aviation training operations requires precise and flawless management of a variety of complex interrelated business processes. Airlines must therefore balance training time with operational time to ensure that pilots and crew maintain their skills and compliance with regulatory bodies. For training providers, the challenge of providing high-quality, affordable and timely training is further complicated by the diverse regulatory, qualification and curriculum requirements of their many customers (Britannica, 2016). The Advanced Qualification Program (AQP) seeks to integrate the training and evaluation of cognitive skills at each stage of a curriculum. For pass/fail purposes, pilots must demonstrate proficiency in scenarios that test both technical and crew resource management skills together. Air carriers participating in the AQP must design and implement data collection strategies which are diagnostic of cognitive and technical skills (Federal Aviation Administration- FAA, 2016).

Civil Aviation Authority-CAA (2014) emphasizes that the aim of an Alternative Training and Qualification Programme (ATQP), when approved by the Authority, is to allow an operator to establish training and qualification standards that are higher than the core requirements of the Air Operations, and to prioritise training in areas where the greatest benefit can be achieved. According to CAA (2014), an ATQP permits an operator to change from training and testing based on the completion of specific standard items and maneuvers, together with the associated periods of validity, to a system of training and qualification based on training objectives. The ATQP, when fully developed and approved, will enable the operator to change both the structure and validity periods of the qualification requirements for flight crew and hence obtain specific operational benefits. Such benefits, however, are only achievable if the operator is able to substantiate that such change to the core requirements result in an increase in safety standards (CAA, 2014).

In the Alternative Training and Qualification Programme (ATQP), the global marking system must be able to identify crew performance for each of the assessable tasks both in the simulator and during line checks, the scale of 1 to 5 is commonly used where 3 is company standard (CAA, 2014). The operator is free to develop its own marking system however it must be acceptable to the Authority. The training record system must be readily available to the trainers, simple to use and have the ability to analyse the data to show weaknesses in crew performance. The operator is required to determine the various tasks to be undertaken by the flight crew when operating specific type(s) of aeroplane. The analysis should describe the knowledge and skills required to complete the various tasks and identify the appropriate behavioural markers that should be exhibited by a crew (CAA, 2014). There is a lot of literature on training in the aviation as a safety determinant. However, the programme for training has been given minimal attention. For instance Trainair Plus programme which was developed to improve safety and efficiency of air transport through the establishment; maintenance and monitoring of high standards of training and competency for aviation personnel on a worldwide basis in cost effective approach using standardized methodology. This training programme employs best practice methods and standards to meet regulatory requirements thus promoting affordable competency-based training courses that is monitored through quality control mechanisms.

Chang & Yeh (2004) and Liou et al. (2008) reported that in the commercial airline industry, enhancement of safety is crucial for the industry success and for that reason proper training could prevent accidents in the air transport industry. A study by Qing & Ye (2015) revealed that safety in the airline industry depends on various inputs such as labor, funds, technology and staff training. A study by Bent & Chan (2010) found that training is a means of preventing accidents in the aviation industry and airlines globally strive for the highest safety standards.

2.3.2 Compliance with Certification Process Standards and Air Transport Performance

Wade (2013) defines certification as the process that examines and documents compliance of the aircraft or aircraft modification (that is the product) against pre-defined airworthiness requirements and standards to the satisfaction of the certifying authority. According to the Aviation Glossary (2012), the term certification refers to legal recognition by a certifying authority that a product, service or organisation complies with applicable requirements. Such certification comprises the activity of checking the product, service, organisation or person and the formal recognition of compliance with the applicable requirements by issue of certificate, license, approval or other document as required by national law or procedures. Certification is further defined as the end result of a process that formally examines and documents compliance of a product, process or organisation against pre-defined requirements to the satisfaction of the certifying authority (Wade, 2009).

Certification involves at least two parties namely; an applicant and a certifying authority, and sometimes three if independent assessors are involved. The role of the certifying authority is to evaluate the evidence presented by the applicant against the pre-defined requirements and standards, and determine compliance/achievement. This differs somewhat from the concept of self-certification, which implies emphasis on attestation rather than on evaluation by an independent certifying authority. However, the certifying authority may require the applicant to self-certify their compliance/achievement as a component of the evidence that the certifying authority examines. Certification requires that pre-defined requirements and standards be specified as the benchmark for certification. The applicant and the certifying authority require a common benchmark against which evidence can be produced by the applicant, and the evidence evaluated by the certifying authority. A factor affecting certification and the usage of standards as certification requirements or benchmarks is the way the certification authority is empowered, and thus how enforcements of certification requirements is achieved (Wade, 2013).

In the United States of America, the Federal Aviation Administration (FAA) which is the civil aviation airworthiness regulator, issues certificates for new and modified aircraft and aircraft equipment. This certification is relied upon by the customers (owners and operators) who purchase and operate the aircraft. The FAA approach is also common to other civil aviation National Airworthiness Authorities (NAAs) around the world (for example Australia – Civil Aviation Safety Authority (CASA), UK – Civil Aviation Authority (CAA), Europe – European Aviation Safety Agency (EASA). In this environment the roles of the developer, manufacturer, owner, operator and regulator are typically separated amongst different organizations or entities giving each entity some opportunity for independence in their function. For instance, the owner and operator might be the same organization such as Qantas, whereas the supplier or developer or manufacturer might be an aircraft developer/manufacturer such as Airbus or Boeing, and the regulator is a government agency such as FAA, CAA, CASA and EASA.

In Kenya, the Kenya Civil Aviation Authority (KCAA) is a State Corporation under the Ministry of Transport mandated to develop, regulate, and manage a safe, efficient, and effective Civil Aviation System in Kenya. The Airworthiness division of KCAA is charged with the responsibility of ensuring that all aircrafts operating in the Kenyan airspace are airworthy. Airworthiness department oversees aircraft inspections, airworthiness of aircraft approvals, licensing of Aircraft Maintenance Organizations (AMOs) and Aircraft Maintenance Engineers licensing (AMEs), and continual monitoring and surveillance of AMOs, Air Operators Certificates (AOCs), Aviation Training Organizations (ATOs) and Aircraft Maintenance Engineers (AMEs) (KCAA, 2016).

Drury (2014) reports that inspection structures and systems are important in ensuring continued airworthiness of aircrafts. Drury (2014) asserts that failure in aircraft infrastructure comprises of cracks, corrosion, or deformation beyond the plastic limit and therefore inspection systems are designed to detect these in a timely manner. The Continuing Airworthiness Management (CAM) ensures that all maintenance activities are performed on an aircraft so as to maintain its airworthiness hence assuring operational safety. These activities by CAM must observe requirements given by the aviation authorities, and the manufacturers (Corella, 2015).

2.3.3 Compliance with Resolution of Safety Concerns and Performance of Air Transport

Project success or failure depends largely on the quality of monitoring and evaluation of the project design and the planned activities. Monitoring & Evaluation if carried out properly, acts as a wake up bell for sealing all loop holes that are detected by checking objectives against the achievement of the proposed activities. Civil aviation has been swept up in the wave of commercialization, globalization and trans- nationalization, with implications for safety and security that have to be addressed. Regulations on safety and security is under the

Chicago Convention, the responsibility of individual state; as ownership and operation of airlines, airports and air traffic control devolve from governments and cross-border involvement becomes more common, the need for seamless co-ordination beyond national and national and regional borders becomes even more fundamental (Kotaite, 1997). In the air transport industry, aviation safety standards must be followed by all air operators.

Each country has a body that monitors and evaluates the air transport organizations to ensure compliance. Monitoring and Evaluation of the resolution safety concerns is the fundamental process of taking audits to come up with preventive and corrective actions with a view to enhance performance in the air transport. Resolution of safety concerns is the implementation of processes and procedures that include data collection, analysis, recommendations and enforcement action as deemed appropriate to resolve identified deficiencies impacting aviation safety, which may have been residing in the aviation system and have been detected by the regulatory authority or other appropriate bodies (ICAO, 2013).

The resolution of identified deficiencies and safety concerns is a critical element at the core of all safety oversight activities. A good safety oversight system will provide for the identification of deficiencies and safety concerns and the appropriate action required for resolution. Air Accident Investigation records aircraft accidents have continued to increase despite Kenya Civil Aviation Authority having strengthened its safety oversight by recruitment, training, developing safety procedures and enforcement. A number of safety oversight program have also been conducted by US Federal Aviation Administration (FAA) through its program Safe Sky for African initiative and World Bank to both the aviation regulator and the industry (Ministry of Transport, 2013).

There is significant body of knowledge on the relationship between effective reporting of safety concerns and performance of air transport. Aviation safety reporting system was introduced in the US in 1976 to enhance reporting of safety concerns through the pilot, cabin crew, and engineering communities. The system acted as a preventive measure for any decision making problem that may occur when dealing with safety cases. Employees fill and mail a form to Batelle Memorial Institute in Ohio where a team of experts investigate the claims advanced by the staff and forward an anonymous copy to the appropriate NASA officials. If the concerns occur the day before a scheduled launch of a space shuttle then these can be communicated via telephone to a launch safety officer (ASR [US], 1976). In operating this system NASA makes an assumption that concerns sent by employees are received and dealt with promptly.

To establish whether safety occurrence reporting system has effect on aviation safety, Ombasa et al using a single questionnaire collected data from 39 respondents from the general aviation industry from air operators based at Wilson airport, Kenya. The major concern was to find out if any relationship exists between incident reporting of safety occurrences and aviation safety. Data analysis was done through descriptive statistics, correlation and regression statistics. The findings of this survey reveal that there is a significant relationship between the levels of organizational commitment to reporting of safety occurrences and aviation safety. These findings are in line with ICAO safety oversight manual that reports that a common deficiency identified in the majority of assessed and audited States is a lack of an adequate safety oversight organization and infrastructure within the CAA. In the majority of cases, this has resulted from insufficient resources being provided for the CAA. As a result, such States are unable to fully comply with national and international requirements relating to the safety of civil aviation, including operations and infrastructure. The audits and other ICAO missions have shown that where an appropriate safety oversight organization has not been established, control and supervision of aircraft operation and associated activities are often deficient, creating an opportunity for unsafe practices. The establishment and management of a viable safety oversight system require a high-level government commitment, without which a State cannot satisfactorily discharge its aviation system safety-related responsibilities (Safety Oversight Manual, 2006).

The resolution of identified deficiencies and safety concerns is a critical element at the core of all safety oversight activities. A good safety oversight will provide for the identification of deficiencies and safety concerns and the appropriate action required for resolution. Should the surveillance and inspection programme and related inspection reports reveal that the license /rating/ certificate/approval holder has failed or is unable to meet or maintain the required standards, the CAA technical expert primarily responsible for the surveillance of the operation must promptly advice the license/ rating/certificate/ approval holder of the deficiency observed. Once the cause of the deficiency is determined, the CAA should provide deadlines for corrective action. Once the cause of the deficiency is determined, the CAA should provide deadlines for corrective action to be taken and initiate appropriate follow-up to determine the effectiveness of the corrective action. Additional inspections should be conducted whenever problems in particular area repeatedly occur. If deficiencies are not corrected within the specified deadline, the CAA technical director should inform the Director General of Civil Aviation (DGCA) with a recommendation that the license/rating/certificate/approval holder's privileges be temporarily or permanently withdrawn or restricted. The agreed resolution is officially given to the license/rating/certificate/approval holder (Safety Oversight Manual, 2006). There is paucity of literature on this area. Therefore, this study will take an exploratory approach when dealing with this variable with a view to contribute to knowledge on this important issue in air safety for enhancement of economic development as stipulated in vision 2030. Compliance to Resolution Safety Concern Standard in this study will be operationalized to cover the analysis of Safety Deficiencies, Availability of procedures in rectification of safety and Corrective Action to Safety Deficiencies in relation to performance of air transport.

2.3.4 Compliance with Airport Infrastructure Standards and Air Transport Performance

All over the world, airports are termed as centers of economic activity assuming a significant role in the national economy. The quality of airport infrastructure, which is a vital component of the overall transportation network, contributes directly to a country's international competitiveness and the flow of foreign investment and hence influencing performance of the air transport industry (KPMG, 2012). Airports also represent a country's window on the world. Passengers form their first impressions about a nation from the state of its airports.

They can be effectively used as symbols of national pride, if sufficient attention is given to their quality and maintenance.

According to the Airport Council International (2009), to enhance airport safety while ensuring optimum use of resources, airport design regulations should be developed to meet a generally accepted Target Level of Safety (TLS), to prevent accidents, fatalities, injuries or significant damage. ICAO recommends a runway width of 45metres for Code Letter E and 60metres for Code Letter F. The main factors affecting minimum runway width requirements and the need for shoulders are: the type and handling requirements of aircraft, such as cross-wind limitations; landing gear track; the overhang of engines outside the main-wheel bogies; and the prevention of ingestion of loose material by engines. For Code Letter F, Airport Council International (ACI) believes that a taxiway width of 23metres is acceptable for operations on existing taxiways, provided that the taxiway is equipped with centre line lighting or other adequate guidance systems (ACI, 2009).

The Airport Council International (2009) further notes that, a runway end safety area should be provided to mitigate the consequences of overruns and undershoots, which may result from a combination of adverse operational factors. The capacity of a given airport and runway system is determined by many factors, such as airfield layout, the air traffic control system and its management, the type and mix of aircraft, traffic peaking, weather conditions, environmental considerations, etc. Some of these factors can be accurately assessed, while others are site specific, very difficult to quantify and subject to rapid change. Audits, in cooperation with local management and personnel, are an effective method of checking the actual level of safety and detecting flaws or hazards. The major purpose of inspecting the runway is to check for debris such as aircraft parts and fluids and any loose material, as well as wildlife remains. Other purposes include: to check lighting, markings and signs, and check for obstacles. The capacity of systems used for aircraft navigation, together with other technical (aircraft, air route and air traffic control) factors, can be a determinant of the arrival and departure capacity of runways (ACI, 2009).

International Air Transport Association- IATA (2014) defines airport coordination as a means of managing airport capacity through the application of a set of rules contained in the Worldwide Slot Guidelines (WSG). Coordination is also a process to maximize the efficient use of airport infrastructure. A Level 1 airport is one where the capacity of the airport infrastructure is generally adequate to meet the demands of airport users at all times. The airport managing body of a Level 1 airport should monitor demand for airport infrastructure and develop additional capacity when required to meet that demand. A Level 2 airport is one where there is potential for congestion during some periods of the day, week or season, which can be resolved by schedule adjustments mutually agreed between the airlines and facilitator. The airport managing body must provide the infrastructure necessary to handle planned airline operations within agreed levels of service. A Level 3 airport is one where demand for airport infrastructure significantly exceeds the airport's capacity during the relevant period. As a result, a process of slot allocation is required whereby it is necessary for all airlines and other aircraft operators to have a slot allocated by a coordinator in order to arrive or depart at the airport during the periods when slot allocation occurs (IATA, 2014).

The extent to which air transport can reap economic and social benefits majorly depends on the quantity and quality of airport infrastructure that attract air operators as well as supporting their network growth (Khadaroo & Seetanah, 2008; Hilling, 1996). Piyathilake (2016), reports that airports should have runway facilities sufficient to service fleet that fly long distances so that they secure services for long haul destinations and increase passenger volumes. Size of airport runways and terminal specifications determine the type of aircrafts the airport can handle. A bigger jet such as an Airbus 380 require proper airport infrastructure upgrades in order to handle the plane with long wing span. For international airlines, the main choice of destinations it determined by an airport infrastructures which include: runways, apron facilities and terminal facilities.

The level of physical infrastructure and human capital an airport has are fundamental factors for global competitiveness in air transport (Khadaroo & Seetanah, 2008). Graham (2014) reported that airports need to provide the entire infrastructure needed to enable passengers and freight to transfer move from surface to air modes as well as allow aircrafts to take off or land safely. Rosen (2002) study results revealed that flight delays rise with the ratio of demand to fixed airport infrastructure.

2.4 Monitoring and Evaluation Process and Performance of Air Transport

A review of literature on Monitoring & Evaluation (M&E) by various authors reveals no clear consensus on one definition. Several scholars and agencies such as Bowden (1988); UNICEF (1991); UNDP (1997); and INTRAC (1999) have defined M&E concepts differently, however Hunter (2009) contend that M&E tends to be perceived as one and the same thing. UNFPA (2001) define monitoring as a continuous management function that aims primarily to provide management and main stakeholders with regular feedback and early indications of progress and lack thereof in the achievement of intended results. Monitoring tracks the actual performance or situation against what was planned or expected according to pre-determined standards. Monitoring generally involves collecting and analyzing data on program processes and results and recommending corrective measures (UNFPA, 2001).

Kyalo, Itegi and Nyonje (2011) define monitoring as the routine tracking of information about a program/project and its intended outputs, outcomes and impacts. It is aimed at measurement of progress towards achieving program/project objectives. USAID (2012) define monitoring as an ongoing process that indicates whether desired results are occurring or not. Monitoring aims at measuring progress toward planned results usually through preselected indicators. Monitoring is a system of continuous information for the use of a project manager (Magnen, 1991). Monitoring can be defined as a continuing function that aims primarily to provide the management and main stakeholders of an ongoing intervention with early indications of progress, or lack thereof, in the achievement of results (UNDP, 2009).

OECD (2010) defines evaluation as the systematic and objective assessment of an on-going or completed project, programme or policy, its design implementation and results. The aim is to determine the relevance and fulfillment of objectives, development efficiency, effectiveness, impact and sustainability. An evaluation should provide information that is credible and useful, enabling the incorporation of lessons learned into the decision making process of both recipients and donors (OECD, 2010). Evaluation is also defined as a systematical and periodical gathering, analyzing and interpreting of inputs, information on the effects and impacts of development interventions in order that it may be adjusted where and when necessary (Wegayehu, 2014).

UNDP (2009) define evaluation as a selective exercise attempts to systematically and objectively assess progresses toward achievement of outcome, meaning evaluation is not a onetime event, but an exercise involving assessments of differing scope and depth carried out at several points in time in response to evolving needs for evaluative knowledge and learning during the effort to achieve an outcome. Evaluation ensures assessment of the projects and their variables in terms of their: relevance to expected outcomes, effectiveness in dealing with identified problems, efficiency of the use of resources, impact of the project outcome, and sustainability (Wegayehu, 2014).

Although definitions of M&E differ, the two functions are interlinked and both are necessary if the implementation of any project is to be successful (Amal, 2013; Bowden, 1988). When evaluation is conducted during project implementation, it complements monitoring since it provides significant feedback to management on the approach adopted, the effectiveness of implementation strategies and the likelihood that the programme will achieve its planned results (WFP, 2002). On the other hand, an effective monitoring system will provide the information that will form the core of any evaluation (INTRAC, 1999). Muchelule (2018) found out that monitoring techniques and their adoption impact project and organization performance. The study concluded that monitoring best practices have positive impact on project performance in state corporations in Kenya.

When planning for M&E, it is vital to consider whether appropriate funds and staff time can be allocated to it, since M&E is an on-going process and requires a significant commitment (Waithera, 2015). Evaluation needs to be undertaken by individuals with the relevant skills, sound methods and adequate resources as well as transparency in order to secure their quality (Jones, 2009). This implies the need for the personnel to be highly trained in order to secure the effectiveness of monitoring and evaluation. Budgetary allocation is required to provide adequate resources for the evaluation. A monitoring and evaluation budget need to be developed and included in the overall project budget in order to provide the monitoring and evaluation function its due recognition in its place in project management (Gyorkos, 2003; Rodgers, 2009). Monitoring puts an emphasis on transparency and accountability in the use of resources to the stakeholders while evaluation on the other hand provide an assessment of the effectiveness of the project in achieving the goal and the relevance and sustainability of the on-going project (Njuki, Kaaria, Chetsike, and Sanginga, 2013).

A monitoring and evaluation (M&E) plan is a document that helps to track and assess the results of the interventions throughout the life of a program. It is a living document that should be referred to and updated on a regular basis. While the specifics of each program's M&E plan will look different, they should all follow the same basic structure and include the same key elements. An M&E plan will include some documents that may have been created during the program planning process, and some that will need to be created new. For example, elements such as the logic model/framework, theory of change, and monitoring indicators may have already been developed with input from key stakeholders and/or the program donor. The M&E plan takes those documents and develops a further plan for their implementation.

It is important to develop an M&E plan before beginning any monitoring activities so that there is a clear plan for what questions about the program need to be answered. It will help program staff decide how they are going to collect data to track indicators, how monitoring data will be analyzed, and how the results of data collection will be disseminated both to the donor and internally among staff members for program improvement. An M&E plan will help make sure data is being used efficiently to make programs as effective as possible and to be able to report on results at the end of the program. The first step to creating an M&E plan is to identify the program goals and objectives. Once the program's goals and objectives are defined, it is time to define indicators for tracking progress towards achieving those goals. Program indicators should be a mix of those that measure process, or what is being done in the program, and those that measure outcomes.

Data collection is the process of gathering and measuring information on targeted variables in an established systematic fashion, which then enables one to answer relevant questions and evaluate outcomes. The data collection component of research is common to all fields of study including physical and social sciences, humanities and business.

Corrective actions are improvements to an organization's processes taken to eliminate causes of non-conformities or other undesirable situations (Robitaille, 2002). It is usually a set of actions which are required to be taken and implemented in an organisation at levels of manufacturing, documentation, procedures or systems in order to rectify and eliminate the recurrence of nonperformance. Non-performance is identified after systematic evaluation and analysis of the root cause of the nonperformance. Non-conformance may be a market complaint or customer complaint or a failure of machinery or a quality management system, or misinterpretation of written instructions to carry out a work. The corrective action is designed by a team including quality assurance personnel and the personnel involved in the actual observation point of nonconformance, and is required to be systematically implemented and observed for its ability to eliminate further recurrence of such non-confirmation in future. Corrective actions are implemented in response to customer complaints, unacceptable levels of product non-conformance, issues identified during an internal audit, or adverse or unstable trends in product and process monitoring (Graef, 2016).

According to Stamatis (2003) the process of having a corrective action entails: (1) locating and documenting the root cause of the nonconformity, (2) scanning the entire system to ensure no other similar nonconformity could occur, (3) analyzing the effect such a nonconformity may have had on a product or service produced before the nonconformity was discovered, and take action appropriate to the severity of the situation by either recalling the product, notifying the customer, downgrading or scrapping product, and (4) establishing thorough follow-up to ensure the correction is effective and recurrence has been prevented.

2.5 Theoretical Framework

This section presents the theories on which this study is grounded on. The theories include: the domino theory of aviation safety, Swiss cheese model in aviation safety, the SHELL model of human factors in aviation safety and the resource based view (RBV).

2.5.1 The Domino Theory of Aviation Safety

The Domino Theory of accident causation or Domino Safety Theory was developed by American industrial safety advocate Herbert Heinrich (Pryor and Capra, 2012). This model suggested that injuries occurred due to one's social environment, which he likened to the first domino in a series. Once the domino fell over, it directly caused a series of other dominos to fall ultimately leading to an accident and subsequent injury (Rocky, 2014). This model from the 1930's was further developed by Frank Bird in the 1970's by simply changing the names of some of the dominoes. Bird felt that the initial cause of most accidents was due to lack of management controls or poor management decisions. Therefore, the initial domino became a metaphor for 'Absence of Safety Controls.' Highly reliable industries that experience constant threats to the safety of customers, employees or the public have embraced these models in an effort to better understand and prevent the serious accidents (Rocky, 2014).

According to the Domino effect theorists, an accident occurs from a sequence of events (Rocky, 2014). It is a chain reaction. In order to grasp the sequence, picture five dominoes in a row, the first domino is background which represents a worker's lifestyle and personality. The second domino is personal characteristics representing a worker's attitude, level of knowledge, and physical and mental conditions. The third domino is unsafe acts and unsafe conditions represented by a worker's behaviour and unsafe job conditions. The fourth domino is the accident represented by unplanned event caused by an unsafe act or condition. The fifth domino is the injury represented by someone getting hurt (Rocky, 2014; Pryor and Capra, 2012).

According to Pryor and Capra (2012), the Domino theory contends that for any given incident, not much can be done about a worker’s background and personal characteristics. The domino that must be targeted is unsafe acts and unsafe conditions. When an unsafe act is detected, the worker should be stopped; the situation should be studied; a safer way to perform the task must be found; instruct and train the worker to do it the safer way; check and retrain as necessary; and as a last resort discipline the worker. When an unsafe condition is detected, the condition needs to be removed, guarded, or warned against. Heinrich insists that the responsibility lies first of all with the employer. Heinrich specifies that a truly safety-conscious manager will make sure his foremen and workers do as they are told, and exercise his prerogative and obtain compliance follow through and see the unsafe conditions are eliminated. Heinrich's remedy for such non-compliance is strict supervision, remedial training, and discipline (Leeson and Dean, 2009).

2.5.2 Swiss Cheese Model in Aviation Safety

According to Wiegmann and Shappell (2003) industry-wide acceptance of the concept of the organizational accident was made possible by a simple, yet graphically powerful model developed by Professor James Reason, which provided a means for understanding how aviation operates successfully or drifts into failure. The Swiss Cheese model of accident causation is a model used in risk analysis and risk management, including aviation, and engineering (Perneger, 2005). The model was founded by Dante Orlandella and James T. Reason (Taylor, Easter, and Hegney, 2004). The model likens human systems to multiple slices of Swiss cheese, stacked side by side, in which the risk of a threat becoming a reality is mitigated by the differing layers and types of defenses which are "layered" behind each other. Therefore, lapses and weaknesses in one defense do not allow a risk to materialize, since other defenses also exist, to prevent a single point of weakness (Reason, 1997; Wiegmann and Shappell, 2003).

Reason (1997) hypothesized that most accidents can be traced to one or more of four failure domains: organizational influences, supervision, preconditions and specific acts. Preconditions for unsafe acts include fatigued air crew or improper communications practices. Unsafe supervision encompasses for example, pairing inexperienced pilots on a night flight into known adverse weather (Wiegmann and Shappell, 2003). Organizational influences encompass such things as reduction in expenditure on pilot training in times of financial austerity. In the Swiss Cheese model, an organisation's defenses against failure are modeled as a series of barriers, represented as slices of cheese. The holes in the slices represent weaknesses in individual parts of the system and are continually varying in size and position across the slices. The system produces failures when a hole in each slice momentarily aligns, permitting (in Reason's words) "a trajectory of accident opportunity", so that a hazard passes through holes in all of the slices, leading to a failure (Reason, 1997; Perneger, 2005; and Wiegmann and Shappell, 2003).

In the Swiss cheese model Perneger (2005) contends that accidents require the coming together of a number of enabling factors, each one necessary, but in itself not sufficient to breach system defences. Professor Reason argues that, complex systems such as aviation are extremely well-defended by layers of defences in-depth, single-point failures are rarely consequential in the aviation system. Equipment failures or operational errors are never the cause of breaches in safety defences, but rather the triggers (Wiegmann and Shappell, 2003). Breaches in safety defences are a delayed consequence of decisions made at the highest levels of the system, which remain dormant until their effects or damaging potential are activated by specific sets of operational circumstances. Under such specific circumstances, human failures or active failures at the operational level act as triggers of latent conditions conducive to facilitating a breach of the system’s inherent safety defences (Taylor et al., 2004).

2.5.3 The Software, Hardware, environment and Livewire (SHELL) Model of Human Factors in Aviation Safety

The SHELL (Software, Hardware, environment and Livewire) model was first developed by Elwyn Edwards (1972) (Keightley, 2004). The SHELL model is a conceptual model of human factors that clarifies the scope of aviation human factors and assists in understanding the human factor relationships between aviation system resources/environment (the flying subsystem) and the human component in the aviation system (the human subsystem) (Campbell and Bagshaw, 2002). Hawkins and Orlady (2003) posit that The SHELL model adopts a systems perspective that suggests the human is rarely, if ever, the sole cause of an accident. The systems perspective considers a variety of contextual and task-related factors that interact with the human operator within the aviation system to affect operator performance. As a result, the SHELL model considers both active and latent failures in the aviation system (Cacciabue, 2004; Keightley, 2004).

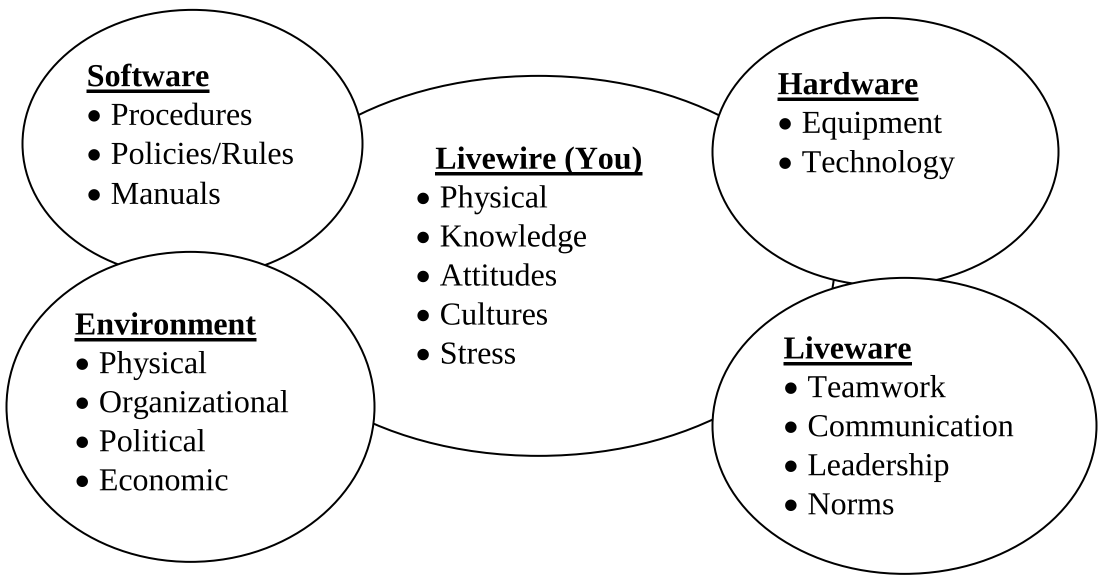

Figure 1: Software, Hardware, Environment, Livewire and Liveware (SHELL) Model

Source: Adapted from Naval Aviation School Command (2016)

It was generally noted that most of the air accidents are related to human errors, while the mechanical failures in aircraft maintenance today has enormously been on the decrease with a number of new high technological equipment inventions (Keightley, 2004). The human element is at the centre or hub of the SHELL model that represents the modern air transportation system. The main elements in the model can be identified as hardware which includes equipment, tools, aircraft, workspace, buildings and other physical resources without human elements in aviation; the software comprises all non-physical resources such as organizational policies, rules, procedures, manuals and placards (Maurino, 2005). The next element is the environment which entails not only the factors which influence where people are working such as climate, temperature, vibration and noise, but also socio-political and economic factors. The live-ware includes factors like teamwork, communication, leadership and norms. The central live-ware can be defined as human elements such as knowledge, attitudes, cultures and stress. This live-ware is regarded as the core of the SHELL Model and other components match with the live-ware as the central figure (Hawkins, 1987). Many countries in the world strive to secure the safety by training based on the interactions of each of SHELL components (Hawkins, 1987; Maurino, 2005).

2.5.4 Resource-Based View (RBV)

According to the resource-based view (RBV) of the firm, organizations' resources can be classified into three main categories: tangible, intangible, and human resources (Tayeb, 2012). Tangible resources include financial and physical resources. Intangible resources include reputation and culture. Human resources include skills and know-how, capacity for communication and collaboration and motivation (Grant, 2002). Resources are treated in terms of what they will generate, benefits and competitive advantages, and consist of a sticky bundle of potential services (Tayeb, 2012). The resources controlled by a company allow the creation of strategies and support their efficient and effective implementation (Barney, 1999). Momme et al. (2000) suggested that an organization is defined as a unique bundle of resources and capabilities which mostly determine what activities should be outsourced and how this relationship should be established and managed. Belcourt (2006) argued that if an organization believes that an activity is a source of competitive advantage, but that activity can be easily obtained from the market, then the organization ought to reconsider its belief. In that sense, McIvor, Humphreys, and McAleer (1997) indicate that the core activities of an organization cannot be easily identified.

The organization should consider the processes in which the necessary resources and capabilities are not available internally; these can be outsourced. Complementary capabilities can be acquired from external providers while no significant advantage can be achieved if performed by the organization (McIvor, 2008). In that sense, Kotabe and Mol (2009) summarised that the RBV predicts that firms with a rich competence base that can be deployed for undertaking a given activity may internalize that activity. For those firms that are less well prepared internally, outsourcing is more viable.

2.6 Conceptual Framework

A conceptual framework is defined as a hypothesized model identifying the concepts under study and their relationships (Mugenda and Mugenda, 2003). In this framework, there are certain factors influencing performance of air transport in Kenya. These factors include but are not limited to: implementation of aviation training standards; aircraft airworthiness certification process standards; resolution safety concern standards; and aircraft infrastructure standards. Monitoring and evaluation is the moderating variable. Performance of air transport in Kenya is the dependent variable that is affected by the independent variables. The study was guided by the conceptual framework as shown in Figure 2 relating the dependent and independent variables and how the strength of this relationship is determined by M&E process.

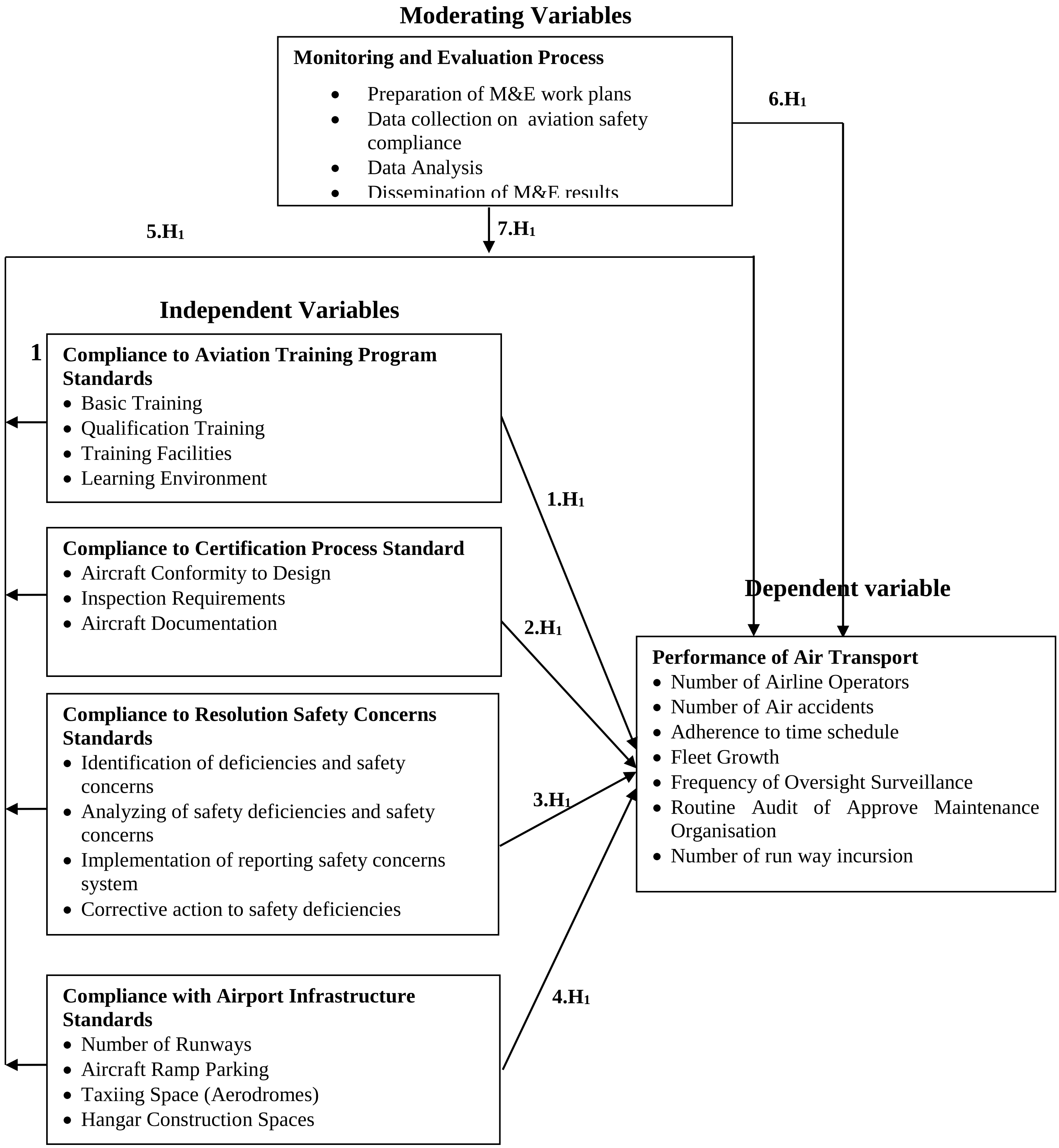

Figure 2: Conceptual Framework

2.7 Summary of Research Gaps

Table 2.1: Summary of Research Gaps Table

Author	**Focus of the Study**	**Methodology used**	**Findings**	**Gap in Knowledge**	**Focus of current study**
Ombasa, and Ngugi, (2014).	Effects of Reporting Safety Concerns on Aviation Safety in the General Aviation Industry a Case Study of Wilson Airport Kenya	Descriptive Survey	The study concluded an improvement on the level of implementation of reporting systems and organizational commitment on reporting systems, however there is need to further improve aviation safety.	This study only looks at Reporting of Safety Concerns	The focus of the current study is to establish the influence of compliance to aviation training standards on performance of air transport in Kenya
Njeru, (2015).	Factors Influencing Aviation Safety in Kenya: The Case of Kenya Civil Aviation Authority	Cross Sectional Survey	The study established that professional qualification has a major effect on aviation safety at the KCAA as the authority had few qualified technical inspectors and technical safety staff in the safety management	This study only looks at Aviation Safety	This aim of this study was to determine the influence of compliance to airworthiness certification process standards on performance of air transport in Kenya

			system		
Beer, (2005).	Developing an aviation safety strategy within the Southern African context: A stakeholder perspective	Case study	The maintenance of adequate training standards and practices, or the lack thereof, has been identified as an important element in an effective safety strategy.	This study looked at safety strategy and more so in South Africa	The focus of the current study was to establish the influence of compliance to aviation resolution of safety concerns standards on performance of air transport in Kenya
Remawi, (2010).	The Relationship between the Implementation of Safety Management Systems and Attitudes towards Unsafe Acts in Aviation	Cross-Sectional Descriptive Survey	Results indicate that participants at Sharjah Airport recorded a significant positive shift in attitude to the safety factors covered in the safety culture survey	This study focused on Implementation of Safety Management Systems and Attitudes towards Unsafe Acts in Aviation	The focus of the current study was to establish the Relationship between compliance to aviation safety standards and performance of air transport in Kenya
Dragomir, (2013).	The effects of commercial aviation accidents a dynamic approach	Cross-Sectional Survey	This study revealed that severe fatal accidents strongly influence the crash-airlines' financial values and that safety is key	The study only focused on accidents	This study focuses on performance of commercial air transport and safety standards

Quinn, (2012)	Influence of Safety Management in the Personal Spaceflight Industry	Exploratory Study	It is concluded that in general all aspects of the industries are doing their bit for safety	This study looked at Spaceflight and NASA to be precise	The current study was focused on establishing the moderating influence of monitoring and evaluation on the relationship between compliance to aviation safety standards and performance of air transport in Kenya

2.8 Summary of Literature Review

The focus of this chapter is the review of relevant literature on the moderating influence of service outsourcing on the relationship between monitoring and evaluation of aviation safety standards and performance of air transport. Literature is also presented on performance of air transport, monitoring and evaluation of aviation safety standards, and service outsourcing. Literature has also reviewed literature on aviation training standards, aircraft airworthiness certification process standards, resolution safety concern standards, aircraft infrastructure standards, influence on performance of air transport. Domino effect theory on aviation safety, Swiss Cheese model theory, the SHELL model, and the resource based view (RBV) were examined because they provide a framework for understanding the holistic approach to addressing issues concerning compliance to aviation safety standards and performance of air transport and how this influence is moderated monitoring and evaluation and evaluation process. This is the focus of this study. By pointing at the weaknesses and gaps of the previous researches as shown in the summary of research gaps, it has helped support the current study with a view of suggesting possible viable measures.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Methodological details appropriate for the study are discussed in this chapter. The chapter is the blueprint for the collection, measurement and analysis of data. The main focus includes: research paradigm, research design, target population, sample size and sampling procedures, research instruments, validity and reliability of the research instruments, data collection procedures, data analysis techniques, ethical considerations and operationalization of the study variables.

3.2 Research Paradigm

Research paradigm is a crucial element in any type of study. A paradigm is a system of beliefs and practices that influence how researchers select both the questions they study and methods that they use to study them (Morgan, 2014). A paradigm is also defined by Creswell, (2013) as a set of beliefs or philosophical assumptions that guide researchers when conducting a study. These assumptions, practices, and agreements guide a research study. The research paradigm helps the researcher with a specific direction to conduct the research by offering the framework, methods and ways of defining data (Collis and Hussay, 2003). Paradigms emerged from two opposing views about the nature of knowledge, the role of values and the nature of reality. The types of beliefs held by individual researchers will often lead a researcher embracing a qualitative, quantitative, or mixed methods approach in their research (Wambugu, Kyalo, Mbii & Nyonje,2015). In this study, research paradigm has been conceptualized based on Morgan (2014) and Creswell (2013) definitions.

The philosophical underpinning of this study was pragmatic paradigm. The pragmatic worldview advocate for use of mixed methods research (MMR) as opposed to mono-methods research that argue for either qualitative or quantitative approach. Mixed method research is defined as an approach in which both quantitative and qualitative data are collected, analyzed, integrated and interpretations drawn based on the combined strengths of both sets of data (Creswell, 2015 and Plano Clark, 2011). These authors maintain that, instead of focusing on the methods, researchers emphasize the research problem, and use all approaches available to understand the problem. The mixed methods research recognizes both quantitative and qualitative research as important and useful (Johnson and Onwuegbuzie, 2004). This position is supported by Pragmatists who do not see the world as an absolute unity. Mixed method researchers look at many approaches for collecting and analyzing data rather than subscribing to only one way either qualitative or quantitative (Wambugu, Kyalo, Mbii & Nyonje, 2015). MMR encourages researchers to use multiple approaches in collecting and analyzing data within a single study, recognizing the limitations of using a single method (Migiro and Magangi, 2011).

The preference of pragmatic paradigm was guided by ontological, epistemological, axiological and methodological underpinnings in this paradigm. This study has aspects of quantitative and qualitative data in the independent, moderating and dependent variables thus necessitating the employment of pragmatic paradigm. Ontology view was used to balance between qualitative and quantitative world view lenses. Ontologically, pragmatism was adopted to balance the objective nature of in the construction of reality advocated by positivism in quantitative design and also the subjective nature of reality propagated by both constructivism and emancipatory in qualitative designs (Brierley, 2017). Epistemologically, in (positivism and post-positivism paradigm) quantitative researcher is distanced from the researched while in (constructivism and emancipatory paradigm) a qualitative researcher attempts to narrow the distance gap by collaborating and spending time with the researched or even tries to be an insider(Wambugu, Kyalo, Mbii &Nyonje, 2015).

Data on compliance with aviation safety standards was gathered quantitatively by use of questionnaires and analyzed using descriptive and inferential statistics. Qualitative data were collected using an interview and observation guide for triangulation purposes., quantitativ Epistemologically research is value free and should not have researcher bias while in qualitative researcher acknowledge that research is value and that biases are present. From an axiological perspective, Johnson and Anthony (2004) argue that pragmatism is the best suited for mixed methods research approach in that the paradigm balances between quantitative research which is value free with no researcher bias and qualitative research which is potentially value laden (Johnson and Antony, 2004). Finally, research Proponents of pragmatism indicate that methodologically, the paradigm balances between deductive logic used in quantitative research and inductive logic used in qualitative research (Tashakkori & Teddlie, 2010). Since both deductive and inductive logic were desired in this study, pragmatism emerged as the best paradigm to guide the research methodology. Since both positivism and post-positivism guide deductive logic, the paradigms would have limited the current study

Quantitative data was collected using structured questionnaires where qualitative data was collected using interview guides in this study thus making pragmatism the most appropriate for this research. Using mixed methods enhanced data triangulation. Further by use of sequential mixed methods, the researcher would sequentially use both quantitative and qualitative data collection and analysis methods and this provided a comprehensive analysis of the variables under study. Pragmatism utilizes transferability to consider the implications of research and hence refers to the possibility of the local and external connections that data can reveal about a phenomenon and can be transferred to other setting (Jensen, 2008).

Given that this study sought to establish how the influence of compliance of aviation safety standards on performance of air transport is moderated by monitoring and evaluation process, the study was guided by the pragmatism philosophical standpoint, mixed methods of data collection and sequential triangulation strategy. The tools of data collection included a structured questionnaire, interview guide observation guide and document analysis. Mixed method involves the use of both qualitative and quantitative approaches so that the overall strength is greater than either qualitative or quantitative research (Creswell and Clark, 2011). Pragmatic paradigm principles were followed in the whole process of data collection, analysis, report writing and presentation.

3.2.1 Research Design

Descriptive cross sectional survey and correlational research design were adopted in this study. In descriptive cross sectional survey, either the entire or part of the population is selected for study where data is collected, analyzed and interpreted to answer research study questions. In this study, the target population will be sampled and a representative sample was used. This design is appropriate since the researcher will be able to collect quantitative data that will be usable in hypothesis testing so as to get an objective conclusion as proposed by Cooper and Schindler (2011) and Kothari (2010).

The cross-sectional research design has been chosen because all data will be collected at one point in time to determine the variable relationships through selecting analyzing samples from the population to unearth occurrences (Kothari and Garg, 2014: Oso and Onen, 2008). The descriptive cross sectional survey made it possible in obtaining data from a cross-section of respondents who represent a larger population gathered within the shortest time of the study. The design offered an opportunity for the researcher to develop a broad understanding of the phenomena by collecting data from key aviation players, and test the relationships on how monitoring and evaluation process influences the relationship between compliance to aviation safety standards and performance of the air transport industry in Kenya.

Correlational survey is used when a researcher wants to describe in quantitative terms the degree to which two or more variables are related (Wambugu *et al*., 2015). Correlational research design is defined as a measurement of two or more factors to determine or estimate the extent to which the values for the factors are related or change in an identifiable pattern (Creswell, 2013). In this study the moderating influence of monitoring and evaluation process variables on the relationship between compliance to aviation safety standards, and performance of the air transport, was studied hence a correlational research design. Therefore, both cross-sectional research design and correlational research design were used in this study.

3.3 Target Population

The target population for this study was 269 participants that consisted of: 9 senior officials, 92 staff in KCAA (Kenya Civil Aviation Authority Staff Registry, 2016), who are directly involved with air safety and two senior managers from each of 84 registered air operators. The key population under the KCAA that this study targeted included all the flight operations inspectors who are responsible for issuance of air operators certificates (AOC), in charge of aircraft operation safety oversight, approval and monitoring of AOC holder training programmes, station facility inspection and evaluation of flight training simulators as well as their approval; the Airworthiness inspectors who are responsible for overseeing aircraft inspection, airworthiness of aircraft approvals, licensing of aircraft maintenance organizations (AMOs), and aircraft maintenance engineers (AMEs), and continual monitoring and surveillance of AMOs, AOCs, Aviation training organizations (ATOs) and AMEs; the third group is the Air transport inspectors who deal with economic regulation of the air transport sector, issuance of air service licenses, ad hoc clearance, aircraft lease approvals and participation in Bilateral Air Service Agreement (BASAs); personnel licensing deals with aircraft registration, aviation personnel licensing, surveillance and ATO certification; Aviation Security is responsible for Airport Aviation Security system audits, operator Aviation Security Programmes approvals, Certification of cargo handlers, Management of Kenya National Civil Aviation Security programme and continual monitoring and surveillance of operators' security programmes and Aerodrome, is responsible for certification and surveillance of aerodromes, Air navigation operations. The study will also target all the Air Operator Certificate (AMO) holders in Kenya (Spotters, 2016). Table 3.1 shows the target population.

Table 3.1: Target Population

Category	Target Population
Regulator (Senior officers)	9
Regulator (Staff)	92
Air Operator staff	168
Total	**269**

Source: Kenya Civil Aviation Authority Staff Registry (2016)

3.4 Sample Size and Sampling Procedure

In this section the sample size and the sampling procedures are discussed. A sample is a subset of the population. Cohen, Manion, and Morrison (2007) define sampling as the process of selecting a small part (sample) from the entire population to be studied. The ideal sample is large enough to serve as an adequate representation of the population about which the researcher wishes to generalize and small enough to be selected economically (Wambugu *et al.*, 2015). This section of the study comprises the sampling procedures used to derive the sample for the study which will be used to generalize the findings for the larger population. Sampling involves the researcher securing a representative group that will enable him/her to gain information about the population (Mugenda and Mugenda, 2003). Choosing a sample is a key feature of any research undertaking.

3.4.1 Sample Size

To determine the sample size for this study, Research Advisors Table (2016) on Appendix VI was used. This Table was developed using the formula that was used by Krejcie & Morgan (1970) in their article entitled 'Determining Sample Size for Research Activities' (Educational and Psychological Measurement, pp.607-610). The formula by Krejcie & Morgan (1970) is as follows:

$s = X^2NP(1-P) + d^2(N-1) + X^2P(1-P)$

s = required sample size

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)

N = the population size

P = the population proportion (assumed to be .50 since this would provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (.05)

In this study, sample was drawn from each group of targeted respondents that is 9 officials, 92 regulators and 168 air operators' staff. The first group had a population of 9 respondents. At confidence level of 95.0% and margin error of 0.035 (3.5%), the appropriate sample size was 9. Therefore all regulator senior officials were included in the research which translates to census. The sample size of a population of 92 at confidence level of 95.0% and Margin Error (degree of accuracy) of 0.035 (3.5%) is 89 while the sample size for a population of 168 at confidence level of 95.0% and Margin Error of 0.035 (3.5%) is 126 as indicated in Researcher Advisors Table (2006). This is in line with the principle of Krejcie & Morgan (1970) Table that reveal there is a relationship between sample size and margin of error, therefore, smaller sample sizes yield larger margin error. Applying the formula, the minimum sample size obtained was 224 out of target population of 269. Therefore this study involved 9 regulator officials, 89 regulators, and 126 air operators' staff. The total participants were 224. This is in line with Salkind (2005) who proposes that a sample size of 30 to 500 is appropriate for most academic researches as a rule of the thumb for determining sample size. Table 3.2 presents the sample size of the study.

Table 3.2: Sample size

s/n	Target population	Sample size	Confidence level (%)	Margin error (%)
1.	9	9	(95.0)	0.035(3.5)
2.	92	89	(95.0)	0.035(3.5)
3.	168	126	(95.0)	0.035(3.5)
Total	**269**	**224**	**(95.0)**	**0.035(3.5)**

3.4.2 Sampling Procedure

In order to generate a sample for questionnaire respondents, a combination of purposive and systematic sampling techniques was utilized. This is supported by Creswell (2012) who maintains that purposive selection of respondents; site or documents for study would help the researcher to understand the problem of the research. The 9 senior officials were purposively sampled for this study. To get the sample of 89 inspectors from the 92, systematic sampling method was employed. This involved skipping every eighteenth (18^{th}) respondent from a list provided by KCAA office. The same method was used to select the respondents from the air operators. This involved the skipping of every 4^{th} respondent in a list of registered air operators obtained from KCAA office.

3.5 Research Instruments

Secondary and primary data were collected. Secondary data were gathered through document review to solicit information about performance of air transport in Kenya. Primary data were collected from the respondents. For triangulation purpose, three instruments were used that included self administered structured questionnaire, interview guide and observation guide as discussed in the subsequent sub-headings

3.5.1 Questionnaire for Regulator Staff

A questionnaire has the ability to collect a large amount of information in a reasonably quick span of time (Kothari, 2008; Wambugu *et al*., 2015). In this study a self administered structured questionnaire was used to collect primary data from regulator staff and air operators. The questionnaire comprised of items which were seeking to answer questions related to the objectives of this study. The questionnaire method was preferred because of the large number of respondents targeted and the nature of information sought. Questionnaires are also free from the bias of the researcher and contain closed-ended questions and a few open-ended questions. The questionnaire was chosen because it is assumed that the respondents would appreciate the importance of the study since it touches on the compliance to aviation safety standards, monitoring and evaluation process, and performance of the air transport; an area in which they take part on a daily basis. The first paragraph of the questionnaire contained information that introduced the study to the respondents. The questionnaire was divided into five sections (See Appendix II).

The first section was used to gather information on demographic information of the respondents that is gender, age, level of education, experience and department of the respondent. This information though not major focus of the study, set the stage by for data collection through improved rapport. The information is also useful in that the researcher was able to understand the respondent's ability in responding to the items in the questionnaire. The second section had six parts each with open ended questions and Likert type scale using strongly agree (SA), Agree (A), Neutral (N), and Disagree (D) and strongly disagree (SD). The pool of items included both positive and negative statements. Carifio and Rocco (2007) suggested the values of strongly agree (SA) $4.2 < SA < 5.0$, Agree (A) $3.4 < A < 4.2$, Neutral (N) $2.6 < N < 3.4$, and Disagree (D) $1.8 < D < 2.6$ and strongly disagree (SD) $1 < D < 1.8$. The information gathered in these parts were based on the variables of the study that include performance of air transport, compliance with aviation safety training standards, compliance with certification process standards, compliance with resolution safety concern standards, compliance with airport infrastructure standards and monitoring and evaluation process.

3.5.2 Interview Guide

The information collected through the use of questionnaire was triangulated with data that were gathered through interview guide (Appendix III). This instrument was used to collect qualitative data from the key informants. Regulator top management was purposively selected for interview using open ended questions. Information on monitoring and evaluation of aviation safety standards, service outsourcing, and performance of the air transport industry was collected. The information which was collected targeted the in-depth information on the variables under study in the questionnaire. As the interview progressed the interviewee was given opportunity to elaborate more on relevant information. The tool was divided into two sections. The first section was the introduction where by the purpose of the interview was expressed. The second section of the guide sought to obtain information on the variables that include compliance with aviation safety standards monitoring and evaluation process and performance of air transport. The collected data was analyzed through non-parametric techniques

3.5.3 Observation Guide

Observation guide (Appendix V) was used by the researcher to gather data on variables related to infrastructure, training facilities and materials were observed by the researcher using a check list. The instrument was divided into four segments that include: training, certification, resolution of safety concerns manuals and status of infrastructure. The researcher observed the existence of training manuals in the shelves and also the displayed schedules of training for air operators staff as required by regulations. The observation of the certification process includes availability of established office for operators, maintenance equipment and tools and a well displayed roster for supervisory personnel. The third segment is the air infrastructure that entails observation of adequacy of parking bays, taxiing space, expansion space and free from encroachment by illegal developers. The final segment is monitoring and evaluation where the research observed the displayed M& work schedules and meetings held on dissemination of M&E results

3.5.4 Document Analysis

Documents pertaining to air safety (Appendix VI) were analyzed prior to field work by the researcher. This involved reviewing of regulatory manuals that are in line with the objectives of the study. The point of focus to ascertain what the regulatory manuals say about the aviation training standards, aircraft airworthiness standards, aviation resolution safety concerns standards and aircraft infrastructure standards with a view to make a case before embarking on the field work. These documents included but not limited to ICAO safety standards and M&E Manuals, KCAA safety manuals and reports.

3.6 Pretesting of the Instrument

Before administering the research instruments to the respondents, pre-testing was done so as to help in determining the validity and reliability of the research tools to ensure that the questions are applicable and clearly understandable.

3.6.1 Pilot Study

The research instrument was piloted on a small representative sample. The selection of participants of the main study was done prior to determination of the participants of the pilot study. The staffs that were left out after the sampling formed the participants of the pilot study; they were not used in the actual study. These included five regulator staff and 10 air operators who were approached and given questionnaires. The 15 respondents formed 5.8% of the population. These respondents were not among the group included in the actual research sample size. The pilot study enabled the researcher check whether the items used are valid and reliable and also correct misconstruction, check language level and eliminate ubiquity at the right time. The piloting also extracted comments from respondents which helped in improving the instruments by modifying and making the instructions given to the respondent clear in order to avoid misinterpretation during the actual data collection.

3.6.2 Validity of the Research Instrument

Testing validity of instrument is an integral part of research process. It is through this test that the researcher can state with confidence that the instruments are measuring what they purport to measure. Validity is the appropriateness, meaningfulness and usefulness of the inferences a researcher makes based on the items in instrument (Wambugu et al. 2015) According to Kothari (2008) validity is the most critical criterion of sound measurement and indicates the degree to which an instrument measures what it purports to measure. The common types of validity that researchers focus on include content related, criterion related and construct related validity (Donald and Delno, 2006). Kothari (2010) defines content validity of the instrument as the extent to which a measuring instrument provides adequate coverage of the topic under study in terms of content and format of the instrument. Criterion related validity is defined as the relationship between scores obtained using an instrument and scores obtained using one or more instrument or measure. He also argues that a measure is said to possess construct validity to the degree that it confirms to predicted correlations with other theoretical propositions.

This study adopted content validity which is the extent to which a measuring instrument provides adequate coverage of the topic under study. The choice of this method of validity test was informed by the research objectives and the research paradigm that was used to gather in-depth content on performance of air transport and how it is influenced by compliance with aviation safety standards. Content on the moderating influence of monitoring and evaluation process on the relationship between independent and dependent variables was also sought. This study used content validity to examine whether the instruments will answer the research questions. In order to establish content validity and make adjustments and/or additions to the research instruments, consultations and discussions with the experts from university academicians, the supervisors and practitioners was done. The recommendations were used to make the necessary corrections in the research tools. Any abstruseness in the questionnaire item was cleared before the questionnaire is taken to the field for data collection.

3.6.3 Reliability of the Research Instruments

A reliable instrument is determined by internal consistency of the scores that are obtained using such instrument during data collection. Reliability of the research instrument is used to ensure that the research instrument is able to measure the consistency, precision, repeatability and trustworthiness of a test (Chakrabartty, 2013). It is also used to measure internal consistency of scores obtained by the instrument. Fraenkel and Wallen (2008) refer to reliability as the consistency of scores or answers from one administration of an instrument to another and from one set of items to another. Reliability is the degree of consistency that the instrument or tool demonstrates on repeat trials and has two aspects that include stability and equivalence. Equivalency is the measure of how much error gets introduced by different investigators or different samples of the items under investigation (Kothari, 2010; Wambugu *et al*., 2015). Reliability is achieved if it gives consistent results with repeated measurements of the same object with the same instrument. To ensure reliability of the instrument, the researcher employed a self-administration approach of data collection and monitored the process to ensure that people outside the sample did not fill the questionnaires. In many cases, the questionnaire was filled while the researcher waited, thereby providing clarification where necessary whereas in cases where the questionnaires were to be left behind, the respondents were asked to go through the questions and seek clarification where necessary, thus raising the reliability.

To establish the reliability of the instruments in the study, pilot testing was done on respondents and then the Cronbach's alpha was calculated. Cronbach's Coefficient Alpha approach recommended by Cohen, Manion and Morrison (2007) for its ability to give average split-half correlation for all possible ways of dividing the test into two parts was used to measure internal consistency of the research instruments. Cronbach's Coefficient Alpha is a scale measurement tool appropriate in measuring internal consistency in descriptive survey researches. Computation of Cronbach's Alpha was done using SPSS for windows version 20.0 programme. Correlation coefficient varies on a scale of 0.00 (indicating total unreliability and 1.00 (indicating perfect reliability). 0.8-0.9 indicates high reliability, 0.6-0.8 indicates acceptable reliability value while below 0.5 is unacceptable (Wambugu *et al*., 2015). A scale is said to be reliable, if Cronbach's coefficient alpha of the scale is well above the threshold value of 0.7 and the acceptable minimum of 0.6 (Hair et al., 2006). The questionnaires were accepted at reliability indices of 0.70 and above. Scholars such as Kyalo

(2007); Munyoki (2007); Mulwa (2012); Nganga (2014) Ibua (2014) and Kikwatha(2018) have used the same tool successfully to test reliability of their research instruments.

3.7 Data Collection Procedures

The researcher first obtained a transmittal letter from the University of Nairobi, Open Learning department office and a permit from the National Council for Science, Technology and Innovation (NACOSTI) in order to aid get authorization from the management of regulator to collect data from the respondents in the premises. The researcher also used trained and qualified research assistants to assist with the questionnaire distribution. To ensure that the purpose of the study was achieved, the researcher interviewed one person at a time in a period of approximately ten minutes each. The researcher explained the purpose of the study and offered guidance to the respondents on the way to fill in the questionnaire before administering the questionnaire. The respondents were assured verbally that the information obtained from them would be treated with ultimate confidentiality hence they were requested to provide the information truthfully and honestly. They also signed consent forms that ensured them that they are participating voluntarily and are free to leave before the end of the interview. In the event the respondents were busy such as in the case of airline operators, the questionnaires were administered through drop and pick method whereby the respondents were left with the questionnaire to fill in their convenient time. The researcher made subsequent visits and courtesy calls when necessary to remind the respondents to fill the questionnaires and in so doing increasing the response rate.

3.8 Data Analysis Techniques

Data collected through questionnaires were summarized, coded, tabulated and checked for any errors and omissions. The data was then entered into a computer statistics program, a process known as data entry. Responses in the questionnaires were processed by use of a computer Statistical Package for Social Science (SPSS) version 20.0 programme to analyze the data. Data analysis involves reduction of accumulated data to a manageable size, developing summaries, looking for patterns and applying statistical techniques (Ngechu, 2004). Mixed methods data analysis techniques were used to analyze both qualitative and quantitative data. Thematic analysis was used to analyze qualitative data, that is, data collected from open ended questions. The results were then presented in form of a prose.

Quantitative data or nominal data from the socio-demographic information section in the questionnaire was analyzed by use of percentages and frequencies. This data included age bracket, gender, and level of education and respondents' departments. In addition, non-parametric data was analyzed descriptively by use of measures of central tendency as the tools of data analysis. The arithmetic mean was the measure of central tendency statistical tool that was used for data analysis while the standard deviation was the measure of dispersion statistical tool of data analysis that was used.

As for the parametric data, Pearson's Product Moment Correlation analysis(r) and multivariate regression analysis was used to test the relationship between variables. The Pearson product-moment correlation coefficient (or Pearson correlation coefficient, for short) is a measure of the strength of a linear association between two variables and is denoted by *r*. Basically, a Pearson product-moment correlation attempts to draw a line of best fit through the data of two variables, and the Pearson correlation coefficient, *r*, indicates how far away all these data points are to this line of best fit. The Pearson correlation coefficient, *r*, can take a range of values from +1 to -1. A value of 0 indicates that there is no association between the two variables (Greener, 2008). A value greater than 0 indicates a positive association; that is, as the value of one variable increases, so does the value of the other variable. A value less than 0 indicates a negative association; that is, as the value of one variable increases, the value of the other variable decreases.

Regression analysis was applied in all the cases where correlation was found to exist between the independent and dependent variables. It is important to carry out regression analysis so as to establish the extent of the influence exerted on the dependent variable by the independent variable. The study therefore used univariate and multivariate regression models to test the relationship between variables. A simple linear regression model (univariate model) has one outcome and one predictor, whereas a multivariate linear regression model has one outcome and multiple predictors. The study applied a 95% confidence level. A 95% confidence interval indicates a significance level of 0.05 which implies that for an independent variable to have a significant influence on the dependent variable, the p-value ought to be below the significance level (0.05).

3.8.1 Regression Models

The following are regression models for testing the 5 hypotheses:

Regression model for objective one:

1. **H_1:** Compliance with training standards has a significant influence on the performance of air transport in Kenya.

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_1	=	Coefficients of determination
X_1	=	Compliance with aviation training standards
ε	=	Error term

Regression model for objective two:

2.H_1: Compliance with aircraft airworthiness certification process standards has a significant influence on performance of air transport in Kenya

$$Y = \beta_0 + \beta_2 X_2 + \varepsilon$$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_2	=	Coefficients of determination
X_2	=	Compliance with aircraft airworthiness certification process standards
ε	=	Error term

Regression model for objective three:

3. H_1: Compliance with resolution safety concern standards has a significant influence on performance of air transport in Kenya.

$Y = \beta_0 + \beta_3 X_3 + \varepsilon$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_3	=	Coefficients of determination
X_3	=	Compliance with resolution of safety concern
ε	=	Error term

Regression model for objective four:

4. H_1: Compliance with airport infrastructure standards significantly influences performance of air transport in Kenya

$Y = \beta_0 + \beta_4 X_4 + \varepsilon$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_4	=	Coefficients of determination
X_4	=	compliance with aircraft infrastructure standards
ε	=	Error term

Regression model for objective five:

5. H_1: There is significant relationship between combined compliance with aviation safety standards and performance of air transport in Kenya.

$Y = \beta_0 + \beta_4 X_4 + \varepsilon$

Whereby;

Y = Performance of air transport in Kenya

β_0 = Constant

β_4 = Coefficients of determination

X_4 = Combined compliance with aviation safety standards

ε = Error term

Regression model for objective six:

6. H_1: Monitoring and evaluation process has a significant influence on performance of air transport in Kenya

$$Y = \beta_0 + \beta_4 X_4 + \varepsilon$$

Whereby;

Y = Performance of air transport in Kenya

β_0 = Constant

β_4 = Coefficients of determination

X_4 = Monitoring and evaluation process

ε = Error term

Regression model for objective seven:

7. H_1: The strength of the relationship between compliance with aviation safety standards and performance of air transport in Kenya significantly depends on monitoring and evaluation process.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

Whereby;

Y = Performance of air transport in Kenya

B_0 = Constant

β_1 = Coefficients of determination

X_1 = Compliance with aviation training standards

X_2 = Compliance with aircraft airworthiness certification process standards

X_3 = Compliance with resolution safety concern

X_4 = Compliance with infrastructure safety standards

X_5 = Combined compliance with aviation safety standards

X_6 = Monitoring and evaluation process

ε = Error term

Table 3.3: Test of Hypotheses

Hypothesis	Type of Analysis	Interpretation of Results
There is no significant relationship between compliance to aviation training standards and the performance of air transport in Kenya	Correlation analysis Regression analysis	For $p < 0.05$, H_0 was rejected; and H_1 was the conclusion
There is no significant relationship between compliance to aircraft airworthiness certification process standards and the performance of air transport in Kenya	Correlation analysis Regression analysis	For $p < 0.05$, H_0 was rejected; and H_1 was the conclusion
There is no significant relationship compliance to resolution safety concern and performance of air transport in Kenya.	Correlation analysis Regression analysis	For $p < 0.05$, H_0 was rejected; and H_1 was the conclusion
There is no significant relationship compliance to structure safety standards and performance of air transport in Kenya.	Correlation analysis Regression analysis	For $p < 0.05$, H_0 was rejected; and H_1 was the conclusion
There is no significant relationship between combined compliance to aviation safety standards and performance of air transport in Kenya.	Correlation analysis Regression analysis	For $p < 0.05$, H_0 was rejected; and H_1 was the conclusion
There is no significant relationship between monitoring and evaluation process and performance of air transport in Kenya	Correlation analysis Regression analysis	For $p < 0.05$, H_0 was rejected; and H_1 was the conclusion
The strength of the relationship between compliance to aviation safety standards and performance of air transport in Kenya does not depend on monitoring and evaluation process.	Correlation analysis Regression analysis	For $p < 0.05$, H_0 was rejected; and H_1 was the conclusion

3.9 Ethical Consideration

Ethical considerations were observed throughout the research process. A letter of authorization to conduct the study from University of Nairobi was sent to National Commission for Science, Technology and Innovation (NACOSTI) for issuance of permit and a letter granting the authority to carry out research within Kenya. The introduction letter was send to the head of Kenya Civil Aviation Authority to inform him of the intended study for approval to visit the premises to carry out the study in airports within Nairobi County where operators are found and also KCAA headquarter in Nairobi.

The contribution of this research to the knowledge of Project Planning and Management required utmost anonymity of the respondents to be upheld. To ensure this is done, all respondents were given freedom to participate and contribute voluntarily to the study. The researcher also adhered to appropriate behaviour in relation to the rights of the respondents. A verbal consent was sought from the sample respondents before being interviewed. The necessary research authorities were consulted and consent approved and appropriate explanations specified to the respondents before commencement of the study. In addition, all forms of plagiarism were avoided through proper referencing of all sources used. Confidentiality is the non-disclosure of research findings to an unauthorized party who may use the research data for their own purposes. Creswell (2013) argues that the researcher has an obligation to respect the rights, needs, values and desires of the informants. At all times the researcher adhered to ethical issues including; informed consent, honesty and trust, privacy, anonymity, disclosure, harm and risk policy, and voluntary participation. During data analysis and reporting, the researcher endeavored to practice acceptable analytical methods and reporting.

Research protocol and itinerary activities involved getting a letter of approval from KCAA, list of target population and training two research assistants for two days. The training covered reading the questionnaires and discussing possible questions that may come from respondents who do not understand some parts in the items. After the training they were issued with introduction letters to ensure cooperation during data collection. Ethical considerations formed the core of the research from inception to completion of the research. Respondents were treated with respect and their identities kept confidential. The cooperation between the KCAA staff and also the operators made data collection easier. The collected data generated information that was organized for data analysis.

3.10 Operational Definition of Variables

Table 3.3 gives a summary of research objectives, variables of study, their indicators, and level of measurement, type of statistical analysis, and tools of analysis for each objective and type of tool employed for each objective.

Table 3.4: Operational Measurement of Variables

Objectives	**Indicators**	**Measurement scale**	**Tools of Analysis**
Performance of Air Transport	• Number of airline operators • Number of air accidents • Adherence to time schedule • Frequency of oversight surveillence	Ordinal Interval	• Descriptive statistics • Correlation Analysis • Univariate regression analysis • Multiple regression analysis
Compliance with Aviation Training Standard	• Basic Training • Qualification Training • Training Facilities • Learning Environment	Ordinal Interval	• Descriptive statistics • Correlation Analysis • Univariate regression analysis • Multiple regression analysis
Compliance with Certification Process Standard	• Condition of the Aircraft • Aircraft Conformity to Design • Inspection Requirements • Aircraft Documentation	Ordinal Interval	• Descriptive statistics • Correlation Analysis • Univariate regression analysis • Multiple regression analysis
Compliance with resolution Safety Concern Standard	• Analyzing Safety Deficiencies • Availability of procedures in rectification of safety • Corrective Action to Safety Deficiencies	Ordinal Interval	• Descriptive statistics • Correlation Analysis • Univariate regression analysis • Multiple regression analysis
Compliance with Airport Infrastructure Standards	• Number of Runways • Aircraft Ramp Parking • Taxiing Space (Aerodromes) • Hangar Construction Spaces	Ordinal Interval	• Descriptive statistics • Correlation Analysis • Univariate regression analysis • Multiple regression analysis
Monitoring and Evaluation process	• Preparation of M&E work plans • Data collection on aviation safety compliance • Data Analysis • Dissemination of M&E results	Ordinal Interval	• Descriptive statistics • Correlation Analysis • Univariate regression analysis • Multiple regression analysis

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents the analysis of the data collected and gathered as defined by the study's research methodology. Data were analyzed and presented as per thematic areas in line with the objectives of the study. The chapter is divided into several sections. The first section is the introduction of the chapter. The second one presents the study's questionnaires response rate. The third section presents the respondents demographic information of both regulator and the air operators based on gender, age, highest level of education, years of experience in the air transport, and their department in the institution. This is followed by the section on tests of assumptions as well as analysis of Likert type of data. The fifth presents the analysis of the dependent variable of the study followed by analysis of the influence of each of the independent variables on the dependent variables as per study objectives.

4.2 Questionnaire Return Rate

The issue of response rate in survey studies is very essential. Questionnaire return rate may be affected by several factors. Such factors may include the survey design, social environment, respondent's interest, obligations, lifestyle, experience and psychological predisposition. High response rate is an indicator of willingness and cooperation of the respondents to participate in the study although low response does not indicate bias (Rindfuss, Choe, Tsuva, Bumpass & Tamaki, 2015). Qquestionnaires were administered to 126 air operators out of which 121 were filled and returned for data analysis translating to 96.0% return rate. The questionnaires were also administered to 101 regulators out of which 81 were filled and returned for data analysis translating to 80.0% return rate. The response rate of the study was deemed reasonable for statistical generalization and for further analysis as recommended by (Saunders, Lewis & Thornhill, 2009).

4.3 Demographic Information of the Respondents

Respondent's demographic information or in other cases referred to as biographic data play a substantial role in the categories of responses conveyed by the respondents. This section presents the demographic information of the respondents according to their gender, age, education level, work experience, and their departments. This information helps to check if the respondents are normally distributed.

4.3.1 Distribution of Respondents by Gender

Gender of the respondents is a key variable putting into consideration the one third gender rule as specified by the new constitution of Kenya. The respondents were requested to indicate their gender and the results are presented in Table 4.1.

Table 4.1: Gender Distribution of Respondents

Respondents	**Regulators**	**(Staff)**	**Air Operators**	
Gender	**Frequency**	**Percentage%**	**Frequency**	**Percentage%**
Male	48	59.3	83	68.6
Female	33	40.7	37	30.6
No response	0	0.0	1	0.8
Total	**81**	**100.0**	**121**	**100.0**

In regard to gender of the respondents (regulators), the study results in Table 4.1 indicate that majority of the respondents 48(59.3%) were male while 33(40.7%) were female. Although the findings depict that KCAA is male dominated, the organization has adhered to the constitutional requirement of having at least 30% employees as either gender in a bid to encourage gender balance in various professions. The results in Table 4.1 reveals that majority of the respondents (Air operators) 83(68.6%) were male while 37(30.6%) were female. Even though the findings depict that air operators in Kenya is male dominated, the companies appear to have adhered to the constitutional requirement of having at least 30% operators as either gender in a bid to encourage gender balance in various professions (constitution of Kenya, 2010).]

4.3.2 Distribution of Respondents by Age

The age of a respondent defines the level of maturity of the respondents and is among the very important characteristics used to understand the respondent's views on a particular subject. In this study, age was not a parameter of focus but was used to check if the respondents were normally distributed. The interval between groups was 10 that is 20-30 years, 31-40 years, 41-5 years, above 50 years for both the regulator and operator age groups were. The respondents were requested to indicate their age and the results are presented in Table 4.2.

Table 4.2: Distribution of Respondents by Age

Age Bracket (Years)	**Regulators Frequency**	**Percentage%**	**Air Operators Frequency**	**Percentage%**
20-30	06	7.4	5	4.1
31-40	16	19.8	17	14.0
41-50	32	39.5	44	36.3
Above 50	26	32.1	53	43.8
No response	01	1.2	1	0.8
Total	**81**	**100.0**	**121**	**100.0**

On the age characteristic of the regulator, the research results in Table 4.2 indicate that 32(39.5%) of Regulators were aged between 41-50 years, 26(32.1%) were above 50 years, 16(19.8%) were between 31-40 years, while 6(7.4%) were between 20-30 years. These findings indicate that majority of the regulators are above 40 years of age hence well proficient in their work and therefore expected to perform their duties to high standards.

Results on Table 4.2 regarding the age characteristic of the respondents (air operators) indicate that 53(43.8%) of the air operators who participated in this study were above 50 years, 44(36.4%) were between 41-50 years, 17(14.0%) were between 31-40 years, and 5(4.1%) were between 20-30 years of age. These results indicate that majority of the air operators are above 40 years of age implying they are able to run their businesses seriously because they are mature enough to make informed choices without peer influence.

4.3.3 Distribution of Respondents by Level of Education

The education of a respondent is another significant characteristic that influences the respondent's attitudes and way of understanding a certain social phenomenon. It is also important because it implicated on how to respond to questionnaire items and interview questions as well as their understanding of aviation safety standards and performance of air transport in Kenya. The level of education was characterized in levels that included secondary education, certificate, diploma, bachelors, masters, PhD and the respondents were allowed to specify any other level not in these categories. The respondents were requested to indicate their highest level of education whose findings are presented in Table 4.3.

Table 4.3: Distribution of Respondents by Level of Education

Highest Education Level	Regulator Frequency	Percentage %	Air Operators Frequency	Percentage%
Secondary	1	1.3	0	0.0
Certificate	1	1.2	2	1.7
Diploma	15	18.5	18	14.9
Bachelors	31	38.3	56	46'3
Masters	32	39.5	37	30.6
PhD	0	0.0	6	5.0
No response	1	1.2	2	1.7
Total	**81**	**100.0**	**121**	**100.0**

With regard to the respondents' education, the study results in Table 4.3 reveal that 32(39.5%) of the regulator staff had attained Master's degree level of study, 31(38.5%) had Bachelor's degree, 15(18.5%) had Diploma level of education, 1(1.2%) had certificate and 1(1.2%) had attained secondary level of education. The results indicate that majority of Regulators have attained Master's and Bachelor's degree as their highest level of education implying that the staff are adequately qualified academically for their posts and therefore regulation of air transport is expected to be excellent.

The results on Table 4.3 show that 56(46.3%) of the air operators have attained Bachelor degree, 37(30.6%) had Master's degree, 18(14.9%) had diploma, 6(5.0%) had PhD degree and 2(1.7%) had certificate level of education. The results indicate that majority of air operators have attained university degree as their highest level of education implying that they are adequately qualified for their professions and are expected to bring a positive influence to air transport in Kenya.

4.3.4 Distribution of Respondents by Professional Career

The respondents were requested to indicate their professional career and the findings are presented in Table 4.4.

Table 4.4: Distribution of Respondents by Professional Career

Professional Career	**Regulator Frequency**	**Percentage%**
Pilot	13	16.0
Aircraft engineer	21	25.9
Air traffic controller	6	7.4
Aviation security	8	9.6
Personnel licensing	6	7.4
Aerodrome inspector	1	1.2
Human resource	2	2.5
ATC	1	1.2
Flight operations	9	11.1
Air transport officer	1	1.2
RPAS officer	1	1.2
No response	12	14.8
Total	**81**	**100.0**

On the respondents' professional career, the study results reveal that 21(25.9%) of the Regulators were engineers by profession, 13(16.0%) were pilots, 9(11.1%) were in flight operations, 8(9.9%) aviation security, 6(7.4%) air traffic, 6(7.4%) personnel licensing, 2(2.5%) human resource, 1(1.2%) aerodrome inspection, 1(1.2%) ATC, 1(1.2%) were air transport officers, and 1(1.2%) were RPAS officers. These findings show that majority of the respondents were engineers and pilots and therefore implying they have vast knowledge about air transport.

4.3.5 Distribution of Respondents by Department in KCAA

A respondent's department has a bearing on the quality of responses given in regard to technical questions. The respondents were requested to indicate the department they worked in and the findings are presented in Table 4.5.

Table 4.5: Distribution of Respondents by Department in KCAA

Department in KCAA	Frequency	Percentage%
Flight operations	21	25.9
Airworthiness	21	25.9
Personnel licensing	6	7.4
Ground operations	12	14.8
Aviation security	7	8.6
Air transport	11	13.6
Human resource	2	2.5
RPAS officer	1	1.2
Total	**81**	**100.0**

The findings as indicated in Table 4.5 denote that 21(25.9%) of regulator staff are in flight operations department, 21(25.9%) airworthiness department, 12(14.8%) ground operations department, 11(13.6%) air transport department, 7(8.6%) aviation security department, 6(7.4%) personnel licensing department, 2(2.5%) human resource department, and 1(1.2%) were from the RPAS department. The study results imply that majority of Regulators are in flight operations and airworthiness departments which are key departments in regulating air transport in a country.

4.3.6 Distribution of Respondents by Work Experience

A respondent's work experience has an influence on the quality of responses given in regard to technical questions. The respondents were requested to indicate the number of years they have worked in air transport industry and the findings are presented in Table 4.6.

Table 4.6: Distribution of Respondents by Work Experience

Work Experience in Air Transport Industry	Regulators Frequency	Percentage%	Air Operators Frequency	Percentage%
Less than 1 year	7	8.6	3	2.5
1-3 years	12	14.8	29	24.0
4-6 years	6	7.4	39	32.2
7-10 years	19	23.5	28	23.1
Above 10 years	37	45.7	21	17.4
No response	0	0.0	1	0.8
Total	**81**	**100.0**	**121**	**100.0**

In regard to the respondents' general work experience in air transport, the study found that majority 37(45.7%) of the Regulators have worked with air transport for more than 10 years, 7-10 years 19(23.5%), 1-3 years 12(14.8%), less than 1 year 9(8.6%) and 4-6 years 6(7.4%). Therefore, majority of the Regulators have worked in air transport for over 10 years implying that the staff are expected to utilise their gained experience to influence performance of air transport in Kenya.

Results show that majority 39(32.2%) of the air operators have worked in the aviation industry or with air transport for 4-6 years, 29(24.0%) for 1-3 years, 28(23.1%) for 7-10 years, 21(17.4%) for more than 10 years, and 3(2.5%) for less than 1 year. Therefore, majority of air operator staff have worked in the aviation industry for a period of 4-6 years implying that the staff are expected to utilise the gained experience to influence performance of air transport in Kenya.

4.3.7 Distribution of Respondents by Number of Years with KCAA

The respondents were requested to indicate the number of years they have been employed by KCAA. The study findings are presented in Table 4.7.

Table 4.7: Distribution of Respondents by Number of Years with KCAA

Number of Years with KCAA	Frequency	Percentage%
Less than 1 year	11	13.6
1-3 years	13	16.0
4-6 years	17	21.0
7-10 years	12	14.8
Above 10 years	27	33.3
No response	1	1.2
Total	**81**	**100.0**

The study results in Table 4.7 revealed that 27(33.3%) of the respondents have worked with KCAA for more than 10 years, 17(21.0) have worked for 4-6 years, 13(16.0%), have worked for 1-3 years, 12(14.8%) have worked for 7-10 years, 11(13.6%) have worked for less than one year.. From the study results, majority of the Regulators have worked with the institution for more than 10 years. This implies that KCAA is not affected by staff turnover and therefore good performance may be attributed to staff stability.

4.3.8 Distribution of Respondents by Number of Years as Air Operator

The respondents were requested to indicate the number of years the air operator has been operational. The study findings are presented in Table 4.8.

Table 4.8: Distribution of Respondents by Number of Years as Air Operator

Number of Years as Air Operator	Frequency	Percentage
Less than 1 year	3	2.5
1-3 years	19	15.7
4-6 years	19	15.7
7-10 years	29	24.0
Above 10 years	31	25.6
No response	20	16.5
Total	**121**	**100.0**

With regard to the number of years the air operator has been operational, the study results in Table 4.8 revealed that 31(25.6%) have worked as an air operator for over 10 years, 29(24.0%) for 7-10 years, 19(15.7%) for 4-6 years, 19(15.7%) for 1-3 years 3(2.5%) for less than 1 year. The results imply that majority of air operators have been operational for more than 10 years and therefore are expected to have some significant influence by complying with aviation safety standards on the performance of air transport in Kenya.

4.4 Tests for Statistical Assumptions and Analysis of Likert Type of Data

This section elucidates in detail how tests for normality, multicollinearity, homoscedasticity and heteroscedasticity were carried out and also explains the procedure used in controlling Type I and Type II errors. In addition usage of Likert Scale data analysis is also illuminated

4.4.1 Tests of Normality

Tests of normality were carried out and presented in this section of the study. The study conducted tests of normality using Kolmogorov-Smirnov test statistics (KS-test) and Shapiro-Wilk test (SW-test). According to Rizali & Wah (2011), KS- test belongs to the Supremum class of EDF statistics which is meant to test if data follows or does not follow a specified distribution based on the largest vertical difference between the hypothesized and empirical distribution. Assumption of normality is essential for most of the statistical analysis such as correlation, regression, and analysis of variance since their validity is based on normality (Singh & Masaku, 2014). It is usually assumed that the population from which samples are taken is normally distributed. Among some of the commonly used tests for normality are the Kolmogorov-Smirnov tests, Shapiro-Wilk tests, and the Anderson-Darling tests. When interpreting Shapiro-Wilk tests, if the p-value of the test is greater than 0.05, then the data is normal and if it is below 0.05 then the data significantly deviates from normal distribution.

When testing for normality, the null hypothesis was that the sample population was not normal. The study used Shapiro-Wilk test countercheck the validity of the normality results obtained from the KS-test statistics. Rizali & Wah (2011) argue that the Shapiro-Wilk test has the ability to detect departures from normality due to either skewness or kurtosis or both. When testing whether a population is normal using SW-test, the null hypothesis is rejected if the value of W is too small (Rizali & Wah, 2011). Statistically, the value of W should lie between zero and one whereby small values of W lead to the rejection of normality whereas a value of one indicates normality of the data Rizali & Wah (2011). The study results of the KS- test and SW-test are presented in Table 4.9.

Table 4.9: Results of Kolmogorov-Smirnov and Shapiro-Wilk tests

	Kolmogorov-Smirnov			**Shapiro-Wilk**		
Variables	**Statistic**	**Df**	**Sig.**	**Statistic**	**Df**	**Sig.**
Compliance with aviation training standards	0.311	202	0.201	0.777	202	0.067
Compliance with aircraft airworthiness certification process standards	0.348	202	0.165	0.747	202	0.009
Compliance with resolution safety concern standards	0.374	202	0.001	0.719	202	0.090
Compliance with aircraft infrastructure standards	0.428	202	0.206	0.785	202	0.115
Monitoring and evaluation process	0.345	202	0.008	0.751	202	0.04
Performance of Air Transport industry	0.379	202	0.002	0.709	202	0.000

Results in Table 4.9 indicate that compliance with: aviation training standards, aircraft airworthiness certification process, and aircraft infrastructure standards were normally distributed while compliance with resolution safety concern, monitoring and evaluation process, and performance of air transport are skewed. In social sciences, most variables are not normally distributed (Smith & Wells, 2006). According to Wuensch (2016), when absolute values of skewness and kurtosis are less than 1, then normality can be assumed albeit p-value under SW-test being less than 0.05. Under this study, absolute values of skewness and kurtosis were less than 1 and hence normality was assumed. Table 4.3 further reveal that in all the variables under investigation, $p < 0.05$ and therefore the null hypothesis was rejected and concluded that the sample was picked from a normal population. The SW-test statistics for the study variables were between .719 and .785 hence the null hypothesis that the population was not normal was rejected. It was therefore concluded that the sample population was normally distributed.

4.4.2 Tests for Multicollinearity for the Variables

The study variables were then subjected to multicollinearity tests using Variance Inflation Factor (VIF) and Tolerance Tests as recommended by Asteriou & Hall (2007). Asteriou & Hall (2007) contend that multicollinearity is caused by intercorrelations among explanatory variables. Garson (2012) and Koop (2005) argue that multicollinearity is a problem that stems out if some or all explanatory variables are highly correlated with one another. When multicollinearity is present, the regression model has struggles to reveal which explanatory variable(s) influences the dependent variable. Therefore, a multicollinearity problem reveals itself through low t-statistics and hence high P-values (Garson, 2012). Having an intercorrelation among the independents above 0.80 reveals a likely problem. Table 4.10 presents the results for multicollinearity tests.

Table 4.10: Results of Multicollinearity Tests

Variables	Tolerance	VIF
Compliance with aviation training standards	0.452	3.037
Compliance with aircraft airworthiness certification process standards	0.431	2.320
Compliance with resolution safety concern standards	0.269	2.432
Compliance with aircraft infrastructure standards	0.259	4.821
Monitoring and evaluation process	0.619	2.871
Performance of Aviation industry	0.120	3.367

The study variables were subjected to Multicollinearity testing using Variance Inflation Factor (VIF) and Tolerance Tests in the regression analysis. From the study results on Table 4.10, the values of Variance Inflation Factor (VIF) ranged from 2.32 to 4.8 which is less than 10. The values of Variance Inflation Factor (VIF) for the study were within the criteria set by Meyers (1990), who suggest that VIF should be less than 10. The tolerance value was between 0.120 and 0.619 which was within Menard's (1995) criteria, who suggested that tolerance value of less than 0.1 can imply Multicollinearity. None of the independent variables had a correlation of more than 0.8 which suggested that there was no Multicollinearity. According to Garson (2008), inter-correlation among variables of more than 0.8 indicates a likely problem of Multicollinearity

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4.4.3 Test for Homoscedasticity and Heteroscedasticity

Testing of homoscedasticity prior to estimation of regression coefficient and testing of hypotheses is integral part of research. This was done to ensure that the assumptions for the application and analysis by use of regression analysis were complied with. Whenever variance of error varies across observations, heteroscedasticity occurs and homoscedasticity means that the variance of error is the same across all levels of independent variable. If such variances are not rectified they would lead to incorrect inferences. This implies that testing of heteroscedasticity is a must for prudent data analysis that decreases the possibility of Type I error. The assumption of homoscedasticity was checked by visually by observing plot of standardized residuals (errors) and the regression standardized predicted value. If the Sig. value>0.05, then there is no problem of Heteroscedasticity. The results for tests of Heteroscedasticity were presented in Table 4.11.

Table 4.11: Test for Heteroscedasticity

Coefficients Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**T**	**Sig.**
1	(Constant)	1.362	.242		5.663	.148
	Aviation training standards	.092	.045	.554	2.815	.059
	Aircraft airworthiness certification	.034	.053	.465	2.512	.860
	Resolution safety concern	.030	.057	.152	1.955	.065
	Airport infrastructure	.008	.050	.359	3.201	.089

a. Dependent Variable: Performance of Air Transport

Based on the output coefficients, the study obtained Sig. values >0.05 implying there were no problems of Heteroscedasticity. This shows that there is no difference in residual variance of independent to dependent variables tested.

4.4.4 Control of Type I Error and Type II Error

These errors arise out of failure to meet some assumptions about variables used in the data analysis that give untrustworthy results. Removal of univariate and bivariate outliers can reduce the probability of Type I and Type II errors and improve accuracy of estimates by using SPSS as evident by (Osborn and Waters, 2001). Errors must be avoided during analysis because unreliable measurement in a simple correlation and regression causes relationships to be under-estimated thus increasing Type II errors. Also in multiple regression or partial correlation, effect sizes of other variables can be over-estimated if the covariate is not reliably measured. In the current study correlation of low reliability was done and obtained a composite Cronbach alpha of 0.70. This ensured the reliability and displayed a true picture of the relationship of the variables and avoided over-estimating in the multiple regressions. Confidence level of 95% and significant level of 0.05 was used during testing of results and Type II error was minimized by taking a large sample of 201 participants.

4.4.5 Analysis of Likert-Type Data

In this study, six sections of the research instruments had items in a Likert type scale format with five scales. Bryman (2012) refers to a Likert scale as a multiple-item measure of a set of attitudes relating to a particular area which aims at measuring intensity of feelings about the area in question. The most common format for indicating the level of agreement is a five-point scale ranging from ‘strongly agree’ to ‘strongly disagree’ whereas the middle positions of the scale are ‘neither agree nor disagree’ or ‘undecided’ denoting neutrality on a particular issue. Each respondent is asked to indicate their level of agreement with the statement and the reply on each item is scored then the scores are aggregated to give an overall score as suggested by Lantz (2013).

In this study the following Likert Scale was used: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree. The following scale was also used: 1=To a very small extent; 2=To a small extent; 3=To a moderate extent; 4=To a great extent; and 5=To a very great extent. Carifio and Racco (2007) indicates that when using a five point Likert scale the following is the scoring; To a very great extent (VGE) 4.2<VGE<5.0; To a great extent (GE) 3.4<GE<4.2; To a moderate extent (ME) 2.6<ME<3.4; To a little extent (LE) 1.8<LE<2.6 and to a very little extent (VLE) 1.0<VLE<1.8. The scale gives equidistant of 0.8. This weighting criterion was followed in data analysis of Likert-type of data in this study. The same scale was used successfully by Kinyanjui (2014), Kirema (2015), Obondi(2017) and Seboru (2017).

4.5 Analysis of Performance of Air Transport

In this study, performance of air transport was identified as the dependent variable. Based on theory and accessible empirical literature, several indicators were identified and considered to measure performance of air transport in Kenya. These include number of air operators, number of flight bookings and air charters, number of air accidents, number of aircrafts in KCAA register records, airline business growth, operators flight routes, staff trainings, scheduled oversight surveillance by regulator, aircraft operational turn-around time, inspection of airport facilities, aircraft parking space, initial training, periodic recurring trainings on aviation safety standards, and conducive environment for air transport business.

4.5.1 Current Overall Performance of the Air Transport in Kenya

The respondents who were regulators and air operators were asked to indicate the current overall performance of the air transport in Kenya. The results are presented in Table 4.12.

Table 4.12: Current Overall Performance of the Air Transport in Kenya

Current Overall	**Air Operators**		**Regulators**	
Performance	**Frequency**	**Percentage%**	**Frequency**	**Percentage%**
Excellent	10	8.3	2	2.5
Good	75	62.0	44	54.3
Average	35	28.9	35	43.2
Low	0	0.0	0	0.0
Poor	0	0.0	0	0.0
No response	1	0.8	0	0.0
Total	**121**	**100.0**	**81**	**100.0**

Results on Table 4.12 indicate that 75(62.0%) of the air operators and 44(54.3%) of the regulator indicated that the current overall performance of the air transport in Kenya was good. 35(28.9%) of the air operators and 35(43.2%) of the regulators indicated that the current overall performance of the air transport in Kenya was average. A significant number of air operators and regulators 10(8.3%) and 2(2.5%) respectively indicated that the current overall performance of the air transport in Kenya was excellent. The study results reveal that both the air operators and their regulator unanimously felt that the current overall performance of the air transport in Kenya was good leaving room for improvement to achieve excellent performance. This was echoed by key informant interview respondent who said in average business is not doing badly. One respondent said:

> Air transport is complicated and unpredictable business. It is marred by all sorts of turbulent, unexpected happenings. Sometimes you wake up only to hear from news a helicopter has crashed and all occupants including the pilot perished. Your fear is if the helicopter is that which you audited thoroughly just a few weeks ago. I tell you the performance of air transport is unpredictable but we are managing the industry. So far as we stand here I can say the performance is good but the fear of unpredictable exists. This business is not an easy operation and only God knows because the risk is high.

From this discussion it can be deduced that air transport is doing well although the operators should be on high alert and put risk management plans updated all the time to tackle any unexpected eventuality. The respondent articulated the uncertainty of air transport. Therefore systems should be put in place to counter any risky situation.

4.5.2 General Performance of the Air Operator in the Last 3 Years

The air operators were requested to indicate how their general performance has been in the last 3 years of operation. The findings are presented in Table 4.13.

Table 4.13: General Performance of Air Operators in the Last 3 years

General Performance in 3 years	Frequency	Percentage%
Excellent	12	9.9
Good	68	56.2
Average	35	28.9
Low	0	0.0
Poor	0	0.0
No response	6	5.0
Total	**121**	**100.0**

The research results in Table 4.13 show that 68(56.2%) of the air operators indicated that their general performance in the last 3 years has been good, 35(28.9%) indicated that it has been average while 12(9.9%) indicated that it was excellent. This indicates that in overall the general performance of the air operators in the last 3 years has been good but with challenges as business industry.

4.5.3 Safety Related Air Accidents or Incidents in the Last 10 Years

The air operators were requested to indicate if in their operations, they have experienced any safety related air accidents or incidents in the last 10 years. The findings are presented in Table 4.14.

Table 4.14: Safety Related Air Accidents or Incidents in the Last 10 Years

Safety Related Air Accidents	Frequency	Percentage%
Yes	90	74.4
No	25	20.6
No response	6	5.0
Total	**121**	**100.0**

Results in Table 4.14 reveal that 90(74.4%) of the air operators indicated that they have experienced safety related air accidents or incidents in the last 10 years while a significant number 25(20.7%) indicated that they have never experienced safety related air accidents and/or incidents in the last 10 years. The study findings reveal that there have been a significant number of safety related air accidents and/or incidents in the last 10 years by some air operators. Air operators were given eight items rated on a five point Likert scale ranging from: Strongly Agree (SA); agree (A); Neutral (N); Disagree (D); and Strongly Disagree (SD) from which to choose. The findings are presented in Table 4.15.

Table 4.15: Performance of Air Transport (Air operators)

Statements	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	SDV	Total F (%)
There is an increase in the number of air operators in the country	59(48.8)	59(48.8)	3(2.5)	0(0.0)	0(0.0)	1.54	0.54	121(100)
Increase in flight bookings, air charters and maintenance activities	43(35.5)	74(61.2)	4(3.3)	3(2.5)	0(0.0)	1.68	0.53	121(100)
There has been noticeable reduction in number of air accidents in the country	31(25.6)	56(46.3)	25(20.7)	9(7.4)	0(0.0)	2.10	0.87	121(100)
There is an increase in number of aircraft in KCAA register-records	36(29.8)	73(60.3)	8(6.6)	1(0.8)	0(0.0)	1.78	0.60	121(100)
Air operators have experienced growth in business revenues	36(29.8)	59(48.8)	23(19.0)	3(2.5)	0(0.0)	1.94	0.76	121(100)
Expansion of operators flight route	30(24.8)	56(46.3)	33(27.3)	2(1.6)	0(0.0)	2.03	0.73	121(100)
There has been continuous staff training by the air operators in all fields in the business	18(14.9)	66(54.5)	28(23.1)	1(0.8)	0(0.0)	2.24	0.81	121(100)
There is scheduled oversight surveillance by the regulator	36(29.8)	47(38.8)	33(27.3)	2(1.7)	0(0.0)	2.01	0.81	121(100)
Composite for Performance of Air Transport						**1.91**	**0.73**	

In regard to performance of air transport, Table 4.15 revealed that majority of the air operators agreed that there has been increase in flight bookings, air charters and maintenance activities (61.2%), there was an increase in number of aircraft in KCAA register-records (60.3%), there has been continuous staff training by the air operators in all fields in the business (54.5%), there is an increase in the number of air operators in the country (48.8%), air operators have experienced growth in business revenues (48.8%), there has been noticeable reduction in number of air accidents in the country (46.3%), there has expansion of operators flight route (46.3%), and there is scheduled oversight surveillance by the regulator (38.8%). Table 4.8 further reveals that a significantly good number of air operators strongly agreed that there has been increase in flight bookings, air charters and maintenance activities (35.5%) and there is an increase in the number of air operators in the country (48.8%). These study results reveal that increase in flight bookings, air charters and maintenance activities and increase in the number of air operators in the country are the main indicators of the good performance of air transport in Kenya as assumed by air operators in Kenya.

Results in Table 4.15 indicate that the mean score for the eight statements used to measure air transport performance was 1.91 and standard deviation of 0.73. This implies that there has been an increase in performance of air transport as shown by the indicators herein. The study results in Table 4.15 show that respondents agreed: there is an increase in the number of air operators in the country (M=1.54, SVD=0.54), there is increase in flight bookings, air charters and maintenance activities (M=1.68, SVD=0.53), that there has been noticeable reduction in number of air accidents in the country (M=2.10, SVD=0.87), that there is an increase in number of aircraft in KCAA register-records (M=1.78, SVD=0.60), that air operators have experienced growth in business revenues (M=1.94, SVD=0.76), that expansion of operators flight route (M=2.03, SVD=0.73), that there has been continuous staff training by the air operators in all fields in the business (M=2.24, SVD=0.81), and that there is scheduled oversight surveillance by the regulator (M=2.01, SVD=0.81). The results imply that increase in flight bookings, air charters and maintenance activities, reduction in number of air accidents in the country, air operator's growth in business revenues, and increase in the number of air operators in the country are key indicators of good performance of air transport in Kenya.

The respondents (regulator) were given twelve items rated on a five point Likert scale ranging from: 0-20%; 21-40%; 41-60%; 61-80%; and 81-100% to choose from in regard to performance of air transport. The study findings in regard to the air regulator were presented in Table 4.16.

Table 4.16: Performance of Air Transport and Regulators

Statements	0-20% F (%)	21-40% F (%)	41-60% F (%)	61-80% F (%)	81-100% F (%)	Mean	SDV	Total F (%)
There is an increase in the number of air operators in Kenya	6 (7.4)	11(13.4)	14(17.3)	29(35.8)	21(25.9)	3.59	1.22	81(100)
There has been reduction in number of air accidents/air-incidents in Kenya	5(6.2)	22(27.2)	18(22.2)	22(27.2)	13(16.0)	3.20	1.195	81(100)
There is an increase in number of registered aircraft fleet	3(3.7)	7(28.6)	15(18.5)	33(40.7)	23(28.4)	3.81	1.06	81(100)
Compliance with air safety standards has led to an increment in aircraft fleet	8(9.9)	7(8.6)	28(34.6)	25(30.9)	12(14.8)	3.32	1.14	81(100)
Adherence to regulator service chatter timelines improves the quality of air transport services	8(9.9)	4(4.9)	11(13.6)	43(53.1)	15(18.5)	3.65	1.14	81(100)
Aircraft operational turn round time can be shorter because of strict adherence to set schedules	5(6.2)	12(14.8)	28(34.6)	24(29.6)	11(13.6)	3.30	1.08	81(100)
Aircraft parking space (ramp) can accommodate high number of aircrafts fleet	19(23.5)	24(29.6)	16(19.8)	19(23.5)	2(2.5)	2.51	1.16	81(100)
Inspection of airport facilities	2(2.5)	16(19.8)	9(11.1)	14(17.3)	6(7.4)	3.13	1.15	81(100)
Movement of aircrafts on the ramp have adequate expansion space	11(13.6)	23(28.4)	18(22.2)	17(21.0)	12(14.8)	2.95	1.28	81(100)
Regulator staff are scheduled for recurring training on aviation safety standards annually	10(12.3)	18(22.2)	24(29.6)	20(24.7)	7(8.6)	2.95	1.16	81(100)
Strict schedules on oversight surveillance by the regulator improves air transport performance	6(7.4)	10(12.3)	14(17.3)	30(37.0)	21(25.9)	3.62	1.21	81(100)
Compliance with applicable regulations and terms will increase air transport performance	6(7.4)	3(3.7)	5(6.2)	31(38.3)	36(44.4)	4.09	1.15	81(100)
Kenya has conducive environment for air transport business	0(0.0)	5(6.2)	12(14.8)	31(38.3)	32(39.5)	4.13	0.89	81(100)
Composite for Performance of Air Transport						**3.68**	**0.64**	

In evaluating performance of air transport in Kenya for the last five years, Table 4.16 denote that majority of the regulators (53.1%) agreed that adherence to regulator service chatter timelines improves the quality of air transport services scoring 61-80%, 44.4% agreed that compliance with applicable regulations and terms will increase air transport performance scoring 81-100%, 40.7% agreed that there is an increase in number of registered aircraft fleet scoring 61-80%, 39.5% agreed that Kenya has conducive environment for air transport business scoring 81-100%, 38.3% agreed that compliance with applicable regulations and terms will increase air transport performance scoring 61-80%, 37.0% agreed that strict schedules on oversight surveillance by the regulator improves air transport performance scoring 61-80%, 35.3% agreed that there is an increase in the number of air operators in Kenya 61-80%, 34.6% agreed aircraft operational turn round time can be shorter because of strict adherence to set schedules 41-60%, 34.6% agreed that compliance with air safety standards has led to an increment in aircraft fleet scoring 41-60%, and 30.9% of the regulators agreed that compliance with air safety standards has led to an increment in aircraft fleet scoring 61-80%.

The study results in Table 4.16 revealed that for the last five years, compliance with applicable regulations and terms increases air transport performance, and Kenya has conducive environment for air transport business scored 81-100% which is above the expected pass in audit score of over 80% as set by ICAO. The study findings further revealed that: adherence to regulator service chatter timelines, increase in number of registered aircraft fleet, compliance with applicable regulations and terms, strict schedules on oversight surveillance by the regulator, increase in the number of air operators, shorter aircraft operational turn round time due to strict adherence to set schedules, compliance with air safety standards, and compliance with air safety standards has influenced air transport performance and quality of air transport services for the last five years scoring 61-80% slightly lower than the expected pass in audit score of over 80% set by ICAO .

Table 4.16 results indicate that the mean score for the twelve statements used to measure air transport performance was 3.68 and standard deviation of 0.64 implying that there has been an increase in performance of air transport. The study results in Table 4.15 show that respondents agreed: there is an increase in the number of air operators in Kenya (M=3.59, SVD=1.22), there has been reduction in number of air accidents/air-incidents in Kenya (M=3.20, SVD=1.19), there is an increase in number of registered aircraft fleet (M=3.81, SVD=1.06), that compliance with air safety standards has led to an increment in aircraft fleet (M=3.32, SVD=1.14), that adherence to regulator service chatter timelines improves the quality of air transport services (M=3.65, SVD=1.14), that aircraft operational turn round time can be shorter because of strict adherence to set schedules (M=3.30, SVD=1.08), that aircraft parking space (ramp) can accommodate high number of aircrafts fleet (M=2.51, SVD=1.16), that inspection of airport facilities (M=3.13, SVD=1.15), that movement of aircrafts on the ramp have adequate expansion space (M=2.95, SVD=1.28), that regulator staff are scheduled for recurring training on aviation safety standards annually (M=2.95, SVD=1.16), that strict schedules on oversight surveillance by the regulator improves air transport performance (M=3.62, SVD=1.21), that compliance with applicable regulations and terms will increase air transport performance (M=4.09, SVD=1.15), and that compliance with applicable regulations and terms will increase air transport performance (M=4.13, SVD=0.89). The results of the means and standard deviation imply that compliance with applicable regulations and terms, compliance with applicable regulations and terms, increase in number of registered aircraft fleet, increase in the number of air operators in Kenya, adherence to regulator service chatter timelines, strict schedules on oversight surveillance by the regulator are key indicators of increased performance of air transport in Kenya and improved quality of air transport services.

4.6 Compliance with Aviation Safety Training Standard and Performance of Air Transport

Aviation safety training standards in this study, was identified as the first independent variable as indicated by the objectives. Based on theory and accessible empirical literature, several indicators were identified and considered to measure aviation safety training standard. These include: basic training on aviation safety standards, specialized qualification training, training facilities for aviation personnel, moderation of exams by experts, timely feedback of results, consideration of individual differences when administering oral exam by examiners, dissemination of content through multi-media, conducive learning environment, continuous monitoring and evaluation of aviation training standards by the regulator, adequacy of the content in the training module, regular revision of modules, training curriculum meeting KCAA laid down standards, observation of prerequisite entry qualification, and training records for operating staff is updated continuously.

4.6.1 Work Involvement with Aviation Safety Training Standards

The respondents (regulators) were requested to indicate if their work involves compliance with aviation safety training standards. The results are presented in Table 4.17.

Table 4.17: Work Involvement with Aviation Safety Training Standards

Work Involvement	Frequency	Percentage
Yes	76	93.8
No	4	4.9
No response	1	1.2
Total	**81**	**100.0**

Results in Table 4.17 indicate that majority of the respondents (regulator)76(93.8%) who participated in the study indicated that their work involved compliance with aviation safety training standards while 4(4.9%) indicated that their work does not involve compliance with aviation safety training standards. What emerges from the results is that majority of respondents(regulator)who participated in this study are quite knowledgeable on the topic of the study and were expected to give valuable information in regard to compliance with aviation safety training standards since their work involves this area.

4.6.2 Descriptive Analysis for Aviation Safety Training Standards

Compliance with aviation safety training standards was measured by providing respondents that is regulator and air operators with statements rated on a five point Likert scale ranging from To a Great Extent (TGE); To Some Extent (TSE); Neutral (N); To a Small Extent (TSE); and To No Extent TNE) for regulator and Strongly Agree (SA); Agree (A); Neutral (N); Disagree (D); and Strongly Disagree (SD) for the air operators. The study aimed at finding out the level of agreement to statements regarding compliance with aviation safety training standards by the regulator. The results are presented in Table 4.18.

Table 4.18: Compliance with Aviation Safety Training Standards (Regulators)

Statements	TGE F (%)	TSE F (%)	N F (%)	TSE F (%)	TNE F (%)	Mean	SDV	Total F (%)
Basic training on aviation safety standards improves performance of air transport	63(77.8)	18(22.2)	0(0.0)	0(0.0)	0(0.0)	1.22	0.418	81(100)
Specialized qualification training is key in air transport performance	74(91.4)	7(8.6)	0(0.0)	0(0.0)	0(0.0)	1.09	0.283	81(100)
There are sufficient training facilities for aviation personnel	4(4.9)	21(25.9)	40(49.4)	19(19.8)	0(0.0)	2.84	0.798	81(100)
Our examinations are well moderated by aviation experts	17(21.0)	43(53.1)	14(17.3)	6(7.4)	1(1.2)	2.15	0.882	81(100)
Feedback on results is timely	27(33.3)	29(35.8)	20(24.7)	3(1.7)	1(1.2)	2.03	0.927	81(100)
Examiners consider individual differences when giving oral assessment	11(13.6)	17(21.0)	36(44.4)	15(18.5)	2(2.5)	2.75	0.994	81(100)
Content is disseminated through multi-media	7(8.6)	24(29.6)	37(45.7)	11(13.5)	2(2.5)	2.72	0.898	81(100)
The environment is conducive to learning for aviation personnel	14(17.3)	46(17.3)	18(22.2)	3(3.7)	0(0.0)	2.12	0.731	81(100)
There is sufficient monitoring and evaluation of aviation training standards by the regulator	20(24.7)	32(39.5)	24(29.6)	5(6.2)	0(0.0)	2.17	0.877	81(100)
Aviation training in Kenya meet international set standards	19(23.5)	43(53.1)	12(14.8)	5(6.2)	2(2.5)	2.11	0.922	81(100)
Am satisfied with the training process in the aviation industry	8(9.9)	47(58.0)	20(24.7)	5(6.2)	1(1.2)	2.31	0.785	81(100)
Composite for Aviation Safety Training Standard (regulator)						**2.14**	**0.63**	

Information provided by the regulators in Table 4.18 show that majority (91.4%) of them agreed to a very great extent that specialized qualification training is key in air transport performance and that basic training on aviation safety standards improve performance of air transport (77.8%). The results further indicate that majority of the respondents agreed to some extent that they are satisfied with the training process in the aviation industry (58.0%); aviation training in Kenya meet international set standards (53.1%); examinations are well moderated by aviation experts (53.1%), there is sufficient monitoring and evaluation of aviation training standards by the regulator (39.5%), feedback on results is timely (35.5%). The findings further revealed that a significant 19.8% of the regulators agreed to a small extent that there are sufficient training facilities for aviation personnel, and that content is disseminated through multi-media (13.5%). However, a significant number of respondents were neutral to: there are sufficient training facilities for aviation personnel (49.4%), the environment is conducive to learning for aviation personnel (45.7%), and examiners consider individual differences when giving oral assessment (44.4%).

From the results, it emerges that there was an agreement among the respondents basic training on aviation safety standards improves performance of air transport (M=1.22, SVD=0.418), that specialized qualification training is key in air transport performance (M=1.09, SVD=0.283), that there are sufficient training facilities for aviation personnel (M=2.84, SVD=0.798), that our examinations are well moderated by aviation experts (M=2.15, SVD=0.882), that feedback on results is timely (M=2.03, SVD=0.927), that examiners consider individual differences when giving oral assessment (M=2.75, SVD=0.994), that content is disseminated through multi-media (M=2.72, SVD=0.898), that the environment is conducive to learning for aviation personnel (M=2.12, SVD=0.731), that there is sufficient monitoring and evaluation of aviation training standards by the regulator (M=2.17, SVD=0.877), that aviation training in Kenya meet international set standards (M=2.11, SVD=0.922), and that am satisfied with the training process in the aviation industry (M=2.31, SVD=0.785).

Data analysis results depict that having specialized qualification training is key in air transport performance and that basic training on aviation safety standards improve performance of air transport. The information provided by the regulators reveal the following: that aviation training done in Kenya rarely meet international set standards; there is sufficient monitoring and evaluation of aviation training standards by the regulator; there are no sufficient training facilities for aviation personnel and examinations are well moderated by aviation experts and feedback on results is timely. Overall results portray that KCAA the regulator are not satisfied with the training process in the air transport industry in Kenya. The aim was to establish the level of agreement to statements regarding compliance with aviation safety training standards by the respondents (air operators). The results are presented in Table 4.19.

When asked to explain how compliance with aviation training standards influences performance of air transport in Kenya one key informant had this to say:

> *Training is the key nerve of air transport. All operational staff must be continuously trained to be at par with the new trends in the air transport. We have no choice. An operator's certificate can be withdrawn because of failure to train staff. We enforce the ICAO regulations with a view to save lives. Yes, air transport performances depend on level of training. We have basic training that is mandatory to all staff, and then one has to go through qualification training on the area they are specializing on. It does not matter how long one has worked with air transport; you must be continuously trained and also given some development training. Safety is not something to be taken for granted.*

This is a clear indication that there is a correlation between training and performance of air transport. Operators should be compelled to prioritize training to all staff. The tendency to train only selected staff or even the most preferred workers should be avoided. The future of air transport depends on the quality of training of all staff irrespective of their position in the organization.

Table 4.19: Compliance with Aviation Safety Training Standards (Air Operators)

Statements	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	SDV	Total F (%)
Continuous monitoring and evaluation of aviation training facilities and management is mandatory in all training colleges	55(45.5)	43(35.5)	22(18.2)	1(0.8)	0(0.0)	1.74	0.78	121(100)
The content in the training modules is adequate for particular course	21(17.4)	80(66.1)	16(13.2)	4(3.3)	0(0.0)	2.02	0.66	121(100)
The aviation training modules are revised regularly	32(26.4)	60(49.6)	23(19.0)	6(5.0)	0(0.0)	2.02	0.81	121(100)
Training curriculum meet KCAA laid down regulations/standards	34(28.1)	69(57.0)	16(13.2)	1(0.8)	0(0.0)	1.87	0.66	121(100)
There is sufficient monitoring and evaluation of aviation training standards by KCAA compared to other state CAA.	25(20.7)	63(52.1)	27(22.3)	5(4.1)	0(0.0)	2.10	0.77	121(100)
KCAA carry out sufficient examination process before issuing licenses to aviation personnel	57(47.1)	41(33.9)	21(17.4)	1(0.8)	0(0.0)	1.72	0.78	121(100)
Prerequisite entry qualifications for each course training is observed	23(19.0)	79(65.3)	16(13.2)	2(1.7)	0(0.0)	1.98	0.62	121(100)
Aviation personnel in operational areas such as pilots and engineers have basic	61(50.4)	37(30.6)	21(17.4)	1(0.8)	0(0.0)	1.68	0.78	121(100)

type training and are experienced on the equipment they work on								
Training facilities in aviation colleges are adequate in all institutions	11(9.1)	37(30.6)	56(46.3)	16(13.2)	0(0.0)	2.66	0.85	121(100)
The learning environment in aviation institutions are conducive for learning	11(9.1)	64(52.9)	37(30.6)	7(5.8)	0(0.0)	2.34	0.72	121(100)
Training records for operating staff is kept current and suitable for the job engaged on	20(16.5)	82(67.8)	17(14.0)	2(1.7)	0(0.0)	2.01	0.61	121(100)
Composite for Aviation Safety Training Standard (air operators)						**2.01**	**0.56**	

The information in Table 4.19 show that majority of the respondents (air operators) strongly agreed that: aviation personnel in operational areas such as pilots and engineers have basic type training and are experienced on the equipment they work on (50.4%), KCAA carry out sufficient examination process before issuing licenses to aviation personnel (47.1%), and there is continuous monitoring and evaluation of aviation training facilities and management is mandatory in all training colleges (45.4%). The results further revealed that majority of the respondents agreed that: training records for operating staff is kept current and suitable for the job engaged on (67.8%), the content in the training modules is adequate for particular course (66.1%), the prerequisite entry qualifications for each course training is observed (65.3%), training curriculum meet KCAA laid down regulations/standards (57.0%), the learning environment in aviation institutions are conducive for learning (52.9%), there is sufficient monitoring and evaluation of aviation training standards by KCAA (52.1%), the aviation training modules are revised regularly (49.6%), and training facilities in aviation colleges are adequate in all institutions (30.6%).

It is evident from the data presented in Table 4.19 that respondents agreed that: there is continuous monitoring and evaluation of aviation training facilities and management is mandatory in all training colleges (M=1.74, SVD=0.780); the content in the training modules is adequate for particular course (M=2.02, SVD=0.664); the aviation training modules are revised regularly (M=2.02, SVD=0.811); training curriculum meet KCAA laid down regulations/standards (M=1.87, SVD=0.660); there is sufficient monitoring and evaluation of aviation training standards by KCAA (M=2.10, SVD=0.771); KCAA carry out sufficient examination process before issuing licenses to aviation personnel (M=1.72, SVD=0.780); prerequisite entry qualifications for each course training program is observed (M=1.98, SVD=0.628); aviation personnel in operational areas, pilots, engineers have basic, type training and are experienced on the equipment they work on (M=1.68, SVD=0.788); training facilities in aviation colleges are adequate in all institutions (M=2.66, SVD=0.852); the learning environment in aviation institutions are conducive for learning (M=2.34, SVD=0.728); and training records for operating staff is kept current and suitable for the job engaged on (M=2.01, SVD=0.612).

From the results it emerges that majority of air operators in Kenya feel that aviation personnel in operational areas, pilots, engineers have basic type training and are experienced on the equipment they work on, KCAA the air transport regulator carries out sufficient examination process before issuing licenses to aviation personnel, and there is continuous monitoring and evaluation of aviation training facilities and management is mandatory in all training colleges. The results further depict that training curriculums in aviation colleges meet KCAA laid down regulations/standards, the learning environment in aviation institutions are conducive for learning, the aviation training modules are revised regularly, training facilities in aviation colleges are adequate in all institutions, and there is sufficient monitoring and evaluation of aviation training standards by KCAA.

4.6.3 Correlational Analysis of Compliance with Aviation Training Standard and Performance of Air Transport

Pearson's Product Moment correlation technique was used to determine the relationship that exists between the indicators of compliance with aviation training standard and performance of air transport. The standard measure of correlation known as Karl Pearson Coefficient of Correlation is normally represented by the product moment correlation coefficient. The correlation coefficient index is denoted by 'r' (Wambugu *et al*., 2015). Correlation analysis identified the strength and direction of the association between the indicators of compliance with aviation training standard and performance of air transport. In correlation analysis, correlation 'r' has values lying between -1 and +1 whereby -1 indicates a perfect negative correlation, +1 indicates a perfect positive correlation and (zero) indicates no correlation or relationship between the variables (Wambugu *et al*., 2015). In detail, a correlation coefficient from 0.80 to 1.0 indicates a very strong relationship, 0.60 to 0.79 is strong, 0.40 to 0.59 is moderate, from 0.20 to 0.39 is weak whereas 0.00 to 0.19 implies no relationship (Hair et al., 2006). The results of the objectives correlation analysis is summarized in Table 4.20.

Table 4.20 Correlation Matrix for Compliance with Aviation Training Standard and Performance of Air Transport

		Basic Training	Qualification Training	Training Facilities	Learning Environment
Performance of Air Transport	Pearson Correlation	.632*	.717*	.428*	.397*
	Sig. (2-tailed)	.000	.000	.000	.000
	N	202	202	202	202

**.Correlation is significant at the 0.05 level (2-tailed)*

The correlation analysis results for objective one of the study as presented in Table 4.20 indicate positive and significant relationships between the indicators of compliance with aviation safety training standard and performance of air transport. Table 4.20 revealed that qualification training had statistically significant positive relationship with performance of air transport (r=.717, p value<0.05). The correlation results also indicate that basic training had a statistically significant positive relationship with performance of air transport (r=.632, p value<0.05). Training facilities and learning environment had a moderate and significant relationship with performance of air transport (r=.428, p value<0.05) and (r=.397, p value<0.05) respectively.

4.6.4 Inferential Analysis of Influence of Compliance with Aviation Training Standard and Performance of Air Transport

The first objective of the study was to establish how compliance with aviation training standards influences performance of air transport in Kenya. The dependent variable of the study was performance of air transport which had the following indicators: increase in airline operators, reduced number of air accidents, adherence to time schedule, fleet growth, frequency of oversight surveillance, and number of run way incursions. The independent variable was compliance with aviation training standards whose indicators were: basic training, qualification training, training facilities, and learning environment.

4.6.4.1 Hypothesis Testing

So as to satisfy the requirements of the first objective, the study tested the following hypothesis by use of simple regression model.

Hypothesis 1

H_0: There is no significant relationship between compliance with aviation training standards and the performance of air transport in Kenya.

The null hypothesis was tested using the following linear regression model:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_1	=	Coefficients of determination
X_1	=	Compliance with aviation training standards
ε	=	Error term

The results of the study are presented in Table 4.21.

Table 4.21: Regression Results for Compliance with Aviation Training Standards

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	1.875	.199		9.414	.000
	Basic training	.217	.070	.334	1.615	.003
	Qualification training	.196	.060	.280	3.247	.001
	Training facilities	.085	.069	.115	1.234	.001
	Learning environment	.053	.065	.073	.810	.216

Predictors: (Constant), Basic training, Qualification training, Training facilities, Learning environment

Dependent Variable: Performance of Air Transport

R = 0.401

R Square = 0.160

F(3,163) = 10.034 at significance level p=0.001<0.05

The results in Table 4.21 indicates that r is equal to 0.401 implying that compliance with aviation training standards has a moderate influence on performance of air transport. The R Squared value is 0.160, implying that compliance with aviation training standards explains 16.0% of the variation in the performance of air transport. The β coefficients for the indicators are: basic training is 0.334, qualification training is 0.280, training facilities is 0.115, and learning environment is 0.073. The Beta β values imply that one unit change in performance of air transport is associated with 33.4% change in basic training, 28.0% change in qualification training, 11.5% change in training facilities, and 7.3% change in learning environment.

Learning environment as indicated by results in Table 4.21 had no statistically significant influence on the performance of air transport (β=0.073, t=0.810, p=0.216>0.05). Basic training had a statistically significant influence on the performance of air transport (β=0.334, t=1.615, p=0.003<0.05). Qualification training had a statistically significant influence on the performance of air transport (β=0.280, t=3.247, p=0.001<0.05). Training facilities had a statistically significant influence on the performance of air transport (β=0.115, t=1.234, p=0.001<0.05).

The study results indicate the overall F-statistic was (3,163) = 10.034 at p = 0.001<0.05 indicating that there was a statistically significant relationship between compliance with aviation training standards and performance of air transport. Based on the research results the null hypothesis which stated that 'There is no significant relationship between compliance with aviation training standards and performance of air transport' was rejected and conclude that compliance with aviation training standards has a statistically significant influence on performance of air transport in Kenya.

Using the study's statistical results, the regression model can be substituted as follows:

$$Y = 1.875 + 0.334 X_1 + 0.280 X_2 + 0.115 X_3 + 0.073 X_4 + \varepsilon$$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_1	=	Coefficients of determination
X_1	=	Basic training
X_2	=	Qualification training
X_3	=	Training facilities
X_4	=	Learning environment
ε	=	Error term

4.7 Compliance with Aircraft Worthiness Certification Process Standards and Performance of Air Transport

In this section, aircraft worthiness certification process standards was identified as the second independent variable as indicated by the objectives. Based on theory and accessible empirical literature, several indicators were identified and considered to measure aircraft worthiness certification process standards. These include: certification procedures, effectiveness of certification department, documentation of airworthiness procedure, inspection of aircraft by qualified personnel, well documentation of certification procedures, aircraft conformity to design, satisfactory inspection requirements before completion of recertification process, availability of documented aircraft records when requested by KCAA, screening of documents prior to certification, approval of aviation courses, and matching regulations to industry needs.

4.7.1 Descriptive Analysis for Aircraft Worthiness Certification Process Standards

Compliance with aircraft airworthiness certification process standards was measured by providing respondents (Regulator and air operators) with statements rated on a five point Likert scale ranging from Strongly Agree (SA); agree (A); Neutral (N); Disagree (D); and Strongly Disagree (SD). The aim was to establish the level of agreement to statements regarding compliance with aircraft worthiness certification process standards by the respondents. Regulators responses are presented in Table 4.22.

Table 4.22: Compliance with Aircraft Worthiness Certification Process Standards (Regulators)

Statements	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	SDV	Total F (%)
I understand the procedure for certification	5(6.2)	21(25.9)	24(29.6)	21(25.9)	10(12.3)	3.12	1.12	81(100)
The certification department is very effective	9(11.1)	47(58.0)	22(27.2)	3(3.7)	0(0.0)	2.23	0.69	81(100)
The airworthiness department is very effective in certification	11(13.6)	39(48.1)	25(30.9)	6(7.4)	0(0.0)	2.32	0.80	81(100)
Certification correspondence records are well kept	16(19.8)	47(58.0)	17(21.0)	1(1.2)	0(0.0)	2.04	0.67	81(100)
Inspection of aircrafts is done by qualified personnel	29(35.8)	38(46.9)	13(16.0)	1(1.2)	0(0.0)	1.83	0.73	81(100)
Certification procedure is well documented and circulated to all parties	23(28.4)	43(53.1)	15(18.5)	()	0(0.0)	1.90	0.68	81(100)
The health of an aircraft depends only on its condition as per the laid out requirements	9(11.1)	27(33.3)	26(32.1)	12(14.8)	7(8.6)	2.77	1.11	81(100)
Aircrafts must conform to designs necessary for certification process	9(11.1)	27(33.3)	33(40.7)	9(11.1)	3(3.7)	2.63	0.95	81(100)
All inspection requirements need to be satisfactory before recertification processes are completed	46(56.8)	24(29.6)	9(11.1)	2(2.5)	0(0.0)	1.59	0.78	81(100)
Aircraft records are documented and availed to KCAA upon request during certification process	24(29.6)	37(45.7)	17(21.0)	3(3.7)	0(0.0)	1.99	0.81	81(100)
I am satisfied with the aircraft certification process	14(17.3)	44(54.3)	22(27.2)	1(1.2)	0(0.0)	2.12	0.69	81(100)
Composite for Aircraft Worthiness Certification Process Standard Regulators						**2.23**	**0.72**	

Information in Table 4.22 show that majority of the respondents (regulators) strongly agreed that: all inspection requirements need to be satisfactory before recertification processes are completed (56.8%) and inspection of aircrafts is done by qualified personnel (35.8%). The findings presented in Table 4.22 further reveal that the respondents agreed that: the certification department is very effective (58.0%), certification correspondence records are well kept (58.0%), they are satisfied with the aircraft certification process (54.3%), certification procedure is well documented and circulated to all parties (53.1%), the airworthiness department is very effective in certification (48.1%), inspection of aircrafts is done by qualified personnel (46.9%), aircraft records are documented and availed to KCAA upon request during certification process (45.7%), the health of an aircraft depends only on its condition as per the laid out requirements (33.3%), aircrafts must conform to designs necessary for certification process (33.3%).

The study results in Table 4.22 show that respondents agreed that: they understand the procedure for certification (M=3.12, SVD=1.12), the certification department is very effective (M=2.23, SVD=0.69), the airworthiness department is very effective in certification (M=2.32, SVD=0.80), certification correspondence records are well kept (M=2.04, SVD=0.67), inspection of aircrafts is done by qualified personnel (M=1.83, SVD=0.73), certification procedure is well documented and circulated to all parties (M=1.90, SVD=0.68), the health of an aircraft depends only on its condition as per the laid out requirements (M=2.77, SVD=1.11), aircrafts must conform to designs necessary for certification process (M=2.63, SVD=0.95), all inspection requirements need to be satisfactory before recertification processes are completed (M=1.59, SVD=0.78), aircraft records are documented and availed to KCAA upon request during certification process (M=1.99, SVD=0.81), and they are satisfied with the aircraft certification process (M=2.12, SVD=0.69).

The study findings reveal that in regard with compliance with aircraft airworthiness certification process standards, KCAA feel that all inspection requirements need to be satisfactory before recertification processes are completed, and inspection of aircrafts is done by qualified personnel due to the fact that they understand the procedure for certification. The findings further reveal that KCAA feel that: their certification department is very effective, certification correspondence records are well kept, certification procedure is well documented and circulated to all parties, the airworthiness department is very effective in certification, aircraft records are documented and availed to KCAA upon request during certification process, the health of an aircraft depends only on its condition as per the laid out requirements, and aircrafts must conform to designs necessary for certification process. Overall, the study reveals that KCAA are satisfied with the aircraft certification process.

The key informants' responses seemed to move to a common direction that compliance with aircraft airworthiness certification process standards determines the level of air transport performance. One respondent maintained:

> *You see where I sit; here we deal with aircraft airworthiness certification processes. What am I saying? Is that, we cannot allow air operators to carry out air services without proper certification procedures that imply thorough evaluation of documents and inspection by our able and qualified air worthiness inspectors.*

When asked to comment on the influence of aircraft airworthiness certification on performance of air transport in Kenya, he said this:

> *I say this again and again, aircraft airworthiness certification standards must be adhered to and my work is to enforce this by working through KCAA inspectors. There is a direct relationship between certification and performance of air transport.*

The study aimed at finding out the level of agreement to statements regarding compliance with aircraft worthiness certification process standards by the respondents (air operators). The findings are presented in Table 4.23.

Table 4.23: Compliance with Aircraft Airworthiness Certification Process Standards (Air Operator)

Statements	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	SDV	Total F (%)
I understand the procedure for certification in the aviation industry	65(53.7)	50(41.3)	5(4.1)	1(0.8)	0(0.0)	1.58	1.03	121(100)
The aviation certification department is very effective	36(29.8)	53(43.8)	29(24.0)	0(0.0)	3(2.5)	2.02	0.87	121(100)
The time scheduled to complete certification process is not realistic	10(8.3)	48(39.7)	48(39.7)	8(6.6)	4(3.3)	2.56	0.87	121(100)
Documents for certification applicants are well screened before certification	17(14.0)	64(52.9)	36(29.8)	3(2.5)	1(0.8)	2.23	0.75	121(100)
Failure to regulate cargo agents	9(7.4)	19(15.7)	62(51.2)	11(9.1)	16(13.2)	3.05	1.05	121(100)
Certification procedure is well documented and circulated to all parties	26(21.5)	64(52.9)	28(23.1)	3(2.5)	0(0.0)	2.07	0.73	121(100)
Delivery of non-approved courses by aviation training schools causes performance failure in aviation	33(27.3)	47(38.8)	21(17.4)	19(15.7)	0(0.0)	2.22	1.02	121(100)
Regulations do not match industry needs	16(13.2)	28(23.1)	52(43.0)	21(17.4)	1(0.8)	2.69	0.94	121(100)
All inspection requirements need to be satisfactory before recertification processes are completed	59(48.8)	54(44.6)	8(6.6)	0(0.0)	0(0.0)	1.58	0.61	121(100)
Aircraft records are documented and availed to KCAA upon request during certification process	66(54.5)	39(32.2)	16(13.2)	0(0.0)	0(0.0)	1.59	0.71	121(100)
I am satisfied with the aircraft certification process in aviation industry	30(24.8)	71(58.7)	19(15.7)	1(0.8)	0(0.0)	1.93	0.66	121(100)
Composite for Aircraft Worthiness Certification Process Standard (Air Operators)						**2.13**	**0.89**	

The study findings in Table 4.23 show that majority of the respondents (air operators) strongly agreed that: they understand the procedure for certification in the aviation industry (53.7%), aircraft records are documented and availed to KCAA upon request during certification process (54.5%), and all inspection requirements need to be satisfactory before recertification process are completed (48.8%). Table 4.23 further reveals that majority of the air operators agreed that: documents for certification applicants are well screened before certification (52.9%), certification procedure is well documented and circulated to all parties (52.9%), the aviation certification department is very effective (43.8%), the time scheduled to complete certification process is not realistic (39.7%), and delivery of non-approved courses by aviation training schools causes performance failure in aviation (38.8%). Majority of the respondents however were neutral to failure to regulate cargo agents (51.2%), and regulations do not match industry needs (43.0%).

The study results in Table 4.23 show that respondents agreed that: they understand the procedure for certification in the aviation industry (M=1.58, SVD=1.03), the aviation certification department is very effective (M=2.02, SVD=0.87), the time scheduled to complete certification process is not realistic (M=2.56, SVD=0.87), documents for certification applicants are well screened before certification (M=2.23, SVD=0.75), failure to regulate cargo agents (M=3.05, SVD=1.05), certification procedure is well documented and circulated to all parties (M=2.07, SVD=0.73), delivery of non-approved courses by aviation training schools causes performance failure in aviation (M=2.22, SVD=1.02), regulations do not match industry needs (M=2.69, SVD=0.94), all inspection requirements need to be satisfactory before recertification processes are completed (M=1.58, SVD=0.61), aircraft records are documented and availed to KCAA upon request during certification process (M=1.59, SVD=0.71), and the air operators are satisfied with the aircraft certification process in aviation industry (M=1.93, SVD=0.66).

The study findings revealed that in regard to compliance with aircraft airworthiness certification process standards, air operators understand the procedure for certification in the aviation industry, and aircraft records are documented and availed to KCAA upon request during certification process. The findings also revealed that all inspection requirements need to be satisfactory before recertification process is completed in Kenya. From the study findings, the air operators felt that the documents for certification applicants were well screened before certification, certification procedure was well documented and circulated to all parties, and delivery of non-approved courses by aviation training schools causes performance failure in aviation. The air operators however felt that the time scheduled by KCAA to complete certification process was not realistic. Overall, the study findings indicate that air operators feel that the aviation certification department is very effective and they are satisfied with the aircraft certification process in the air transport in Kenya.

4.7.2 Correlational Analysis of Compliance with Aircraft Airworthiness Certification Process Standards and Performance of Air Transport

Correlation analysis was done by use of Pearson's Product Moment technique to determine the relationship that exists between the indicators of compliance with aircraft worthiness certification process standards and performance of air transport. Correlation analysis identified the strength and direction of the association between the indicators of compliance with aircraft worthiness certification process standards and performance of air transport. The second objectives correlation analysis is summarized in Table 4.24.

Table 4.24 Correlation Matrix for Compliance with Aircraft Airworthiness Certification Process Standards and Performance of Air Transport

		Aircraft Condition	Conformity to Design	Inspection Requirements	Aircraft Documentation
Performance of Air Transport	Pearson Correlation	-.018	-.230	.677*	.451*
	Sig. (2-tailed)	.796	.001	.012	.033
	N	202	202	202	202

**.Correlation is significant at the 0.05 level (2-tailed)*

The correlation analysis results for objective two of the study as presented in Table 4.24 indicate positive and significant coefficients between the indicators of compliance with aircraft worthiness certification process standards and performance of air transport. Table 4.24 revealed that aircraft condition had no statistically significant relationship with performance of air transport (r= -.018, p value<0.05). The correlation results indicated that conformity to design had a negative and statistically significant relationship with performance of air transport (r= -.230, p value<0.05). Inspection requirements had a positive and statistically significant relationship with performance of air transport (r=.677, p value<0.05). Aircraft documentation had a moderate and significant relationship with performance of air transport (r=.451, p value<0.05).

4.7.3 Inferential Analysis of Compliance with Aircraft Airworthiness Certification Process Standards

The second objective of the study was to establish how compliance with aircraft worthiness certification process standards influences performance of air transport in Kenya. Literature reviewed suggested that compliance with aircraft worthiness certification process standards would be associated with performance of air transport. The independent variable was compliance with aircraft worthiness certification process standards whose indicators were: aircraft condition, conformity to design, inspection requirements, and aircraft documentation.

4.7.4 Hypothesis Testing

So as to satisfy the requirements of the second objective, the study tested the following hypothesis using simple regression model.

Hypothesis 2

H_0: There is no significant relationship between compliance with aircraft airworthiness certification process standards and the performance of air transport in Kenya.

The null hypothesis was tested using the following linear regression model:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_1	=	Coefficients of determination
X_1	=	Compliance with aircraft worthiness certification process standards
ε	=	Error term

The results of the study are presented in Table 4.25

Table 4.25: Regression Results for Compliance with Aircraft Airworthiness Certification Process Standards and Performance of Air Transport

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	2.273	.170		13.374	.000
	Aircraft condition	.049	.0038	.094	1.275	.204
	Conformity to design	-.158	.044	-.266	3.632	.020
	Inspection requirements	.138	.059	.169	2.346	.000
	Aircraft documentation	.059	.052	.082	1.148	.003

Predictors: (Constant), Aircraft Condition, Conformity to design, Inspection requirements, Aircraft documentation

Dependent Variable: Performance of Air Transport

R = 0.316

R Square = 0.100

F(5,349) = 6.288 at significance level p=0.000<0.05

The study results in Table 4.25 indicates that r is equal to 0.316 implying that compliance with aircraft worthiness certification process standards has a weak influence on performance of air transport. The R Squared value is 0.100, implying that compliance with aircraft worthiness certification process standards explains 10.0% of the variation in the performance of air transport. The β coefficients for the indicators are: aircraft condition 0.094, conformity to design -0.266, inspection requirements 0.169, and aircraft documentation 0.082. The Beta β values imply that one unit change in performance of air transport is associated with 9.4% change in aircraft condition, 26.6% change in conformity to design, 16.9% change in inspection requirements, and 8.2% change in aircraft documentation.

Results in Table 4.25 show that inspection requirements had a statistically significant influence on the performance of air transport ($\beta=0.169$, $t=2.346$, $p=0.000<0.05$). Aircraft condition had no statistically significant influence on the performance of air transport ($\beta=0.094$, $t=1.275$, $p=0.204>0.05$). Conformity to design had a statistically significant influence on the performance of air transport ($\beta=-0.266$, $t=3.632$, $p=0.020>0.05$). Aircraft documentation had a statistically significant influence on the performance of air transport ($\beta=0.082$, $t=1.148$, $p=0.003<0.05$).

The results indicate the overall F-statistic was (5,349) = 6.288 at $p = 0.000<0.05$ implying that there was a statistically significant relationship between compliance with aircraft airworthiness certification process standards and performance of air transport. Based on the study findings the null hypothesis which stated that there is no significant relationship between compliance with aircraft airworthiness certification process standards and performance of air transport was rejected and conclude that compliance with aircraft worthiness certification process standards has a statistically significant influence on performance of air transport in Kenya.

Using the study's statistical results, the regression model can be substituted as follows:

$$Y = 2.273 + 0.094X_1 - 0.266X_2 + 0.169X_3 + 0.082X_4 + \varepsilon$$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_1	=	Coefficients of determination
X_1	=	Aircraft condition
X_2	=	Conformity to design
X_3	=	Inspection requirements
X_4	=	Aircraft documentation
ε	=	Error term

4.8 Compliance with Resolution Safety Concern Standards and Performance of Air Transport

In this section, variable of resolution safety concern standards was identified as the third independent variable as indicated by the objectives. Based on theory and accessible empirical literature, several indicators were identified and considered to measure resolution safety concern standards. These include: compliance with resolution safety concerns, following procedures to address deficiencies, timely analysis of safety deficiencies, availability of safety concern resolution publications to industry, reasonable time given by CAA to correct deficiencies, non-punitive reporting system of deficiencies, forum for disseminating resolution safety concerns, dissemination of safety concern lessons to all CAA certified AOC, AMO, and ATO, action for non-compliance applicable to all, technical guidance and procedures provided for safety oversight improvement.

4.8.1 Descriptive Analysis for Resolution Safety Concern Standards

Compliance with resolution safety concern standards was measured by providing respondents (regulator staff and air operators) with statements rated on a five point Likert scale ranging from Strongly Agree (SA); agree (A); Neutral (N); Disagree (D); and Strongly Disagree (SD). The study aimed at finding out the level of agreement to statements regarding compliance with resolution safety concern standards by the respondents. The findings for the responses by regulator staff are presented in Table 4.26.

Table 4.26: Compliance with Resolution Safety Concern Standards (Regulators)

Statements	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	SDV	Total F (%)
Compliance with resolution safety concerns is integral part of aviation performance	54(66.7)	20(24.7)	7(8.6)	0(0.0)	0(0.0)	1.42	0.64	81(100)
The laid down procedures are followed all the time when a deficiency is found during inspection	16(19.8)	28(34.6)	29(35.8)	8(9.9)	0(0.0)	2.36	0.91	81(100)
The resolution safety concern resolution advisory publications are available to aviation industry	11(13/6)	41(50.6)	24(29.6)	5(6.2)	0(0.0)	2.28	0.77	81(100)
Analysis of safety deficiencies is done immediately after inspection and circulated to the concerned parties for corrective action.	11(13.6)	34(42.0)	29(35.6)	7(8.6)	0(0.0)	2.40	0.83	81(100)
The period of time given by the CAA to correct deficiencies is reasonable	25(30.9)	32(39.5)	23(28.4)	1(1.2)	0(0.0)	2.00	0.80	81(100)
There is a forum for disseminating resolution safety concerns compliance status to concerned parties	12(14.8)	42(51.9)	17(21.0)	7(8.6)	3(3.7)	2.35	0.96	81(100)
Reporting system of deficiencies in aviation is non-punitive	16(19.8)	36(44.4)	26(32.1)	3(3.7)	0(0.0)	2.20	0.79	81(100)
Lessons learned during resolution of safety concerns are disseminated to all CAA certified AOC, AMO and ATO	13(16.0)	28(34.6)	27(33.3)	8(9.9)	5(6.2)	2.56	1.07	81(100)
Action taken for non-compliance is applicable to all	12(14.8)	35(43.2)	22(27.2)	8(9.9)	4(4.9)	2.47	1.02	81(100)
Corrective action taken on safety deficiencies influence performance of air transport	28(34.6)	41(50.6)	9(11.1)	2(2.5)	1(1.2)	1.85	0.80	81(100)
I am satisfied with the resolution of safety deficiencies process	14(17.3)	33(40.7)	31(38.3)	2(2.5)	1(1.2)	2.30	0.82	81(100)
Composite for Resolution Safety Concern Standard (Regulators)						**2.19**	**0.87**	

Results in Table 4.26 indicated that majority of the respondents (Regulators) strongly agreed that compliance with resolution safety concerns is integral part of aviation performance (66.7%). Table 4.26 further revealed that majority of the respondents (Regulators) agreed that: there is a forum for disseminating resolution safety concerns compliance status to concerned parties (51.9%), resolution safety concern advisory publications are available to aviation industry (50.6%), corrective action taken on safety deficiencies influence performance of air transport(50.6%), reporting system of deficiencies in aviation is non-punitive (44.4%), action taken for non-compliance is applicable to all (43.6%), analysis of safety deficiencies is done immediately after inspection and circulated to the concerned parties for corrective action (42.0%), they satisfied with the resolution of safety deficiencies process (40.7%), the period of time given by the CAA to correct deficiencies is reasonable (39.5%), lessons learned during resolution of safety concerns are disseminated to all CAA certified AOC, AMO and ATO (34.6%). A significant number of respondents however were neutral to the laid down procedures are followed all the time when a deficiency is found during inspection (35.8%).

The study results in Table 4.26 show respondents agreed that: compliance with resolution safety concerns is integral part of aviation performance (M=1.42, SVD=0.649), that the laid down procedures are followed all the time when a deficiency is found during inspection (M=2.36, SVD=0.913), the resolution safety concern resolution advisory publications are available to aviation industry (M=, 2.28 SVD=0.778), analysis of safety deficiencies is done immediately after inspection and circulated to the concerned parties for corrective action (M=2.40, SVD=0.832), the period of time given by the CAA to correct deficiencies is reasonable (M=2.00, SVD=0.806), there is a forum for disseminating resolution safety concerns compliance status to concerned parties (M=2.35, SVD=0.964), reporting system of deficiencies in aviation is non-punitive (M=2.20, SVD=0.797), lessons learned during resolution of safety concerns are disseminated to all CAA certified AOC, AMO and ATO (M=2.56, SVD=1.072), action taken for non-compliance is applicable to all (M=2.47, SVD=1.026), corrective action taken on safety deficiencies influence performance of air transport (M=1.85, SVD=0.808), and that I am satisfied with the resolution of safety deficiencies process (M=2.30, SVD=0.828).

The study results reveal that in regard with compliance with resolution safety concern standards, KCAA the air transport regulator in Kenya affirm that compliance with resolution safety concerns is integral part of aviation performance and that corrective action taken on safety deficiencies influence performance of air transport. From the study findings KCAA felt that there is a forum for disseminating resolution safety concerns compliance status to concerned parties, resolution safety concern advisory publications are available to aviation industry, reporting system of deficiencies is non-punitive and that the action taken for non-compliance is applicable to all. KCAA also noted that analysis of safety deficiencies is done immediately after inspection and circulated to the concerned parties for corrective action. Further the findings reveal that the period of time given by the CAA to correct deficiencies is reasonable and the lessons learnt during resolution of safety concerns is disseminated to all CAA certified AOC, AMO and ATO. Overall, the results denote that KCAA are satisfied with the resolution of safety deficiencies process. The study further aimed at finding out the level of agreement to statements regarding compliance with resolution safety concern standards by the respondents (air operators). The findings are presented in Table 4.27.

The KCAA key informants were asked to explain how compliance with resolution safety concern standards influences performance of air transport. These are the words of one key informant:

> *Compliance with resolution of safety concern standards influences performance of air transport. How these safety concerns are reported is very key to performance because corrections are done on timely bases. As in charge we ensure this is done and if not properly done punitive measure process is followed. In brief we ensure deficiencies and safety concerns are identified, analyzed, reporting system is implemented and corrective action to safety deficiency is documented.*

Table 4.27: Compliance with Resolution Safety Concern Standards (Air Operator)

Statements	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	SDV	Total F (%)
Compliance with resolution safety concerns is critical element of oversight activities	68(56.2)	33(27.3)	20(16.5)	0(0.0)	0(0.0)	1.60	0.75	121(100)
The laid down procedures are followed all the time when a deficiency is found during inspection and editing process	20(16.5)	73(60.3)	26(21.5)	1(0.8)	0(0.0)	2.07	0.64	121(100)
Technical guidance and procedures are provided for in the program of safety oversight improvement	34(28.1)	75(62.0)	11(9.1)	1(0.8)	0(0.0)	1.83	0.61	121(100)
Analysis of safety deficiencies is done immediately after discovery and circulated to the concerned parties for corrective action.	34(28.1)	57(47.1)	24(19.8)	6(5.0)	0(0.0)	2.02	0.82	121(100)
The period allocated by the CAA to correct identified deficiencies is sufficient	24(19.8)	62(51.2)	28(23.1)	7(5.8)	0(0.0)	2.15	0.80	121(100)
There is a forum for disseminating resolution safety concerns compliance status to concerned parties	19(15.7)	36(29.8)	54(44.6)	11(9.1)	0(0.0)	2.47	0.86	121(100)
Reporting system deficiency in aviation is non-punitive	8(6.6)	55(45.5)	52(43.0)	4(3.3)	0(0.0)	2.44	0.67	121(100)
Lessons learned during resolution of safety concerns are disseminated to all aviation industry participants	17(14.0)	47(38.8)	46(38.0)	7(5.8)	2(1.7)	2.41	0.86	121(100)
Action taken for non-compliance is applicable to all	20(16.5)	67(55.4)	27(22.3)	6(5.0)	1(0.8)	2.18	0.79	121(100)
Corrective action taken on safety deficiencies influence performance of air transport	40(33.1)	53(43.8)	25(20.7)	3(2.5)	0(0.0)	1.93	0.79	121(100)
I am satisfied with the resolution of safety concerns process of KCAA	28(23.1)	61(50.4)	29(24.0)	1(0.8)	1(0.8)	2.05	0.76	121(100)
Composite for Resolution Safety Concern Standard (Air Operators)						**2.10**	**0.68**	

The study findings in Table 4.27 indicated that majority of the respondents (air operators) strongly agreed that compliance with resolution safety concerns is critical element of oversight activities (56.2%). Table 4.27 further revealed that majority of the respondents (air operators) agreed that: technical guidance and procedures are provided for in the program of safety oversight improvement (62.0%), the laid down procedures are followed all the time when a deficiency is found during inspection and editing process (60.3%), action taken for non-compliance is applicable to all (55.4%), the period allocated by the CAA to correct identified deficiencies is sufficient (51.2%), they are satisfied with the resolution of safety concerns process of KCAA (50.4%), analysis of safety deficiencies is done immediately after discovery and circulated to the concerned parties for corrective action (47.1%), corrective action taken on safety deficiencies influence performance of air transport (43.8%), lessons learned during resolution of safety concerns are disseminated to all aviation industry participants (38.8%). A significant number of respondents however were neutral in regard to: there is a forum for disseminating resolution safety concerns compliance status to concerned parties (44.6%), reporting system deficiency in aviation is non-punitive (43.0%).

The study results in Table 4.27 show respondents agreed that: compliance with resolution safety concerns is critical element of oversight activities (M=1.60, SVD=0.758), the laid down procedures are followed all the time when a deficiency is found during inspection and editing process (M=2.07, SVD=0.645), technical guidance and procedures are provided for in the program of safety oversight improvement (M=1.83, SVD=0.615), analysis of safety deficiencies is done immediately after discovery and circulated to the concerned parties for corrective action (M=2.02, SVD=0.826), the period allocated by the CAA to correct identified deficiencies is sufficient (M=2.15, SVD=0.803), there is a forum for disseminating resolution safety concerns compliance status to concerned parties (M=2.47, SVD=0.869), reporting system deficiency in aviation is non-punitive (M=2.44, SVD=0.672), lessons learned during resolution of safety concerns are disseminated to all aviation industry participants (M=2.41, SVD=0.868), action taken for non-compliance is applicable to all (M=2.18, SVD=0.796), corrective action taken on safety deficiencies influence performance of air transport (M=1.93, SVD=0.798), and that I am satisfied with the resolution of safety concerns process of KCAA (M=2.05, SVD=0.765).

With regard to compliance with resolution safety concern standards, the study results reveal that air operators in Kenya felt that compliance with resolution safety concerns is critical element of oversight activities. The findings also revealed that corrective action taken on safety deficiencies influence performance of air transport in Kenya. The study findings also revealed that air operators in Kenya felt that: technical guidance and procedures are provided for in the program of safety oversight improvement, when inspecting deficiencies the laid down procedures are followed all the time, action taken for non-compliance is applicable to all, the period allocated by the CAA to correct identified deficiencies is sufficient, analysis of safety deficiencies is done immediately after discovery and circulated to the concerned parties for corrective action, lessons learned during resolution of safety concerns are disseminated to all aviation industry participants. Overall, air operators in Kenya are satisfied with the resolution of safety concerns process of KCAA.

4.8.2 Correlational Analysis of Compliance with Resolution of Safety Concern Standards and Performance of Air Transport

Pearson's Product Moment technique was used in correlation analysis to determine the relationship that exists between the indicators of compliance with resolution of safety concern standards and performance of air transport. Correlation analysis identified the strength and direction of the association between the indicators of compliance with resolution safety concern standards and performance of air transport. The third objectives correlation analysis is summarized in Table 4.28.

Table 4.28 Correlation Matrix for Compliance with Resolution of Safety Concern Standards and Performance of Air Transport

		Identification of deficiencies	Analysis of safety deficiency	Reporting system	Corrective action
Performance of Air Transport	Pearson Correlation	.0286	.157*	.022	.488*
	Sig. (2-tailed)	.000	.026	.754	.003
	N	202	202	202	202

**.Correlation is significant at the 0.05 level (2-tailed)*

The correlation analysis results for the third objective of the study as presented in Table 4.28 indicate positive and significant coefficients between the indicators of compliance with resolution safety concern standards and performance of air transport. Table 4.28 revealed that corrective action to safety deficiency concerns had a moderate and statistically significant relationship with performance of air transport (r= .488, p value<0.05). Identification of deficiencies and safety concerns had a statistically significant relationship with performance of air transport (r= .286, p value<0.05). However, from the correlation analysis, the results in Table 4.28 indicated that analysis of safety deficiency concerns, and implementation of reporting safety concern system did not have a statistically significant relationship with performance of air transport.

4.8.3 Inferential Analysis of Compliance with Resolution of Safety Concern Standards and Performance of Air Transport

The third objective of the study was to establish how compliance with resolution safety concern standards influences performance of air transport in Kenya. Literature pertinent to resolution safety suggested that compliance with resolution safety concern standards would be associated with performance of air transport. The independent variable was compliance with resolution safety concern standards whose indicators were: deficiencies and safety concerns, analysis of safety deficiency concerns, implementation of reporting system, and corrective action to safety deficiency.

4.8.3.1 Hypothesis Testing

So as to satisfy the requirements of the third objective, the study tested the following hypothesis using simple regression model.

Hypothesis 3

H_0: There is no significant relationship between compliance with resolution of safety concern standards and the performance of air transport in Kenya.

The null hypothesis was tested using the following linear regression model:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_1	=	Coefficients of determination
X_1	=	Compliance with resolution of safety concern standards
ε	=	Error term

The results of the study are presented in Table 4.29.

Table 4.29: Regression Results for Influence of Compliance with Resolution of Safety Concern Standards on Performance of Air Transport

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	1.720	.173		9.942	.000
	Identification of deficiencies	.184	.063	.252	2.909	.004
	Analysis of deficiencies	-.096	.064	-.143	-1.495	.136
	Reporting system	-.011	.055	-.015	-.203	.839
	Corrective action	.178	.054	.278	3.312	.001

Predictors: (Constant), Identification of deficiencies, Analysis of deficiencies, Implementation of reporting system, Corrective action to safety deficiency

Dependent Variable: Performance of Air Transport

R = 0.354

R Square = 0.126

F(6,929) = 7.963 at significance level p=0.000<0.05

The study results in Table 4.29 indicates that r is equal to 0.354 implying that compliance with resolution of safety concern standards has a weak influence on performance of air transport. The R Squared value is 0.126, implying that compliance with resolution safety concern standards explains 12.6% of the variation in the performance of air transport. The β coefficients for the indicators are: identification of deficiencies and safety concerns 0.252, analysis of safety deficiency and safety concerns -0.143, implementation of reporting safety concern system -0.015, and corrective action to safety deficiencies 0.278. The Beta β values imply that one unit change in performance of air transport is associated with 25.2% change in identification of deficiencies and safety concerns, 14.3% change in analysis of safety deficiency and safety concerns, 1.5% change in implementation of reporting safety concern system, and 27.8% change in corrective action to safety deficiencies.

The study results in Table 4.29 show that identification of deficiencies and safety concerns had a statistically significant influence on the performance of air transport ($\beta=0.252$, $t=2.909$, $p=0.004<0.05$). Analysis of safety deficiency and safety concerns had no statistically significant influence on the performance of air transport ($\beta=-0.143$, $t=1.495$, $p=0.136>0.05$). Implementation of reporting safety concern system had no statistically significant influence on the performance of air transport ($\beta=-0.015$, $t=-.203$, $p=0.839>0.05$) respectively. Corrective action to safety deficiencies had a statistically significant influence on the performance of air transport ($\beta=0.278$, $t=3.312$, $p=0.001<0.05$).

The study results indicate the overall F-statistic was $(6,929) = 7.963$ at $p = 0.000<0.05$ implying that there was a statistically significant relationship between compliance with resolution of safety concern standards and performance of air transport. Based on the study findings the null hypothesis which stated that there is no significant relationship between compliance with resolution of safety concern standards and performance of air transport was rejected and conclude that compliance with resolution of safety concern standards has a statistically significant influence on performance of air transport in Kenya.
Using the study's statistical results, the regression model can be substituted as follows:

$$Y = 1.720 + 0.252X_1 - 0.143X_2 - 0.015X_3 + 0.278X_4 + \varepsilon$$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_1	=	Coefficients of determination
X_1	=	Identification of deficiencies and safety concerns
X_2	=	Analysis of safety deficiency and safety concerns
X_3	=	Implementation of reporting safety concern system
X_4	=	Corrective action to safety deficiencies
ε	=	Error term

4.9 Compliance with Airport Infrastructure Standards and Performance of Air Transport

In this section, airport infrastructure standards was identified as the fourth independent variable as indicated by the objectives. Based on theory and accessible empirical literature, several indicators were identified and considered to measure airport infrastructure standards. These include: number of runways in all airports, aircraft ramp parking for aircrafts, taxiing spaces in the aerodromes, sufficiency of hangar construction spaces, runway inspection for debris for any loose material to promote safety, continuous monitoring and evaluation of airport infrastructure, capacity of airport infrastructure to met demands of airport users, data collected dissemination to all parties, and reports utilization for continuous improvement of infrastructure.

4.9.1 Descriptive Analysis for Airport Infrastructure Standards

Compliance with airport infrastructure standards was measured by providing respondents (regulator staff and air operators) with statements rated on a five point Likert scale ranging from Strongly Agree (SA); agree (A); Neutral (N); Disagree (D); and Strongly Disagree (SD). The study aimed at finding out the level of agreement to statements regarding compliance with airport infrastructure standards by the respondents. The findings for the responses by regulator staff are presented in Table 4.30.

Table 4.30: Compliance with Airport Infrastructure Standards (Regulators)

Statements	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	SDV	Total F (%)
The number of runways are sufficient in all airports	1(1.2)	12(14.8)	15(18.5)	40(49.4)	13(16.0)	3.64	0.96	81(100)
There is sufficient aircraft ramp parking for aircrafts in the airports	1(1.2)	25(30.9)	21(25.9)	27(33.3)	7(8.6)	3.17	1.01	81(100)
The taxiing spaces in the aerodrome is sufficient	7(8.6)	8(9.9)	26(32.1)	33(40.7)	7(8.6)	3.31	1.05	81(100)
Hangar construction spaces are sufficient for the fleet	1(1.2)	12(14.8)	28(34.6)	29(35.8)	11(13.6)	3.46	0.94	81(100)
Runway inspection is done to check for debris, any loose material in order to promote safety	15(18.5)	35(43.2)	24(29.6)	6(7.4)	1(1.2)	2.30	0.90	81(100)
Capacity of airports infrastructure is generally adequate to meet the demands of airport users at all times	2(2.5)	16(19.8)	29(35.8)	32(39.5)	2(2.5)	3.20	0.87	81(100)
There is continuous monitoring and evaluation of airports infrastructure	10(12.3)	21(25.9)	38(46.9)	9(11.1)	2(2.5)	2.65	0.92	81(100)
Data collected during monitoring and evaluation is disseminated to all parties	9(11.1)	14(17.3)	40(49.4)	9(11.1)	9(11.1)	2.94	1.08	81(100)
Reports are utilized for the continuous	12(14.8)	27(33.3)	28(34.6)	13(16.0)	1(1.2)	2.56	0.97	81(100)

improvement of the infrastructure								
Airport infrastructure influences performance of air transport	28(34.6)	34(42.0)	13(16.0)	5(6.2)	1(1.2)	1.98	0.93	81(100)
I am satisfied with airport the level of compliance with airport infrastructure standards	7(8.6)	17(21.0)	43(53.1)	8(9.9)	6(7.4)	2.86	0.97	81(100)
KCAA oversight of aviation service provider is effective in promoting safe air transport	12(14.8)	40(49.4)	22(27.2)	4(4.9)	3(3.7)	2.33	0.92	81(100)
Composite for Airport Infrastructure Standards (Regulators)						**2.86**	**0.61**	

The study findings in Table 4.30 indicated that majority of the respondents (regulator staff) cumulatively strongly agreed and agreed that airport infrastructure influences performance of air transport (34.6%) and (42.0%) respectively. The study findings show that majority of the respondents (regulator staff) agreed that: KCAA oversight of aviation service provider is effective in promoting safe air transport (49.4%), and runway inspection is done to check for debris, any loose material in order to promote safety (43.2%). Table 4.30 further revealed that majority of the respondents (Regulators) disagreed that: the number of runways are sufficient in all airports (49.4%), the taxiing spaces in the aerodrome is sufficient (40.7%), capacity of airports infrastructure is generally adequate to meet the demands of airport users at all times (39.5%), hangar construction spaces are sufficient for the fleet (35.8%), and that there is sufficient aircraft ramp parking for aircrafts in the airport (33.3%). The study findings also revealed that the respondents (Regulators) were neutral to: they were satisfied with airport the level of compliance with airport infrastructure standards (53.1%), data collected during monitoring and evaluation is disseminated to all parties (49.4%), there is continuous monitoring and evaluation of airports infrastructure (46.9%), and reports are utilized for the continuous improvement of the infrastructure (34.6%).

The study results in Table 4.30 indicated respondents disagreed that: the number of runways are sufficient in all airports (M=3.64, SVD=0.96), there is sufficient aircraft ramp parking for aircrafts in the airports (M=3.17, SVD=1.01), the taxiing spaces in the aerodrome is sufficient (M=3.31, SVD=1.05), hangar construction spaces are sufficient for the fleet (M=3.46, SVD=0.94). The study findings indicated respondents agreed to: runway inspection is done to check for debris, any loose material in order to promote safety (M=2.30, SVD=0.90), capacity of airports infrastructure is generally adequate to meet the demands of airport users at all times (M=3.20, SVD=0.87), there is continuous monitoring and evaluation of airports infrastructure (M=2.65, SVD092), data collected during monitoring and evaluation is disseminated to all parties (M=2.94, SVD=1.08), reports are utilized for the continuous improvement of the infrastructure (M=2.56, SVD=0.97), airport infrastructure influences performance of air transport (M=1.98, SVD=0.93), I am satisfied with airport the level of compliance with airport infrastructure standards (M=2.86, SVD=0.97); and KCAA oversight of aviation service provider is effective in promoting safe air transport (M=2.33, SVD=0.92).

The results revealed that in regard to compliance with airport infrastructure standards, the air transport regulator in Kenya affirmed that airport infrastructure influences performance of air transport in Kenya. Regulators felt that their oversight of aviation service provider was effective in promoting safe air transport, and runway inspection was done to check for debris, any loose material in order to promote safety. Important to note is that the study results further revealed that KCAA felt that the number of runways are not sufficient in all airports, the taxiing spaces in the aerodrome are insufficient, capacity of airports infrastructure is not adequate to meet the demands of airport users at all times, hangar construction spaces are insufficient for the fleet, and that there are insufficient aircraft ramp parking for aircrafts in the airport. The study findings further revealed that Regulators were neutral to or did not necessarily want to comment on: their level of satisfaction with JKIA and Wilson airports level of compliance with airport infrastructure standards, data collected during monitoring and evaluation dissemination to all parties, existence of a continuous monitoring and evaluation of airports infrastructure, and reports being utilized for the continuous improvement of the infrastructure. Overall, the findings revealed that airport infrastructure influences performance of air transport in Kenya. The KCAA key informants were requested to comment on influence of compliance with airport infrastructure standards on performance of air transport in Kenya. This is what was said by one of them but echoed by all:

> *Without adequate airport infrastructure standards there is no effective performance air transport because air transport operates on the ground and in the air therefore safety will be compromised and a lot of challenges. Aeroplanes movements will be difficult in the air and on the ground. So the infrastructure should be as specified in the ICAO procedures and safety documents. KCAA enforces this regulation with a lot of keenness to ensure aviation safety which is its core mandate.*

The study further aimed at finding out the level of agreement to statements regarding compliance with airport infrastructure standards by the respondents (air operators). The findings are presented in Table 4.31.

Table 4.31: Compliance with Airport Infrastructure Standards (Air Operator)

Statements	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	SDV	Total F (%)
The number of runways are sufficient in all airports	25(20.7)	20(16.5)	48(39.7)	26(21.5)	2(1.7)	2.67	1.08	121(100)
There is sufficient aircraft ramp parking for aircrafts in the airports	23(19.0)	28(23.1)	48(39.7)	18(14.9)	4(3.3)	2.60	1.06	121(100)
The taxiing spaces in the aerodrome is sufficient	24(19.8)	23(19.0)	60(49.6)	12(9.9)	1(0.8)	2.53	0.95	121(100)
Hangar construction spaces are sufficient for the fleet	17(14.0)	22(18.2)	47(38.8)	28(23.1)	7(5.8)	2.88	1.09	121(100)
Runway inspection is done to check for debris, any loose material in order to promote safety	42(34.7)	36(29.8)	36(29.8)	6(5.0)	1(0.8)	2.07	0.95	121(100)
Capacity of airports infrastructure is generally adequate to meet the demands of airport users at all times	16(13.2)	42(34.7)	47(38.8)	15(12.4)	1(0.8)	2.53	0.90	121(100)
There is continuous monitoring and evaluation of airports infrastructure	8(6.6)	67(55.4)	34(28.1)	6(5.0)	6(5.0)	2.46	0.88	121(100)
Data collected during monitoring and evaluation is disseminated to all parties	21(17.4)	34(28.1)	40(33.1)	19(15.7)	7(5.8)	2.64	1.11	121(100)
Reports are utilized for the continuous improvement of the infrastructure	25(20.7)	54(44.6)	31(25.6)	7(5.8)	3(2.5)	2.24	0.93	121(100)
Airport infrastructure influences performance of air transport	62(51.2)	52(43.0)	7(5.8)	0(0.0)	0(0.0)	1.55	0.60	121(100)
KCAA oversight of airport service provider is effective in promoting safe air transport	40(33.1)	54(44.6)	22(18.2)	1(0.8)	3(2.5)	1.94	0.88	121(100)
Composite for Airport Infrastructure Standards (Air Operators)						**2.37**	**0.71**	

The study findings in Table 4.31 indicated that majority of the respondents (air operators) strongly agreed airport infrastructure influences performance of air transport (51.2%), and runway inspection is done to check for debris, any loose material in order to promote safety (34.7%). The study findings show that majority of the respondents (air operators) agreed that: there is continuous monitoring and evaluation of airports infrastructure (55.4%), reports are utilized for the continuous improvement of the infrastructure (44.6%), KCAA oversight of airport service provider is effective in promoting safe air transport (44.6%), and capacity of airports infrastructure is generally adequate to meet the demands of airport users at all times (34.7%). The study findings reveal that majority of the respondents were neutral and disagreed to: the number of runways are sufficient in all airports (39.7%) and (21.5%) respectively, data collected during monitoring and evaluation is disseminated to all parties (33.1%) and (15.7%) respectively, hangar construction spaces are sufficient for the fleet (38.8%) and (23.1%) respectively, capacity of airports infrastructure is generally adequate to meet the demands of airport users at all times (38.8%) and (12.4%) respectively, and there is sufficient aircraft ramp parking for aircrafts in the airports (39.7%) and (14.9%) respectively. Majority of the respondents disagreed to the taxiing spaces in the aerodrome is sufficient (49.6%).

The research further findings show that respondents disagreed or were neutral to: the number of runways are sufficient in all airports (M=2.67, SVD=1.08), there is sufficient aircraft ramp parking for aircrafts in the airports (M=2.60, SVD=1.06), the taxiing spaces in the aerodrome is sufficient (M=2.53, SVD=0.95); hangar construction spaces are sufficient for the fleet (M=2.88, SVD=1.09), runway inspection is done to check for debris, any loose material in order to promote safety (M=2.07, SVD=0.95), capacity of airports infrastructure is generally adequate to meet the demands of airport users at all times (M=2.53, SVD=0.90), there is continuous monitoring and evaluation of airports infrastructure (M=2.46, SVD=0.88), data collected during monitoring and evaluation is disseminated to all parties (M=2.64, SVD=1.11), reports are utilized for the continuous improvement of the infrastructure (M=2.24, SVD=0.93). The study found that the respondents agreed to: airport infrastructure influences performance of air transport (M=1.55, SVD=0.60); and KCAA oversight of airport service provider is effective in promoting safe air transport (M=1.94, SVD=0.88).

The study results revealed that with regard to compliance with airport infrastructure standards, air operators emphasized that airport infrastructure influences performance of air transport in Kenya, and runway inspection is done to check for debris, any loose material in order to promote safety. The study findings also revealed that the air operators in Kenya felt that: there is continuous monitoring and evaluation of airports infrastructure, reports are utilized for the continuous improvement of the infrastructure, KCAA oversight of airport service provider is effective in promoting safe air transport, and capacity of airports infrastructure is generally adequate to meet the demands of airport users at all times. However, the study reveals that the air operators in Kenya were disagreed to or did not want to comment on: the number of runways being sufficient in all airports, data collected during monitoring and evaluation being disseminated to all parties, hangar construction spaces being sufficient for the fleet, capacity of airports infrastructure being generally adequate to meet the demands of airport users at all times, and there being sufficient aircraft ramp parking for aircrafts in the airports. A substantial number of air operators felt that the taxiing spaces in the aerodromes were insufficient.

4.9.2 Correlational Analysis of Compliance with Airport Infrastructure Standards and Performance of Air Transport

Correlation analysis was done using Pearson's Product Moment technique to determine the relationship that exists between the indicators of compliance with airport infrastructure standards and performance of air transport. Correlation analysis identified the strength and direction of the association between the indicators of compliance with airport infrastructure standards and performance of air transport. Correlation analysis for the fourth objective is summarized in Table 4.32.

Table 4.32 Correlation Matrix for Compliance with Airport Infrastructure Standards and Performance of Air Transport

		Number of runways	Aircraft ramp parking	Taxiing space	Hangar construction spaces
Performance of Air Transport	Pearson Correlation	.252*	.213*	.218	.160
	Sig. (2-tailed)	.000	.002	.002	.023
	N	202	202	202	202

**.Correlation is significant at the 0.05 level (2-tailed)*

The correlation analysis results for the fourth objective of the study as presented in Table 4.32 indicate positive and significant coefficients between the indicators of compliance with airport infrastructure standards and performance of air transport. Table 4.31 revealed that number of runways had statistically significant negative relationship with performance of air transport (r=.252, p value<0.05). Aircraft ramp parking had a statistically significant relationship with performance of air transport (r=.213, p value<0.05). Taxiing space had a statistically significant relationship with performance of air transport (r=.218, p value<0.05). However, from the correlation results on Table 4.32 indicated that hangar construction spaces did not have a statistically significant relationship with performance of air transport.

4.9.3 Inferential Analysis of Compliance with Airport Infrastructure Standards and Performance of Air Transport

The fourth objective of the study was to establish how compliance with airport infrastructure standards influences performance of air transport in Kenya. Literature pertinent to airport infrastructure suggested that compliance with airport infrastructure standards would be associated with performance of air transport. The independent variable was compliance with airport infrastructure standards whose indicators were: number of runways, aircraft ramp parking, taxiing space, and hangar construction spaces.

4.9.3.1 Hypothesis Testing

In order to satisfy the requirements of the fourth objective, the study tested the following hypothesis using simple regression model.

Hypothesis 4

H_0: There is no significant relationship between compliance with airport infrastructure standards and the performance of air transport in Kenya.

The null hypothesis was tested using the following linear regression model:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_1	=	Coefficients of determination
X_1	=	Compliance with airport infrastructure
ε	=	Error term

The results of the study are presented in Table 4.33.

Table 4.33: Regression Results for Compliance with Airport Infrastructure Standards and Performance of Air Transport

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	1.799	.137		13.169	.000
	Number of runways	.092	.045	.183	2.057	.041
	Aircraft ramp parking	.034	.053	.065	.646	.519
	Taxiing space	.030	.057	.056	.522	.602
	Hangar construction spaces	.008	.050	.014	.154	.878

Predictors: (Constant), Number of runways, Aircraft ramp parking, Taxiing space, Hangar construction spaces

Dependent Variable: Performance of Air Transport

R = 0.276

R Square = 0.076

F(4,007) = 4.918 at significance level p=0.004<0.05

Results in Table 4.33 indicates that r is equal to 0.276 implying that compliance with airport infrastructure standards has a weak influence on performance of air transport. The R Squared value is 0.076, implying that compliance with airport infrastructure standards explains 7.6% of the variation in the performance of air transport. The β coefficients for the indicators are: number of runways 0.183, aircraft ramp parking 0.065, taxiing space 0.056, and hangar construction spaces 0.014. The Beta β values imply that one unit change in performance of air transport is associated with 18.3% change in number of runways, 6.5% change in aircraft ramp parking, 5.6% change in taxiing space, and 1.4% change in hangar construction spaces.

Study results in Table 4.33 show that number of runways had a statistically significant influence on the performance of air transport (β=0.183, t=2.057, p=0.041<0.05). Aircraft ramp parking had no statistically significant influence on the performance of air transport (β=-0.065, t=0.646, p=0.519>0.05). Taxiing space had no statistically significant influence on the performance of air transport (β=-0.056, t=.522, p=0.602>0.05) respectively. Hangar construction spaces had no statistically significant influence on the performance of air transport (β=0.014, t=0.154, p=0.878>0.05).

The study results indicate the overall F-statistic was (4,007) = 4.918 at p = 0.004<0.05 implying that there was a statistically significant relationship between compliance with airport infrastructure standards and performance of air transport. Based on the study findings the null hypothesis which stated that there is no significant relationship between compliance with airport infrastructure standards and performance of air transport was rejected and conclude that compliance with airport infrastructure standards has a statistically significant influence on performance of air transport in Kenya.

Using the study's statistical results, the regression model can be substituted as follows:

$$Y = 1.799 + 0.183X_1 + 0.065X_2 + 0.056X_3 + 0.014X_4 + \varepsilon$$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_1	=	Coefficients of determination
X_1	=	Number of runways
X_2	=	Aircraft ramp parking
X_3	=	Taxiing space
X_4	=	Hangar construction spaces
ε	=	Error term

4.10 Combined Compliance with Aviation Safety Standards and Performance of Air Transport

In this study, a combination of compliance with aviation training standards, compliance with aircraft airworthiness certification process standards, compliance with resolution safety concern standards, and compliance with airport infrastructure standards was referred to as compliance with aviation safety standards. The combined influence of these factors on performance of air transport was tested using inferential statistics as the fifth objective of the study.

4.10.1 Correlational Analysis of Compliance with Aviation Safety Standards and Performance of Air Transport

Correlation analysis was done using Pearson's Product Moment technique to determine the relationship that exists between the compliance with aviation safety standards and performance of air transport. Correlation analysis identified the strength and direction of the association between the independent and dependent variable of the study. Correlation analysis for the fifth objective is summarized in Table 4.34.

Table 4.34 Correlation Matrix for Compliance with Aviation Safety Standards and Performance of Air Transport

		Aviation training standards	Aircraft worthiness certification	Resolution safety concern	Airport infrastructure
Performance of Air Transport	Pearson Correlation	.189	.141	.298	.348
	Sig. (2-tailed)	.007	.046	.000	.000
	N	202	202	202	202

**.Correlation is significant at the 0.05 level (2-tailed)*

The correlation analysis results for the fifth objective of the study as presented in Table 4.34 indicate positive and significant coefficients between the indicators of compliance with aviation safety standards and performance of air transport. Table 4.34 revealed that compliance with airport infrastructure standards had a weak and statistically significant relationship with performance of air transport (r=.348, p value<0.05). Compliance with resolution safety concern standards also had a weak and statistically significant relationship with performance of air transport (r=.298, p value<0.05). However, from the correlation results on Table 4.34 indicated that compliance with aviation training standards and compliance with aircraft airworthiness certification process standards did not have a statistically significant relationship with performance of air transport.

4.10.2 Inferential Analysis of Compliance with Aviation Safety Standards and Performance of Air Transport

The fifth objective of the study was to establish how compliance with aviation safety standards influences performance of air transport in Kenya. Compliance with aviation safety standards was a combination of independent variables of the study. A five point Likert-type scale was used.

4.10.2.1 Hypothesis Testing

In order to satisfy the requirements of the fifth objective, the study tested the following hypothesis using multiple regression model

Hypothesis 5

H_0: There is no significant relationship between combined compliance with aviation safety standards and the performance of air transport in Kenya.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

Whereby;

Y	=	Performance of air transport in Kenya
B_0	=	Constant
β_1	=	Coefficients of determination
X_1	=	Compliance with aviation training standards
X_2	=	Compliance with aircraft airworthiness certification process standards
X_3	=	Compliance with resolution of safety concern
X_4	=	Compliance with airport infrastructure safety standards
ε	=	Error term

The results of the study are presented in Table 4.35.

Table 4.35: Regression Results for Combined Compliance with Aviation Safety Standards and Performance of Air Transport

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	1.362	.242		5.663	.000
	Aviation training standards	.092	.045	.554	2.815	.010
	Aircraft airworthiness certification	.034	.053	.465	2.512	.003
	Resolution safety concern	.030	.057	.152	1.955	.001
	Airport infrastructure	.008	.050	.359	3.201	.000

Predictors: (Constant), Aviation training standards, Aircraft airworthiness certification, Resolution safety concern, Airport infrastructure

Dependent Variable: Performance of Air Transport

R = 0.776

R Square = 0.587

F(8,044) = 9.203 at significance level p=0.000<0.05

The study results in Table 4.35 indicates that r is equal to 0.776 implying that compliance with aviation safety standards has a strong influence on performance of air transport. The R Squared value is 0.587, implying that compliance with aviation safety standards explains 58.7% of the variation in the performance of air transport. The β coefficients for the indicators are: compliance with aviation training standards 0.554, compliance with aircraft airworthiness certification process standards 0.465, compliance with resolution safety concern standards 0.152, and compliance with airport infrastructure standards 0.359. The Beta β values imply that one unit change in performance of air transport is associated with 55.4% change in compliance with aviation training standards, 46.5% change in compliance with aircraft airworthiness certification process standards, 15.2% change in compliance with resolution safety concern standards, and 35.9% change in compliance with aircraft infrastructure standards.

Results in Table 4.35 show that compliance with aviation training standards had a statistically significant influence on the performance of air transport ($\beta=0.554$, $t=2.815$, $p=0.010<0.05$). Compliance with aircraft airworthiness certification process standards had a statistically significant influence on the performance of air transport ($\beta=-0.465$, $t=2.512$, $p=0.003>0.05$). Compliance with resolution safety concern standards had a statistically significant influence on the performance of air transport ($\beta=-0.152$, $t=1.955$, $p=0.001>0.05$) respectively. Compliance with airport infrastructure standards had a statistically significant influence on the performance of air transport ($\beta=0.359$, $t=3.201$, $p=0.000<0.05$). The Beta β coefficients indicate that compliance with aviation training standards was the strongest (.554) followed by compliance with aircraft airworthiness certification process standards (.465), compliance with airport infrastructure standards (.359), and lastly compliance with resolution safety concern standards (.152).

The study results indicate the overall F-statistic was (8,044) = 9.203 at $p = 0.000<0.05$ implying that there was a statistically significant relationship between combined compliance with aviation safety standards and performance of air transport. Based on the study findings the null hypothesis which stated that there is no significant relationship between combined compliance with aviation safety standards and performance of air transport was rejected and conclude that combined compliance with aviation safety standards has a statistically significant influence on performance of air transport in Kenya.

Using the study's statistical results, the regression model can be substituted as follows:

$$Y = 1.362 + 0.554X_1 + 0.465X_2 + 0.152X_3 + 0.359X_4 + \varepsilon$$

Whereby;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
β_1	=	Coefficients of determination
X_1	=	Compliance with aviation training standards
X_2	=	Compliance with aircraft airworthiness certification process standards
X_3	=	Compliance with resolution safety concern standards
X_4	=	Compliance with airport infrastructure standards
ε	=	Error term

4.11 The Influence of Monitoring and Evaluation Process on the Relationship between Compliance with Aviation Safety and performance of Air Transport

This section of the study presents descriptive and inferential statistics of the moderating influence of monitoring and evaluation on the relationship between compliance with aviation safety and performance of air transport in Kenya which was the sixth objective of the study. Monitoring and evaluation process was the moderating variable of the study. This objective aimed at understanding how preparation of M&E work plans, data collection on aviation safety, data analysis, and dissemination of M&E results influence performance of air transport in Kenya.

4.11.1 Descriptive Analysis for Monitoring and Evaluation Process

Monitoring and evaluation process was measured by providing respondents (Regulators and air operators) with statements rated on a five point Likert scale ranging from Strongly Agree (SA); agree (A); Neutral (N); Disagree (D); and Strongly Disagree (SD). The study aimed at finding out the level of agreement to statements regarding monitoring and evaluation process by the respondents. Results for the responses by Regulators are presented in Table 4.36.

Table 4.36: Monitoring and evaluation process (Regulators)

Statements	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	SDV	Total F (%)
Adherence to M&E plans in aviation improves performance	50(61.7)	20(24.7)	11(13.6)	0(0.0)	0(0.0)	1.52	0.72	81(100)
M&E leads to proper analysis of the client's needs hence boosting performance of air transport	35(43.2)	34(42.0)	9(11.1)	3(3.7)	0(0.0)	1.75	0.79	81(100)
Methods of data collection determines the performance in air transport	31(38.3)	30(37.0)	16(19.8)	4(4.9)	0(0.0)	1.91	0.88	81(100)
Data presentation contributes a lot in the performance of air transport	28(34.6)	28(34.6)	22(27.2)	3(3.7)	0(0.0)	2.00	0.88	81(100)
Data is analyzed by experts so I never know what it was all about	13(16.0)	10(12.3)	37(45.7)	14(17.3)	7(8.6)	2.90	1.13	81(100)
M&E has more evil than good and lowers productivity in all ways	2(2.5)	14(17.3)	16(19.8)	19(23.5)	29(35.8)	3.74	1.19	81(100)
M&E is the first step to great performance	37(45.7)	25(30.9)	19(23.5)	0(0.0)	0(0.0)	1.78	0.80	81(100)
Tools of M&E help a lot in task accomplishment	34(42.0)	27(33.3)	18(22.2)	0(0.0)	2(2.5)	1.88	0.92	81(100)
Dissemination of M&E results enhances visibility of an airline thus widening the market share	27(33.3)	26(32.1)	25(30.9)	1(1.2)	1(1.2)	2.04	0.90	81(100)
The mode used to communicate results is very clear to me	9(11.1)	26(32.1)	43(53.1)	3(3.7)	0(0.0)	2.49	0.74	81(100)
I am satisfied with the way M&E is done in air transport industry	4(4.9)	24(29.6)	46(56.8)	6(7.4)	1(1.2)	2.70	0.73	81(100)
Composite for monitoring and evaluation process (Regulators)						**2.24**	**0.62**	

Results in Table 4.36 indicated that majority of the respondents (Regulators) strongly agreed: adherence to M&E plans in aviation improves performance (61.7%), M&E is the first step to great performance (45.7%), M&E leads to proper analysis of the client's needs hence boosting performance of air transport (43.2%), tools of M&E help a lot in task accomplishment (42.0%), methods of data collection determine the performance in air transport (38.3%), dissemination of M&E results enhances visibility of an airline thus widening the market share (33.3%), and data presentation contributes a lot in the performance of air transport (34.6%). The study findings further revealed that majority of the respondents (Regulators) were neutral to: they are satisfied with the way M&E is done in air transport industry (56.8%), the mode used to communicate results is very clear to me (53.1%), and data is analyzed by experts so I never know what it was all about (45.7%). A significant number of respondents however agreed that they are satisfied with the way M&E is done in air transport industry (29.6%). The findings further reveal that majority of the respondents strongly disagreed that M&E has more evil than good and lowers productivity in all ways (35.8%).

The study results in Table 4.36 indicated respondents agreed that: adherence to M&E plans in aviation improves performance (M=1.52, SVD=0.72), M&E leads to proper analysis of the client's needs hence boosting performance of air transport (M=1.75, SVD=0.79), M&E is the first step to great performance (M=1.78, SVD=0.80), tools of M&E help a lot in task accomplishment (M=1.88, SVD=0.92); methods of data collection determine the performance in air transport (M=1.91, SVD=0.88). Majority of the respondents were neutral to: data presentation contributes a lot in the performance of air transport (M=2.00, SVD=0.88); data is analyzed by experts so I never know what it was all about (M=2.90, SVD=1.13); dissemination of M&E results enhances visibility of an airline thus widening the market share (M=2.04, SVD=0.90), the mode used to communicate results is very clear to me (M=2.49, SVD=0.74), and I am satisfied with the way M&E is done in air transport industry (M=2.70, SVD=0.73). The respondents however disagreed to M&E has more evil than good and lowers productivity in all ways (M=3.74, SVD=1.19).

The study results revealed that in regard to monitoring and evaluation process, KCAA the air transport regulator in Kenya , affirmed adherence to M&E plans in aviation improves performance, M&E is the first step to great performance, M&E leads to proper analysis of the client's needs hence boosting performance of air transport, tools of M&E help a lot in task accomplishment, methods of data collection determine the performance in air transport, dissemination of M&E results enhances visibility of an airline thus widening the market share, and data presentation contributes a lot in the performance of air transport. The study findings revealed that Regulators were neutral or did not want to comment on their satisfaction with the way M&E is done in air transport industry, the mode used to communicate results being very clear to them, and data being analyzed by experts so they never know what it was all about. A significant number of Regulators however were satisfied with the way M&E is done in air transport industry. Overall, the study findings revealed that M&E is the first step to great performance and as a result, adhering to M&E plans in aviation improves performance. M&E also leads to proper analysis of the client's needs hence boosting performance of air transport in Kenya. The study further aimed at finding out the level of agreement to statements regarding monitoring and evaluation process (air operators). The findings are presented in Table 4.37.

Table 4.37: Monitoring and evaluation process (Air Operators)

Statements	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	SDV	Total F (%)
Adherence to monitoring and evaluation plans in aviation improves performance	77(63.6)	41(33.9)	3(2.5)	0(0.0)	0(0.0)	1.39	0.53	121(100)
Monitoring and evaluation leads to proper analysis of the client's needs hence boosting performance of air transport	77(63.6)	39(32.2)	5(4.1)	0(0.0)	0(0.0)	1.40	0.57	121(100)
Methods of data collection determines the performance in air transport	36(29.8)	73(60.3)	11(9.1)	1(0.8)	0(0.0)	1.81	0.62	121(100)
Data presentation contribute a lot in the performance of air transport	38(31.4)	56(46.3)	27(22.3)	0(0.0)	0(0.0)	1.91	0.73	121(100)
Data is analyzed by experts so I never come to know what it was all about	23(19.0)	22(18.2)	48(39.7)	22(18.2)	6(5.0)	2.72	1.12	121(100)
Monitoring and evaluation has more evil than good and lowers productivity in all ways	15(12.4)	13(10.7)	26(21.5)	54(44.6)	13(10.7)	3.31	1.18	121(100)
Monitoring and evaluation is the first step to great performance	74(61.2)	40(33.1)	7(5.8)	0(0.0)	0(0.0)	1.45	0.60	121(100)
Insensitivity to the industry concerns by the regulator	13(10.7)	32(26.4)	52(43.0)	24(19.8)	0(0.0)	2.72	0.90	121(100)
Dissemination of results enhances visibility of an airline thus widening the market share	30(24.8)	66(54.5)	25(20.7)	0(0.0)	0(0.0)	1.96	0.67	121(100)
The mode used to communicate results is very clear to me	15(12.4)	47(38.8)	49(40.5)	5(4.1)	4(3.3)	2.47	0.88	121(100)
I am satisfied with the way Monitoring and evaluation is done in air transport industry	25(20.7)	60(49.6)	28(23.1)	5(4.1)	2(1.7)	2.16	0.86	121(100)
Composite for monitoring and evaluation process (Air Operators)						**2.11**	**0.53**	

The study findings in Table 4.37 indicated that majority of the respondents (air operator) strongly agreed that: adherence to monitoring and evaluation plans in aviation improves performance (63.6%); monitoring and evaluation leads to proper analysis of the client's needs hence boosting performance of air transport (63.6%), and monitoring and evaluation is the first step to great performance (61.2%). Table 4.37 further reveals that majority of air operators agreed that: methods of data collection determine the performance in air transport (60.3%), dissemination of results enhances visibility of an airline thus widening the market share (54.5%), they satisfied with the way Monitoring and evaluation is done in air transport industry (49.6%), data presentation contribute a lot in the performance of air transport (46.3%), and insensitivity to the industry concerns by the regulator (26.4%). Majority of the respondents were neutral to: insensitivity to the industry concerns by the regulator (43.0%), the mode used to communicate results is very clear to me (40.5%), data is analyzed by experts so I never come to know what it was all about (39.7%), and the mode used to communicate results is very clear to me (40.5%). The study findings also revealed that majority of the respondents however disagreed that monitoring and evaluation has more evil than good and lowers productivity in all ways (44.6%).

The study results in Table 4.37 indicated respondents agreed that: adherence to monitoring and evaluation plans in aviation improves performance (M=1.39, SVD=0.53), monitoring and evaluation leads to proper analysis of the client's needs hence boosting performance of air transport (M=1.40, SVD=0.57), methods of data collection determines the performance in air transport (M=1.81, SVD=0.62), data presentation contribute a lot in the performance of air transport (M=1.91, SVD=0.73), data is analyzed by experts so I never come to know what it was all about (M=2.72, SVD=1.12), monitoring and evaluation has more evil than good and lowers productivity in all ways (M=3.31, SVD=1.18), monitoring and evaluation is the first step to great performance (M=1.45, SVD=0.60), insensitivity to the industry concerns by the regulator (M=2.72, SVD=0.90), dissemination of results enhances visibility of an airline thus widening the market share (M=1.96, SVD=0.67), the mode used to communicate results is very clear to me (M=2.47, SVD=0.88), and that I am satisfied with the way Monitoring and evaluation is done in air transport industry (M=2.16, SVD=0.86).

The study results revealed that in regard to monitoring and evaluation process, air operators in Kenya felt that: adherence to monitoring and evaluation plans in aviation improves performance, monitoring and evaluation leads to proper analysis of the client's needs hence boosting performance of air transport, and monitoring and evaluation is the first step to great performance. The results further denote that majority of air operators felt that: methods of data collection determine the performance in air transport, dissemination of results enhances visibility of an airline thus widening the market share, they satisfied with the way monitoring and evaluation is done in air transport industry, data presentation contribute a lot in the performance of air transport, and insensitivity to the industry concerns by the regulator. Overall the study findings revealed that air operators in Kenya are satisfied with the way monitoring and evaluation is done in air transport industry and that adherence to monitoring and evaluation plans in aviation improves performance.

4.11.2 Correlational Matrix for Monitoring and Evaluation Process and Performance of Air Transport

Correlation analysis was done using Pearson's Product Moment technique to determine the relationship that exists between the indicators of monitoring and evaluation process and performance of air transport. Correlation analysis identified the strength and direction of the association between the indicators of monitoring and evaluation process and performance of air transport. Correlation analysis for the sixth objective is summarized in Table 4.38.

Table 4.38 Correlation Matrix for Compliance with Monitoring and Evaluation Process and Performance of Air Transport

		M&E work plans	**Data collection**	**Data analysis**	**Dissemination of M&E results**
Performance of Air Transport	Pearson Correlation	.234	.268	.125	.414
	Sig. (2-tailed)	.001	.000	.077	.000
	N	202	202	202	202

**.Correlation is significant at the 0.05 level (2-tailed)*

The correlation analysis results for the sixth objective of the study as presented in Table 4.38 indicate positive and significant coefficients between the indicators of monitoring and evaluation process and performance of air transport. Table 4.38 revealed that preparation of M&E work plans had a weak and statistically significant relationship with performance of air transport ($r=.234$, p value<0.05). Data collection on aviation safety had a weak and statistically significant relationship with performance of air transport ($r=.268$, p value<0.05). Dissemination of M&E results had a moderate and statistically significant relationship with performance of air transport ($r=.414$, p value<0.05). However, from the correlation results on Table 4.38 indicated that data analysis did not have a statistically significant relationship with performance of air transport.

4.11.3 Inferential Analysis for Moderating Influence of Monitoring and Evaluation Process on the Relationship between Compliance with Aviation Safety and Performance of Air Transport

The sixth objective of the study was to establish the moderating influence of monitoring and evaluation process on the relationship between compliance with aviation safety and performance of air transport in Kenya. Literature pertinent to monitoring and evaluation suggested that monitoring and evaluation process would be associated with performance of air transport. The indicators of monitoring and evaluation process were: preparation of M&E work plans, data collection on aviation safety, data analysis, and dissemination of M&E results.

4.11.3.1 Hypothesis Testing

So as to satisfy the requirements of the sixth objective, the study tested the following hypothesis using multiple regression model.

Hypothesis 6

H_0: The strength of the relationship between compliance with aviation safety and performance of air transport in Kenya does not depend on monitoring and evaluation process

The null hypothesis was tested using the following linear regression model:

$Y = a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_7X_1 X_2 X_3 X_4 X_5 + e$

Where;

Y	=	Performance of air transport in Kenya
β_0	=	Constant
$\beta_{1,2,3,4}$	=	Regression Coefficients
$X_{1,2,3,4}$	=	Compliance with aviation safety standards
X_5	=	Monitoring and evaluation process
ε	=	Error term

In testing this hypothesis, the moderating influence was computed using hierarchical regression method advocated by Baron and Kenny (1986). This involved testing the influence of the independent variable (compliance with aviation training standards, compliance with aircraft worthiness certification process standards, compliance with resolution safety concern standards, and compliance with airport infrastructure standards) on the dependent variable in step one, and introducing the moderator (monitoring and evaluation process) in step two. Moderation is assumed to take place if the influence of interaction between the independent variable and moderator on dependent variable test is significant.

Step 1: Influence of Compliance with Aviation Safety Standard on Performance of Air Transport

In Step 1, compliance with aviation safety standard was regressed on performance of air transport. The results are presented in Table 4.39.

Step 2: Influence of Compliance with Aviation Safety Standard and monitoring and evaluation process on Performance of Air Transport

In Step 2, the influence of the moderator (monitoring and evaluation process) was introduced on the relationship between compliance with aviation safety standard and performance of air transport. The results are presented in Table 4.39.

Table 4.39: Regression Results for Moderating Influence of Monitoring and Evaluation Process on the Relationship between Compliance with Aviation Safety Standards on Performance of Air Transport

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	1.362	.242		5.663	.000
	Aviation training standards	.092	.045	.554	2.815	.010
	Aircraft airworthiness certification	.034	.053	.465	2.512	.003
	Resolution safety concern	.030	.057	.152	1.955	.001
	Airport infrastructure	.008	.050	.359	3.201	.000
2	(Constant)	1.240	.456		2.753	.000
	Aviation training standards	.119	.061	.619	1.995	.000
	Aircraft airworthiness certification	.051	.073	.428	2.258	.023
	Resolution safety concern	.028	.069	.139	1.404	.047
	Airport infrastructure	.030	.048	.318	3.962	.031
	Monitoring & Evaluation	.169	.216	.192	1.356	.000

a) Predictors: (Constant) Aviation training standards, Aircraft airworthiness certification, Resolution safety concern, Airport infrastructure

b) Dependent Variable: Performance of Air Transport

Model 1:

$F(8,044) = 9.203$ at level of significance $p=0.000<0.05$

Model 2:

$F(9,125) = 8.526$ at level of significance $p=0.001<0.05$

					Change Statistics				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**
1	.776[a]	.586	.434	.32687	.586	7.043	4	26	.000
2	.795[b]	.552	.447	.32356	.086	1.438	1	25	.126

a) Predictors: (Constant) Aviation training standards, Aircraft airworthiness certification, Resolution safety concern, Airport infrastructure

b) Predictors: (Constant) Aviation training standards, Aircraft airworthiness certification, Resolution safety concern, Airport infrastructure, Monitoring & Evaluation

The results in Table 4.39 indicate that in Model 1 aviation safety standards explained 58.6% of the variation in performance of air transport. The F value was statistically significant ($F(8,044) = 9.203$, $p=0.000<0.05$) that aviation safety standards influence performance of air transport.

Using the study's statistical results in Table 4.39, the regression Model 1 can be substituted as follows:

$$Y = 1.362 + 0.554X_1 + 0.465X_2 + 0.152X_3 + 0.359X_4$$

Whereby; Y= Performance of air transport in Kenya

X_1= Compliance with aviation training standards

X_2= Compliance with aircraft airworthiness certification process standards

X_3= Compliance with resolution safety concern standards

X_4= Compliance with airport infrastructure standards

In Step 2, the influence of the moderator (monitoring & evaluation process) was introduced on the relationship between aviation safety standards and performance of air transport. The results in Table 4.39 indicate that the introduction of a moderator (monitoring & evaluation process) in Model 2 increased the value of R squared by 0.086. This gives an implication that aviation safety standards and monitoring & evaluation process explain 8.6% variation in performance of air transport. The F-value remained statistically significant ($F(9,125) = 8.526$, $p=0.001<0.05$).

Therefore from the study results, it can be concluded that monitoring & evaluation process has a statistically significant moderating influence on performance of air transport. The study results suggest that monitoring & evaluation process acted as a moderator in the relationship between aviation safety standards and performance of air transport. Based on the research findings, null hypothesis that the strength of the relationship between compliance with aviation safety standards and performance of air transport in Kenya does not depend on monitoring and evaluation process was rejected.

Using the study's statistical results in Table 4.39, the regression Model 2 can be substituted as follows:

$$Y = 1.240 + 0.619X_1 + 0.428X_2 + 0.139X_3 + 0.318X_4 + 0.192X_5$$

Whereby; Y= Performance of air transport in Kenya

X_1= Compliance with aviation training standards

X_2= Compliance with aircraft airworthiness certification process standards

X_3= Compliance with resolution safety concern standards

X_4= Compliance with airport infrastructure standards

X_5= Monitoring & evaluation process

4.12 Analysis of the Data collected through Observation Method

For triangulation purpose some physical items were observed to establish the actual existence and usability of these items that are key indicator of performance of air transport in Kenya.

Data were gathered on variables related to training, certification, and resolution of safety concerns, manuals and status of infrastructure. The researcher observed the existence of training manuals in the shelves and also the displayed schedules of training for air operators staff as required by regulations. The observation of the certification process included availability of established office for operators, maintenance equipment and tools and a well displayed roster for supervisory personnel. The third segment is the air infrastructure that entails observation of adequacy of parking bays, taxiing space, expansion space and free from encroachment by illegal developers. The final segment is monitoring and evaluation where the research observed the displayed M&E work schedules and meetings held on dissemination of M&E results. Observation guide previously developed was used by the researcher in the 84 registered operator's work premises. A summary of the findings of the observation method is provided in Table 4.40

Table 4.40: Availability of Aviation Safety Standards Physical Indicators Observed by the Researcher

S/N	Physical Items	Present F(%)	Absent F(%)	Remarks
1	**Training**			
	i) Does the Training manuals exist	84(100)	0(0)	High
	ii) Are there well displayed schedules for training?	30 (36)	54(64)	Low
	iii) Is the training location suitable for learning environment	39(46)	45(54)	Low
2	**Certification process**			
	i) Does the operator have an established office	84(100)	0(0)	high
	ii) Does the operator have adequate maintenance equipment and tools	46(55)	38(45)	Medium
	iii) Does the operator have roster for supervisory personnel	60(71)	24(29)	High
3	**Airport Infrastructure**			
	i) Does the airport have adequate aircraft parking bays	20(24)	64(76)	Low
	ii) Does the airport have dedicated aircraft taxiing space	30(36)	54(64)	Low
	iii) Is there expansion space construction of aircraft facilities	33(39)	51(61)	Low
	iv) Is the airport free from encroachment by illegal developers	24(29)	60(71)	Low
4	**Monitoring and Evaluation**			
	i) Are there well displayed Monitoring and Evaluation work schedules	35(42)	49(58)	Low
	ii) Is there evidence of Monitoring and Evaluation results dissemination meetings	36(43)	48(57)	Low

A comparison between the observed data on training Table 4.40 and what was reported by Regulators on Table 4.17 about facilities environment has a close similarity. For instance learning environment was reported at 46% and the same was observed. The 92% of air transport operators reported that the training modules are adequate in Table 4.18 and this was observed at 100% in Table 4.40. The results also reveal that air operators have well established offices as evident by 100% observed sites and the maintenance tools are adequate at 46% observations. Roster for supervisory personnel at 60% was observed. The information about certification stood at 69% this concurs with results on Table 4.21 66% that revealed that certification procedure is well documented and circulated to all parties.

The observed results Table 4.40 for air infrastructure stood at 27% as compared to 18% as reported by Regulators on Table 4.29 and air operators' at58% on table 4.30. Monitoring and Evaluation on the other hand was observed by checking if M&E work schedules were well displayed and also of concern was to establish if there was evidence of M&E results dissemination meetings in terms of notices for meetings or minutes. The observed results show 36% and KCAA report on Table 4.35 show 53% of the Regulators are in agreement that dissemination of M&E results is key to project success and widens the visibility of airline thus giving it a competitive advantage over competitors.

There is a close link between the data that was gathered through the questionnaire and through observation. Table 4.40 reveals that air infrastructure and monitoring and evaluation need a lot of attention. Looking at the Table, the average observed cases for air infrastructure is 27% while monitoring and evaluation was at 36%. This is a wakening call to the concerned parties to invest in these two areas heavily.

CHAPTER FIVE
SUMMARY OF FINDINGS, DISCUSSIONS CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter of the study summary of findings, the study conclusions as well as the recommendations of the study are presented. Under the section of summary of findings, the results and discussion for each hypothesis of the study are presented as per the study objectives. The conclusions deduced by the study are also presented in this chapter and are guided by the research objectives and informed by the findings of the study. From the conclusions made, recommendations of the study to policy and practice are presented. Lastly the proposed areas for further future research are presented.

5.2 Summary of the Findings

The general objective of the study was to establish the influence of compliance with aviation safety standards on performance of air transport in Kenya. Six objectives were addressed by testing six hypotheses. The population of the study comprised of regulators and air operators in Kenya. The research data was then collected from various respondents. Simple linear regression was employed in analysis to determine the influence of each independent variable namely; aviation training standards, aircraft airworthiness certification process standards, resolution of safety concern standards, airport infrastructure standards on performance of air transport in Kenya the-dependent variable of the study. Further multiple and stepwise regression was employed to determine whether monitoring and evaluation process had a moderating influence on the relationship between compliance with aviation safety and performance of air transport in Kenya.

5.2.1 Aviation Training standards and Performance of Air Transport

The study's first objective was to establish the influence of compliance with aviation safety training standards on performance of air transport in Kenya. The null hypothesis tested was 'there is no significant relationship between compliance with aviation training standards and the performance of air transport in Kenya'. The research findings were $R^2= 0.160$, F-statistic was (3,163) = 10.034, p = 0.001<0.05 implying that there was a statistically significant relationship between compliance with aviation training standards and performance of air transport. Based on the study findings the null hypothesis which stated that there is no significant relationship between compliance with aviation training standards and performance of air transport was rejected and concluded that compliance with aviation training standards has a statistically significant influence on performance of air transport in Kenya. The indicators for compliance with aviation training standards are: basic training, qualification training, training facilities, and learning environment. Out of the four indicators, basic training, qualification training, and training facilities had a statistically significant influence on the performance of air transport in Kenya.

The study findings revealed that majority of the respondents (regulators) agreed to a very great extent that specialized qualification training is key in air transport performance (91.4%) which corresponded with those of air operators who strongly agreed that aviation personnel in operational areas such as pilots and engineers have basic type training and are experienced on the equipment they work on (50.4%). Majority of the regulators agreed to a very great extent that compliance to aviation basic training safety standards improve performance of air transport (77.8%) findings which score well with those of air operators who agreed that KCAA carry out sufficient examination process before issuing licenses to aviation personnel (47.1%), the prerequisite entry qualifications for each course training standards is observed (65.3%), and training curriculum meet KCAA laid down regulations/standards (57.0%)which is ICAO standards. The findings indicate that majority of regulators agreed that aviation training standards in Kenya meet international set standards (53.1%), findings that correspond well with air operators responses that the content in the training modules is adequate for particular courses (66.1%). Majority of regulators agreed that there is sufficient monitoring and evaluation of compliance to aviation training standards by the regulator (39.5%) findings that compare relatively well with air operators responses that there is sufficient monitoring and evaluation of compliance to aviation training standards by KCAA (52.1%).

The findings further show that a significant number of regulators agreed to a small extent that there are sufficient training facilities for aviation personnel (19.8%) findings that contravene those of the air operators who indicated that training facilities in aviation colleges are adequate in all institutions (30.6%), the learning environment in aviation institutions is conducive for learning (52.9%), and that there is continuous monitoring and evaluation of aviation training facilities and management which is mandatory in all aviation training institutes (45.4%). Overall, the study results portray that KCAA the air transport regulator is satisfied with the training process in the air transport industry in Kenya.

5.2.2 Aircraft Airworthiness Certification Process Standards and Performance of Air Transport

The second objective of the study was to establish the influence of compliance with aircraft worthiness certification process standards on performance of air transport in Kenya. The null hypothesis tested was ‘there is no significant relationship between compliance with aircraft worthiness certification process standards and the performance of air transport in Kenya’. The research findings were $R^2 = 0.100$, F-statistic was $(5,349) = 6.288$, $p = 0.000 < 0.05$ implying that there was a statistically significant relationship between compliance with aircraft worthiness certification process standards and performance of air transport. Based on the study findings the null hypothesis which stated that ‘there is no significant relationship between compliance with aircraft worthiness certification process standards and performance of air transport’ was rejected and concluded that compliance with aircraft worthiness certification process standards has a statistically significant influence on performance of air transport in Kenya. The indicators for compliance with aircraft worthiness certification process standards were: aircraft condition, conformity to design, inspection requirements, and aircraft documentation. Out of the four indicators, conformity to design, inspection requirements, and aircraft documentation had a statistically significant influence on the performance of air transport in Kenya.

The study findings revealed that majority of the regulators strongly agreed that all inspection requirements need to be satisfactory before recertification process is completed (48.8%)

which conform with majority of air operators (56.8%) agreement to the same question. Majority of the regulators cumulatively agreed that inspection of aircrafts is done by qualified personnel (72.9%), findings that correspond well with air operator's responses to documents for certification applicants are well screened before certification (52.9%). Majority of the regulators (58.0%) agreed that the aviation certification department is very effective which conform with majority of air operators (43.8%) agreement to the same question. The study findings further revealed that majority of the regulators cumulatively agreed that the airworthiness department is very effective in certification (61.7%), findings which relate well with majority of air operators agreement that they understand the procedure for certification in the aviation industry (53.7%).

The study findings further indicated that majority of regulators (53.1%) agreed that certification procedure is well documented and circulated to all parties which conform very well with majority of air operators (52.9%) agreement to the same question. Majority of the regulators (45.7%) agreed that aircraft records are documented and availed to KCAA upon request during certification processes which correspond very well with majority of air operators (54.5%) agreement to the same question. From the study findings majority of regulators agreed that the health of an aircraft depends only on its condition as per the laid out requirements (33.3%) and aircrafts must conform to designs necessary for certification process (33.3%). Worth noting was that, majority of air operators agreed that delivery of non-approved courses by aviation training schools causes performance failure in aviation (38.8%). Overall, the study reveals that both regulators and air operators are satisfied with the aircraft certification process in the air transport in Kenya.

5.2.3 Resolution of Safety Concern Standards and Performance of Air Transport

The third objective of this study was to establish the influence of compliance with resolution safety concern standards on performance of air transport in Kenya. The null hypothesis tested was 'there is no significant relationship between compliance with resolution safety concern standards and the performance of air transport in Kenya'. The research findings were $R^2 = 0.126$, F-statistic was $(6,929) = 7.963$, $p = 0.000 < 0.05$ implying that there was a statistically significant relationship between compliance with resolution safety concern standards and performance of air transport. Based on the study findings the null hypothesis was rejected which stated that there is no significant relationship between compliance with resolution safety concern standards and performance of air transport and concluded that compliance with resolution safety concern standards has a statistically significant influence on performance of air transport in Kenya. The resolution safety concern standards were estimated using the following indicators: identification of deficiencies and safety concerns, analysis of safety deficiency concerns, implementation of reporting system, and corrective action to safety deficiency. Out of the four indicators, identification of deficiencies and safety concerns and corrective action to safety deficiency were the ones that had a statistically significant influence on the performance of air transport in Kenya.

The study findings revealed that majority of the respondents (regulators) strongly agreed that compliance with resolution safety concerns is integral part of aviation performance (66.7%), findings that correspond quite well with majority of air operators who agreed that compliance with resolution safety concerns is critical element of oversight activities (56.2%). Majority of the regulators (39.5%) agreed the period of time given by the CAA to correct deficiencies is reasonable which correspond relatively well with majority of air operators (51.2%) who agreed that the time is sufficient to the same question. Majority of the regulators respondents (50.6%) agreed that corrective action taken on safety deficiencies influence performance of air transport which corresponded well with responses by majority of air operators (43.8%) agreement to the same question. Further, majority of the regulators (34.6%) agreed that lessons learned during resolution of safety concerns are disseminated to all CAA certified AOC, AMO and ATO which corresponds well with findings of majority of air operators (38.8%) who agreed that lessons learned during resolution of safety concerns are disseminated to all aviation industry participants.

Majority of the regulators (42.0%) agreed that analysis of safety deficiencies is done immediately after inspection and circulated to the concerned parties for corrective action which related very well with majority of air operators (47.1%) agreement to the same question. The findings further revealed that majority of the regulators (43.6%) agreed that action taken for non-compliance is applicable to all which corresponded very well with majority of air operators (55.4%) agreement to the same question. Majority of the regulators indicated that there is a forum for disseminating resolution safety concerns compliance status to concerned parties (51.9%), resolution safety concern advisory publications are available to aviation industry (50.6%), and reporting system of deficiencies in aviation is non-punitive (44.4%). From the study findings majority of air operators agreed that technical guidance and procedures are provided for in the program of safety oversight improvement (62.0%). Overall, the study reveals that both regulator and air operators in Kenya are satisfied with the resolution of safety concerns process of KCAA.

5.2.4 Airport Infrastructure Standards and Performance of Air Transport

The fourth objective of the study was to establish the influence of compliance with airport infrastructure standards on performance of air transport in Kenya. The null hypothesis tested was 'there is no significant relationship between compliance with airport infrastructure standards and the performance of air transport in Kenya. The research findings were R^2= 0.076, F-statistic was (4,007) = 4.918, $p = 0.004<0.05$ implying that there was a statistically significant relationship between compliance with airport infrastructure standards and performance of air transport. Based on the study findings the null hypothesis which stated that there is no significant relationship between compliance with airport infrastructure standards and performance of air transport was rejected and concluded that compliance with airport infrastructure standards has a statistically significant influence on performance of air transport in Kenya. The indicators for compliance with airport infrastructure standards were: number of runways, aircraft ramp parking, taxiing space, and hangar construction spaces. Out of the four indicators, number of runways was the only one that had a statistically significant influence on the performance of air transport in Kenya. The contribution of the air ramp parking, taxiing space and hangar construction space should be given attention by decision makers because they are known empirically to have a significant contribution to performance of air transport.

The study findings revealed that majority of the respondents both regulators (76.6%) and air operators (94.2%) cumulatively agreed that airport infrastructure influences performance of air transport. Majority of the regulators (49.4%) agreed KCAA oversight of airport service provider is effective in promoting safe air transport which corresponds well with majority of air operators (44.6%) who agreed to the same question. Majority of the regulators (43.2%) agreed that runway inspection is done to check for debris, any loose material in order to promote safety, findings that were strongly confirmed by majority of air operators (44.6%) when asked the same question. Interestingly, majority of the regulators (44.6%) disagreed that the taxiing spaces in the aerodrome were sufficient findings strongly corresponded with responses by majority of air operators (49.6%) when asked the same question. Majority of air operators were neutral and disagreed to the number of runways are sufficient in all airports (39.7%) and (21.5%) respectively, the same findings were revealed by majority of regulators (49.4%) who disagreed to the number of runways are sufficient in all airports. Majority of the regulators (35.8%) disagreed that hangar construction spaces are sufficient for the fleet (35.8%), findings that were also confirmed by majority of air operators (23.1%) when asked the same question.

Majority of air operators were neutral and disagreed that there is sufficient aircraft ramp parking for aircrafts in the airports (39.7%) and (14.9%) respectively, the same findings were revealed by majority of regulators(33.3%) who disagreed to the same statement. Majority of air operators were neutral and disagreed that the capacity of airports infrastructure is generally adequate to meet the demands of airport users at all times (38.8%) and (12.4%) respectively, the same findings were revealed by majority of regulators(39.5%) who disagreed to the same statement. Majority of air operators were neutral and disagreed that the data collected during monitoring and evaluation is disseminated to all parties (33.1%) and (15.7%) respectively, the same findings were revealed by majority of regulators (49.4%) who remained neutral to the same statement. Majority of the air operators (55.4%) agree that there is continuous monitoring and evaluation of airports infrastructure, a statement that majority of regulators (46.9%) remained neutral about. Majority of the air operators (44.6%) agree that reports are utilized for the continuous improvement of the infrastructure, a statement that majority of regulators (34.6%) remained neutral about. Majority of regulators were neutral about their satisfaction with the level of compliance with airport infrastructure standards (53.1%).

5.2.5 Combined Aviation Safety Standards and Performance of Air Transport

The fifth objective of the study was to establish how combined aviation safety standards influences performance of air transport in Kenya. Compliance with aviation safety standards was a combination of independent variables of the study namely; compliance with aviation training standards, compliance with aircraft worthiness certification process standards, compliance with resolution safety concern standards, and compliance with airport infrastructure standards. The null hypothesis tested was ‘there is no significant relationship between compliance with aviation safety standards and the performance of air transport in Kenya’. The research findings were $R^2 = 0.587$, F-statistic was $(8,044) = 9.203$, $p = 0.000 < 0.05$ implying that there was a statistically significant relationship between combined aviation safety standards and performance of air transport. Based on the study findings the null hypothesis which stated that there is no significant relationship between compliance with aviation safety standards and performance of air transport was rejected and concluded that combined aviation safety standards had a statistically significant influence on performance of air transport in Kenya.

5.2.6 Influence of Monitoring and Evaluation Process on the Relationship between Aviation Safety standards and Performance of Air Transport

The last objective of the study was to establish the moderating influence of monitoring and evaluation process on the relationship between compliance with aviation safety and performance of air transport in Kenya. The null hypothesis tested is ‘that the strength of relationship between compliance with aviation safety standards and the performance of air transport in Kenya did not depend on monitoring and evaluation processes. The research findings were $R^2 = 0.587$, F-statistic was $(10,854) = 11.870$, $p = 0.000 < 0.05$ implying that there was a statistically significant relationship between compliance with aviation safety standards and performance of air transport. Based on the study findings the null hypothesis ‘that the strength of relationship between compliance with aviation safety standards and the performance of air transport in Kenya did not depend on monitoring and evaluation processes was rejected and concluded that the strength of relationship between compliance with aviation safety standards and the performance of air transport in Kenya depended on monitoring and evaluation process. The indicators of monitoring and evaluation process were: preparation of M&E work plans, data collection on aviation safety, data analysis, and dissemination of M&E results. Out of the four indicators, preparation of M&E work plans, data collection on aviation safety, and dissemination of M&E results had a statistically significant influence on the performance of air transport in Kenya. The contribution of data analysis should not be ignored by decision makers because it is an element of M&E process that is empirically proven to influence air transport performance.

The study findings indicated that majority of the respondents both regulators (61.7%) and air operators (63.6%) strongly agreed that adherence to monitoring and evaluation plans in aviation improves performance. The findings revealed that majority of regulator (42.0%) strongly agreed that tools of M&E helps a lot in task accomplishment. Majority of the air operators (61.2%) strongly agreed that monitoring and evaluation is the first step to great performance, findings which correspond well with majority of regulators (45.7%) who strongly agreed to the same question. Majority of the regulators (38.3%) strongly agreed that methods of data collection determine the performance in air transport which corresponds well with majority of air operators (60.3%) who agreed to the same question. Majority of the air operators (63.6%) strongly agreed that monitoring and evaluation leads to proper analysis of the client's needs hence boosting performance of air transport, findings which tally well with majority of regulators (43.2%) who strongly agreed to the same question. Both the air operators and the regulators agreed that data presentation contribute a lot in the performance of air transport (46.3%) and (34.6%) respectively. Both the air operators and the regulators disagreed that monitoring and evaluation has more evil than good and lowers productivity in all ways (44.6%) and (35.8%) respectively. The study findings revealed that majority of air operators agreed they are satisfied with the way monitoring and evaluation is done in air transport industry (49.6%) and this was echoed by the regulators.

5.4 Discussion of the Findings

There is empirical evidence to prove that compliance with aviation safety standards influence the performance of air transport. The discussion section in this study contains supporting literature guided by the objectives and research hypotheses.

The main findings for the first objectives of the study are linked to previous studies that were reviewed in the literature review section. The study stated the following hypothesis: Hypothesis 1: There is a significant relationship between compliance with aviation training standards and the performance of air transport. Britannica (2016) reported that airlines must balance training time with operational time to ensure that pilots and crew maintain their skills and compliance with regulatory bodies. Chang & Yeh (2004) and Liou et al. (2008) reported that in the commercial airline industry, enhancement of safety is crucial for the industry success and for that reason proper training could prevent accidents in the air transport industry. A study by Qing & Ye (2015) established that safety in the airline industry depends on various inputs among them staff training. A study by Bent & Chan (2010) found that training is a means of preventing accidents in the aviation industry and airlines globally strive for the highest safety standards. While studies related to the influence of aviation training standards on performance of air transport seem to be limited, there are a number of studies based on the influence of employee training on organizational performance. Putting into consideration that employee training is part of aviation training standards then references can be made on the studies. Hypothesis 1 was supported by the study data and hence there exists a significant relationship between compliance with aviation training standards and the performance of air transport. It was expected that compliance with aviation training standards would influence the performance of air transport. With reference to the studies mentioned in this section, the study results confirm and support the relationship.

The main findings for the second objective of the study are linked to previous studies that were reviewed in the literature review section. The study stated the following hypothesis: Hypothesis 1: There is a significant relationship between compliance with aircraft worthiness certification process standards and the performance of air transport. Drury (2014) reports that inspection structures and systems are important in ensuring continued airworthiness of aircrafts. Drury (2014) asserts that failure in aircraft infrastructure comprises of cracks, corrosion, or deformation beyond the plastic limit and therefore inspection systems are designed to detect these in a timely manner. The Continuing Airworthiness Management (CAM) ensures that all maintenance activities are performed on an aircraft so as to maintain its airworthiness hence assuring operational safety. These activities by CAM must observe requirements given by the aviation authorities, and the manufacturers (Corella, 2015). Gramopadhye et al. (1995) found that training had a powerful effect on inspection performance when applied by experienced inspectors. Hypothesis 1 was supported by the study data and hence there exists a significant relationship between compliance with aircraft worthiness certification process standards and the performance of air transport.

The main findings for the third objective of the study are linked to previous studies that were reviewed in the literature review section. The study stated the following hypothesis: Hypothesis 1: There is a significant relationship between compliance with resolution of safety concern standards and the performance of air transport. These findings concur with ICAO safety oversight manual that reports that a common deficiency identified in the majority of assessed and audited States is a lack of an adequate safety oversight organization and infrastructure within the CAA. In the majority of cases, this has resulted from insufficient resources being provided for the CAA. As a result, such States are unable to fully comply with national and international requirements relating to the safety of civil aviation, including operations and infrastructure. The audits and other ICAO missions have shown that where an appropriate safety oversight organization has not been established, control and supervision of aircraft operation and associated activities are often deficient, creating an opportunity for unsafe practices. The establishment and management of a viable safety oversight system require a high-level government commitment, without which a State cannot satisfactorily discharge its aviation system safety-related responsibilities (Safety Oversight Manual, 2006). While studies related to the influence of compliance with resolution safety concern standards on performance of air transport seem to be limited, there are a few of studies based on the influence of safety concern standards and airline performance. Since the airline performance and air transport performance are interrelated, then references can be made on the studies. Hypothesis 1 was supported by the study data and hence there exists a significant relationship between compliance with resolution safety concern standards and the performance of air transport.

The main findings for the fourth objective of the study are linked to previous studies that were reviewed in the literature review section. The study stated the following hypothesis: Hypothesis 1: There is a significant relationship between compliance with airport infrastructure standards and the performance of air transport. While studies related to the influence of compliance with airport infrastructure standards on performance of air transport seem to be limited, there are a few of studies based on the influence of airport infrastructure and airline performance. Since the airline performance and air transport performance are interrelated, then references can be made on the studies. Graham (2014) reported that airports need to provide the entire infrastructure needed to enable passengers and freight to transfer move from surface to air modes as well as allow aircrafts to take off or land safely. Piyathilake (2016), reports that airports should have runway facilities sufficient to service fleet that fly long distances so that they secure services for long haul destinations and increase passenger volumes. Khadaroo & Seetanah (2008) found out that the level of physical infrastructure and human capital an airport has are fundamental factors for global competitiveness in air transport. Rosen (2002) study results revealed that flight delays rise with the ratio of demand to fixed airport infrastructure. Hypothesis 1 was supported by the study data and hence there exists a significant relationship between compliance with airport infrastructure standards and the performance of air transport.

There are limited studies relating to compliance with aviation safety standards and performance of air transport. The study stated the following hypothesis: Hypothesis 1: There is a significant relationship between combined compliance with aviation safety standards and the performance of air transport. While studies related to the influence of combined compliance with aviation safety standards on performance of air transport seem to be limited, there are a few of studies based on the influence of aviation safety and airline performance. Since the airline performance and air transport performance are interrelated, then references can be made on the studies. Hypothesis 1 was supported by the study data and hence there exists a significant relationship between combined compliance with aviation safety standards and the performance of air transport.

The main findings for the sixth objective of the study are linked to previous studies that were reviewed in the literature review section. The study stated the following hypothesis: Hypothesis 1: There is a significant relationship between monitoring and evaluation process and the performance of air transport. Muchelule (2018) found out that monitoring techniques and their adoption impact project and organization performance. The study concluded that monitoring best practices have positive impact on project performance in state corporations in Kenya. While studies related to the influence of monitoring and evaluation process on performance of air transport seem to be limited, there are a number of studies based on the influence of monitoring and evaluation process and organization performance. Since the airline performance and organization performance are interrelated, then references can be made on the studies. Hypothesis 1 was supported by the study data and hence there exists a significant relationship between monitoring and evaluation process and the performance of air transport.

5.5 Conclusions

This section of the study presents the conclusions deduced from the study findings. The conclusions are based on the findings which are in line with the objectives and hypothesis of the study.

The first objective of the study was to establish the influence of compliance with aviation safety training standards on performance of air transport in Kenya. The indicators for compliance with aviation training standards were; basic training, qualification training, training facilities, and learning environment. The results from the descriptive analysis indicated that KCAA the air transport regulator felt that specialized qualification training is key in air transport performance a finding supported by air operators who indicated that aviation personnel in operational areas such as pilots and engineers have basic type training and are experienced on the equipment they work on. The study also found that the regulators indicated that basic training on aviation safety standards improves performance of air transport and that aviation training standardss in Kenya meet international set standards. Results from the inferential statistics indicated that compliance with aviation training standards has a statistically significant influence on performance of air transport in Kenya. The results indicated that qualification training and basic training had a strong and statistically significant relationship with performance of air transport in Kenya. The results also revealed that training facilities and learning environment had a moderate and significant relationship with performance of air transport in Kenya. This explanation denotes that aviation training standards influence performance of air transport in Kenya.

The second objective of the study was to establish the influence of compliance with aircraft worthiness certification process standards on performance of air transport in Kenya. The indicators for compliance with aircraft worthiness certification process standards were: aircraft condition, conformity to design, inspection requirements, and aircraft documentation. The results from the descriptive analysis revealed that all inspection requirements need to be satisfactory before recertification process is completed findings that both the regulator and air operators share. Results from the inferential statistics indicated that compliance with aircraft worthiness certification process standards has a statistically significant influence on performance of air transport in Kenya. The results indicated that conformity to design, inspection requirements, and aircraft documentation had a statistically significant relationship with performance of air transport. The results however indicated that aircraft condition had no statistically significant relationship with performance of air transport.

The third objective of the study was to establish the influence of compliance with resolution safety concern standards on performance of air transport in Kenya. The indicators for compliance with resolution safety concern standards were: deficiencies and safety concerns, analysis of safety deficiency concerns, implementation of reporting system, and corrective action. The results from the descriptive analysis revealed that KCAA the air transport regulator affirms that compliance with resolution safety concerns is integral part of aviation performance, a finding supported by air operators who indicated that compliance with resolution safety concerns is critical element of oversight activities. Results from the inferential statistics indicated that compliance with resolution safety concern standards has a statistically significant influence on performance of air transport in Kenya. The results indicated that corrective action to safety deficiency concerns, and identification of deficiencies and safety concerns had a statistically significant relationship with performance of air transport. The results however indicated that analysis of safety deficiency concerns, and implementation of reporting safety concern system did not have a statistically significant relationship with performance of air transport.

The fourth objective of the study was to establish the influence of compliance with airport infrastructure standards on performance of air transport in Kenya. The indicators for compliance with airport infrastructure standards were: number of runways, aircraft ramp parking, taxiing space, and hangar construction spaces. The results from the descriptive analysis revealed that both regulators and the air operators emphasized that airport infrastructure influences performance of air transport in Kenya. Results from the inferential statistics indicated that there was a statistically significant relationship between compliance with airport infrastructure standards and performance of air transport. The results indicated that number of runways, aircraft ramp parking, and taxiing space had a statistically significant relationship with performance of air transport. The results however indicated that hangar construction spaces did not have a statistically significant relationship with performance of air transport.

The last objective of the study was to establish how monitoring and evaluation process influence performance of air transport in Kenya. The indicators for monitoring and evaluation process were: preparation of M&E work plans, data collection on aviation safety, data analysis, and dissemination of M&E results. The results from the descriptive analysis revealed that both regulators and the air operators emphasized that adherence to monitoring and evaluation plans in aviation improve performance and lead to proper analysis of the client's needs hence boosting performance of air transport. Results from the inferential statistics indicated that there was a statistically significant relationship between monitoring and evaluation and performance of air transport. The results indicated that number of runways, aircraft ramp parking, and taxiing space had a statistically significant relationship with performance of air transport. The results however indicated that hangar construction space did not have a statistically significant relationship with performance of air transport. Preparation of M&E work plans, data collection on aviation safety, and dissemination of M&E results had a statistically significant relationship with performance of air transport in Kenya. Data analysis had no statistically significant relationship with performance of air transport

It can therefore be concluded that, compliance to standards governing aviation training in terms of qualification training, training facilities and learning environment have Conformity to design, inspection requirements, and aircraft documentation, Corrective action to safety deficiency concerns, and identification of deficiencies and safety concerns, numbers of runways, aircraft ramp parking, and taxiing space and numbers of runways, have a statistically significant influence on performance of air transport in Kenya. The variables that had no significantly significant influence on air transport should not be ignored because it is evident from literature that the opposite is true. Further, it was established that M&E process moderate the relationship between aviation safety standards and performance of air transport. This call for urgent decision making on how to improve any of these variables that contribute immensely on the performance of aviation transport and the industry at large.

5.6 Contribution of the Study to the Body of Knowledge

From the findings of this study it can be noted that compliance with aviation safety standards influence performance of air transport. The existing empirical reports tackled variables such as safety management personal spaceflight industry, effect of commercial aviation accidents, aviation safety strategy, and stakeholder perspective on aviation safety strategy, effects of reporting of safety concerns in general on performance of air transport. These variables formed the conceptual frame work for this study. The variables were tested empirically by collecting data from the regulators and the operators. There is paucity in literature on studies about influence of aviation safety standards on performance of air transport and how the strength of the relationship between compliance with aviation safety standards and performance of air transport depend on monitoring and evaluation process. This study provided information thus bridging the gaps that were found in the accessible reviewed studies. The study's contribution to the body of knowledge is summarized in Table 5.1:

Table 5.1 Contribution of the Study to the Body of Knowledge

Objectives of the study	Study Findings	Conclusion	Contribution to knowledge
1.To establish how compliance with aviation training standards influence performance of air transport in Kenya	compliance with aviation training standards influence performance of air transport in Kenya	Qualification training, training facilities and learning environment have statistically significance influence on performance of air transport in Kenya	The study findings demonstrate an empirical evidence that: **i).**Qualification training and basic training have a strong and statistically significant relationship with performance of air transport in Kenya. **ii).**Training facilities and learning environment have a moderate and significant relationship with performance of air transport in Kenya.
2. To determine how compliance with aircraft airworthiness certification process standards influence performance of air transport in Kenya.	compliance with aircraft airworthiness certification process standards influence performance of air transport in Kenya	Conformity to design, inspection requirements, and aircraft documentation have a statistically significant relationship with performance of air transport but Aircraft condition has no statistically significant relationship with performance of air transport.	The study findings have empirically established the following: **i).**Conformity to design, inspection requirements, and aircraft documentation have a statistically significant relationship with performance of air transport. **ii).** Aircraft condition has no statistically significant relationship with performance of air transport.
3. To establish the extent to which compliance with resolution of safety concern standards influence performance of air transport in Kenya.	Compliance with resolution of safety concern standards influence performance of air transport in	Corrective action to safety deficiency concerns, and identification of deficiencies and safety concerns have a statistically significant relationship with	Empirical evidence revealed that: **i).**Corrective action to safety deficiency concerns, and identification of deficiencies and safety concerns have a

	Kenya	performance of air transport. Where as Safety deficiency concerns and implementation of reporting safety concern system individually have no statistically significant relationship with performance of air transport.	statistically significant relationship with performance of air transport. **ii).**Safety deficiency concerns and implementation of reporting safety concern system individually have no statistically significant relationship with performance of air transport.
4. To determine how compliance with aircraft infrastructure standards influence performance of air transport in Kenya.	compliance with aircraft infrastructure standards influence performance of air transport in Kenya	The numbers of runways, aircraft ramp parking, and taxiing space individually have a statistically significant relationship with performance of air transport. On the contrary Hangar construction spaces have no statistically significant relationship with performance of air transport	The study has empirically established the following: **i).**Number of runways, aircraft ramp parking, and taxiing space individually has a statistically significant relationship with performance of air transport. **ii).**Hangar construction spaces have no statistically significant relationship with performance of air transport
5. To establish how monitoring and evaluation process influence performance of air transport in Kenya	monitoring and evaluation process influence performance of air transport in Kenya	Preparation of M&E work plans and data collection on aviation safety had a weak and statistically significant relationship with performance of air transport in Kenya. While Dissemination of M&E results has a moderate and statistically significant relationship with performance of air transport in Kenya. In contrast,data analysis has no statistically significant relationship with performance of air	Empirical results denote that: **i).**Preparation of M&E work plans and data collection on aviation safety had a weak and statistically significant relationship with performance of air transport in Kenya. **ii).**Dissemination of M&E results has a moderate and statistically significant relationship with performance of air transport in Kenya. **iii**).Data analysis has no

		transport	statistically significant relationship with performance of air transport
6.To establish how combined compliance with aviation safety standards influence performance of air transport in Kenya	combined compliance with aviation safety standards influence performance of air transport in Kenya	Aviation training standards, aircraft airworthiness certification process, resolution of safety concern standards, aircraft infrastructure standards influence performance of air transport	Empirical confirmation suggest that: **i).**Aviation training standards, **ii**).aircraft airworthiness certification process, **iii**).resolution of safety concern standards, **iv**).aircraft infrastructure standards have statistically significant influence on performance of air transport
7. To establish the extent to which the influence of compliance with aviation safety standards on performance of air transport is moderated by monitoring and evaluation process.	the influence of compliance with aviation safety standards on performance of air transport is moderated by monitoring and evaluation process	The strength of the relationship between compliance with aviation safety standards and performance of air transport depends on monitoring and evaluation process	Empirical findings demonstrate that: Monitoring & evaluation process has a statistically significant moderating influence on performance of air transport. Results suggest that monitoring & evaluation process acted as a moderator in the relationship between aviation safety standards and performance of air transport

5.7 Recommendations

This section of the study presents the recommendations that were based on the research findings, analysis, interpretation, and discussion. The recommendations for policy and practice are presented here.

From the study findings, it is recommended that training of aviation staff on intellectual skills, sound knowledge of basic theory and a comprehensive understanding of the aviation safety standards. The systems upon which they have to work should be reviewed to embrace recommended best practices that are at par with industry demand. The instructors and trainers charged with the responsibility of training aviation staff should be highly knowledgeable, skilled, experienced and competent in their field of expertise so as to produce certificate holders with skills, competency, care, judgment and responsibility necessary to hold that particular qualification certificate.

The learning institutions should be Approved Training Organizations (ATO’s) by aviation regulators. The ATO’s should have training facilities that are conducive to learning and are accessible by personnel in all fields of aviation. Training programs, curriculum, and guidance manuals approved by the civil aviation authority should be availed to all users. It is further recommended that the ATOs need to create distance and e-learning platforms to support continuous learning, short courses, and familiarization courses aimed at reaching working staff and those spatially separated from the learning institutions by distance. This mode of learning is low cost, convenient, and if properly managed is appropriate for current generation that is highly digital.

Aviation industry is the most heavily regulated of all the transportation modes. The design of airframes/engines combination must be proven to that manufacturing state regulator by way of inspection and test flights. New systems incorporate in aircraft has the risk assessed with respect to training syllabus for flight crew and maintenance engineers. Possible contribution factors into accidents of aircraft in service/ operational could be due to corporate culture within manufacturers in designing aircraft and corporate culture within manufacturing state

Regulators. It seems tendency of complacency in acquisition of Design Organization Approval Certification process (DOA) this possible because the Organizations and Regulators have been working together to a point of believing works of each other hence big teamwork with little doubt. Examples of the above scenarios are Airbus A321 fleet and Boeing B737MAX, whereby global population witnessed Fatal accidents. Serious monitoring and evaluation on these process is very important to restore the effectiveness, glory and trust in aviation industry. More learning lessons, research and awareness is needed when aircraft systems malfunctions, incidents are reported by operational crew and maintenance crew this will protect accidents such as those being observed.

Implementation of processes and procedures to resolve identified deficiencies impacting aviation safety which might have been residing in the aviation and have been detected by regulatory authority or other appropriate bodies. Accidents reports should be made available to aviators in order to learn deficiencies and safety concerns related to the accident as a learning curve. The accident could be due to manufacturing of the aircraft systems or components and this need to be analyzed and put the corrective action that was done made available for aviators as a lesson learnt.

It is also recommended that aviation regulators need to conduct continuous inspection, evaluations, analysis, surveillance, and interventions to ensure the aviation industry maintain highly qualified personnel in area of specialization as part of their aviation safety oversight. In addition electronic storage of aircraft documentation records, aviation industry operational personnel records, equipment records, and manuals containing valid information should be kept by aviation regulator departments. There is also need for e-documentation records in regard to qualification of technical personnel to be under custody, and updated by personnel licensing. This database will be accessible to the interested aviation population through KCAA website for the purpose of reference of technical licensed personnel curriculum vitae.
It is also recommended that international airport need to have at least primary runway and secondary runway to provide alternate continued operations (Take off and Landings) in the invent of closed runway due to disabled aircraft removal. Second runway will solve problems

of passengers conveniences such delayed arrivals, missing connecting flights, airlines additional costs, due diversions arriving aircraft and departing aircraft would experience delays, flight cancellations, leading to hotel accommodations and airport lounges congestions. Some airports such as Wilson airport (Nairobi) in particular has serious challenges of encroachment by housing developers to an extend that there is no available expansion space for air operators to construct Hangars, workshops, operational offices, and for activities such as aircraft parking, aircraft movements, aircraft taxiing and is fire high risk because firefighting-trucks have limited access to the equipment and existing structures. This is a serious phenomenon that requires Government experts' intervention urgently.

5.8 Suggestion for Further Research

The focus of this study was to establish the influence of aviation safety standards and performance of air transport and to determine if the strength of this influence depends on monitoring and evaluation process. The study was guided by seven objectives and corresponding research questions and hypotheses. Based on field work experience, several gaps were noted. Therefore, the researcher suggests further research to be carried on the following areas:

i) Human factor management and compliance to aviation safety standards in Kenya
ii) Influence of outsourcing of services on performance of air transport in Kenya
iii) Competency based management and performance of air transport in Kenya

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APPENDICES

APPENDIX I: INTRODUCTION LETTER

Nelson K. Mwikya,
P.O Box 30197,
Nairobi, Kenya
1st December, 2016.
Dear Respondent,

RE: REQUEST FOR PARTICIPATION IN A RESEARCH STUDY

I am a student at University of Nairobi currently undertaking a research study to fulfill the requirements of the Award of Degree of Doctor of Philosophy in Project Planning and Management. I am currently carrying out a research on ‘Compliance with **aviation safety standards,** M**onitoring and evaluation process and performance of air transport in Kenya’** as a requirement for the award of the degree. You have been selected to participate in this study. Your participation in the exercise is voluntary and I kindly request you to spare a few minutes and respond to all questions in the attached questionnaire as completely, accurately and honestly as possible. The information you provide will be used purely for academic purpose.

Thank you in advance for your co-operation.

Yours Faithfully,

Nelson K. Mwikya
L83/98109/2015

APPENDIX II

QUESTIONNAIRE FOR DASSAR STAFF

This questionnaire is designed to collect data on the influence of compliance with aviation safety standards and performance of air transport in Kenya and how this influence is moderated by monitoring and evaluation process. Kindly complete the following questionnaire using the instructions provided for each set of questions. Tick appropriately. Instructions: Please tick (√) as appropriate. Do not write your name on this questionnaire.

PART A: DEMOGRAPHIC DATA

1. What is your gender?

(a) Male [ ] (b) Female [ ]

2. In which of the following age brackets does your age fall?

(a) 20-30 years [ ] (b) 31-40 years [ ] (c) 41-50 years [ ] (d) 50 and above [ ]

3. State your highest education level

(a) Secondary school [ ] (b) Certificate [ ] (c) Diploma [ ]

(d) Undergraduate [ ] (e) Post Graduate [ ] (f) Other ________________

4. How many years have you worked in the air transport industry?

(a) Less than 1year [ ] (b) 1-3 years [ ] (c) 4-6 years [ ]

(d) 7-10 years [ ] (e) More than 10 years [ ]

5. How many years have you worked with KCAA?

(a) Less than 1year [ ] (b) 1-3 years [ ] (c) 4-6 years [ ]

(d) 7-10 years [ ] (e) More than 10 years [ ] (f) Other ________

6. Please identify your department:

Flight Operations [ ] Airworthiness [ ] Personnel licensing [ ]

Ground Operations [ ] Aviation Security [ ] Air Transport [ ]

PART B: PERFORMANCE OF AIR TRANSPORT IN KENYA

8. In your opinion, how is the current overall performance of the air transport in Kenya?

(a) Excellent [ ] (b) Good [ ] (c) Average [ ] (d) Low [ ] (e) Poor [ ]

9. a) Please indicate the extent to which you agree or disagree with the following as measures of performance of the air transport in Kenya? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Performance of air transport	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
There is an increase in the number of air operators in the country					
There has been reduction in number of air accidents					
There is an increase in number of registered aircraft fleet					
The aircraft fleet increment can be attributed to air safety standards compliance					
Adherence to service chatter timelines improves the quality of air transport services					
Turn round time is shorter because of strict adherence to set fleet schedules					
Parking space is not enough due to the high number of aircrafts					
Movement of aircrafts is not easy because of congestion					
There are continuous staff sensitization workshops on safety standards.					
Frequency in oversight surveillance by the regulator has improved performance					
There is always routine audit for Approved Maintenance Organizations					

I am satisfied with the performance of my organization					

b) How else is performance of the air transport in Kenya measured?

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10. Please indicate the extent to which you agree or disagree with the following statements in regards to aviation safety standards and performance of the air transport in Kenya? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Aviation safety standards	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
Inadequate qualified staff especially in maintenance					
Inaccurate documents presented to the regulator for licensing and approvals					
Unethical practices, lack of integrity and conflict of interest by inspectors					
Failure to collect safety data required to monitor trends and for safety information exchange					
Change in economic environment					
Non compliance with ICAO, SARPs and poor regulations					
Operators non compliance with laws and regulations					
Inadequate infrastructure					
Incompetent inspectors					
Poor adoption of technology					
Political interference leading to skewed decision making					

PART C: COMPLIANCE WITH AVIATION SAFETY TRAINING STANDARDS

The training of air transport staff require rigorous imparting of intellectual skills, sound knowledge of basic theory and comprehensive understanding of the relevant systems up on which they will work. Competency-based approved training for aircraft maintenance personnel shall be conducted within an approved training organization. Approved training for flight crew and air traffic controllers shall be conducted within an approved training organization. As long as air travel depends on qualified pilots or other air and ground personnel, their competence, skills and training will remain the essential guarantee of efficient and safe operations. Adequate personnel training and licensing also instill confidence among States, leading to international recognition and acceptance of personnel qualifications and licenses and greater trust in aviation on the part of the traveller.

11. Does your work involve monitoring and evaluation of aviation safety training standards?
    (a) Yes [ ] (b) No [ ]

12. a) Please indicate your level of agreement agree with the following statements on monitoring and evaluation of aviation training standards? Indicate your response based on a 5-point scale: To a great extent (TGE); To Some Extent (TSE); Neutral (N); To a small extent (TSE); and To no extent TNE) by using a tick (√) or X to mark the applicable box.

Aviation Training Standard	**TGE (5)**	**TSE (4)**	**N (3)**	**TSE (2)**	**TNE (1)**
Basic training on aviation safety standards improves performance of air transport					
Specialized qualification training is key in air transport performance					
There are sufficient training facilities for aviation personnel					
Our examinations are well moderated by aviation experts					
Feed back on results is timely					
Examiners consider individual differences when giving oral assessment					
Content is disseminated through					

multi-media					
The environment is conducive to learning for aviation personnel					
There is sufficient monitoring and evaluation of aviation training standards by KCAA					
Aviation training standards in Kenya meet international set standards					
Am satisfied with the training process in the aviation industry					

b) How else does monitoring and evaluation of aviation training standards influence performance of the air transport in Kenya measured?

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PART D: COMPLIANCE WITH CERTIFICATION PROCESS STANDARD

In order to comply with international air navigation system, licensing, certification, authorization and/or approval obligations, organizations must implement the required processes and procedures to ensure that personnel and organizations performing an aviation activity meet the established requirements before they are allowed to exercise the privileges of a license, certificate, authorization and/or approval to conduct the relevant aviation activity.

13. a) Please indicate your level of agreement agree with the following statements on monitoring and evaluation of certification process standards? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Certification Process Standard	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
It is the responsibilities of the operator to ensure operating crew, maintenance crew, working on its fleet of aircraft are appropriately					

qualified, licensed and valid					
To ensure that the required Standards of operation are maintained, the CAA need to establish a systems for both certification continued surveillance of operator					
The KCAA Directorate of Aviation, Safety, Security, and Regulations meet the service charter deadlines.					
Certification correspondence records are well kept					
Deficiencies or weaknesses discovered during certification process of Air operator or Approved maintenance organizations opportunity should be provided to applicant to remedy in targeted time					
Organization Certification procedures and processes is well documented and circulated in CAA wave-sight to all interested parties					
The health of an aircrafts depend only on its condition as per the laid out requirements					
Aircraft certifying personnel in AOC and AMO most of them have not attended Safety Management and documentation procedures trainings.					
Aircraft records are documented and availed to KCAA upon request during certification process					
I am satisfied with certification process					

b) How else does compliance with certification process standards influence performance of the air transport in Kenya measured?

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PART E: COMPLIANCE WITH RESOLUTION SAFETY CONCERN STANDARD

14. a) Please indicate your level of agreement agree with the following statements on monitoring and evaluation of resolution safety concern standards? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Resolution Safety Concern Standard	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
Compliance with resolution safety concerns is integral part of aviation performance					
The laid down procedures are followed all the time when a deficiency is found during inspection					
The resolution safety concern resolution advisory publications are available to aviation industry					
Analysis of safety deficiencies is done immediately after inspection and circulated to the concerned parties for corrective action.					
The period of time given by the CAA to correct deficiencies is reasonable					
There is a forum for disseminating resolution safety concerns compliance status to concerned parties					
Reporting system of deficiencies in aviation is non-punitive					
Lessons learned during resolution of safety concerns are disseminated to all CAA certified AOC, AMO and ATO					

Action taken for non-compliance is applicable to all					
Corrective action taken on safety deficiencies influence performance of air transport					
I am satisfied with the resolution of safety deficiencies process					

b) How else do monitoring and evaluation of resolution safety concern standards influence performance of the air transport in Kenya measured?

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PART F: COMPLIANCE WITH AIRPORT INFRASTRUCTURE STANDARDS

15. a) Please indicate your level of agreement agree with the following statements on monitoring and evaluation of airport infrastructure standards? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Airport Infrastructure Standards	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
The number of runways are sufficient in all airports					
There is sufficient aircraft ramp parking for aircrafts in the airports					
The taxiing spaces in the aerodrome is sufficient					
Hangar construction spaces are sufficient for the fleet					
Runway inspection is done to check for debris, any loose material in order to promote safety					
Capacity of airports infrastructure is generally adequate to meet the demands of airport users at all times					

There is continuous monitoring and evaluation of airports infrastructure					
Data collected during monitoring and evaluation is disseminated to all parties					
Reports are utilized for the continuous improvement of the infrastructure					
Airport infrastructure influences performance of air transport					
I am satisfied with airport the level of compliance with airport infrastructure standards					
KCAA oversight of aviation service provider is effective in promoting safe air transport					

b) How else does compliance with airport infrastructure standards influence performance of the air transport in Kenya measured?

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PART G: MONITORING AND EVALUATION PROCESS

16. a) Please indicate your level of agreement agree with the following statements on monitoring and evaluation process? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Monitoring and Evaluation Process	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
KCAA adheres to the set up M&E plans in improving performance of aviation industry in Kenya					
KCAA M&E process does not lead to expected outcomes, service delivery charter would operating within timelines.					

Methods of data collection KCAA use determines the level of performance in air transport and is not to expectations					
KCAA M&E process, data collection is done only internally, hence external data not collected					
KCAA M&E data is analyzed by experts and not made known to staff and stakeholders.					
KCAA projects monitoring process is not fully effective to assist if preformed decision making.					
KCAA strategic plans M&E process, purpose is to indicate areas needing urgent attentions, and information may be available no implementations and no follow-up.					
KCAA M&E process need variety of data collection tools because of nature of the business, but we only see survey research tools annually.					
Dissemination of M&E process need filtration and pass over to the industry to act on their part, but operators have not yet received.					
The mode used to communicate results is very clear to me					
I am satisfied with the way M&E process is done in air transport industry					

b) How else does monitoring and evaluation process influence performance of the air transport in Kenya measured?

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17. What challenges do you as the regulator face when monitoring and evaluating the compliance with aviation safety standards in air transport?

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18. Please give suggestions/recommendations towards the influence of compliance with aviation safety standards monitoring and performance of air transport in Kenya.

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THANK YOU FOR YOUR TIME AND COOPERATION!!

APPENDIX III

QUESTIONNAIRE FOR AIR OPERATORS

This questionnaire is designed to collect data on the relationship between monitoring and evaluation of aviation safety standards and performance of air transport in Kenya. Kindly complete the following questionnaire using the instructions provided for each set of question. Tick appropriately. Instructions: Please tick as appropriate. Do not write your name on this questionnaire.

PART A: DEMOGRAPHIC DATA

1. What is your gender?

(a) Male [ ] (b) Female [ ]

2. In which of the following age brackets does your age fall?

(a) 20-30 years [ ] (b) 31-40 years [ ] (c) 41-50 years [ ] (d) 50 and above [ ]

3. State your highest education level

(a) Certificate [ ] (b) Diploma [ ] (c) Undergraduate [ ]

(d) Post Graduate [ ] (e) PhD [ ] (f) Other ______________

4. Years of experience you have in the aviation industry?

(a) Less than 1year [ ] (b) 1-3 years [ ] (c) 4-6 years [ ]

(d) 7-10 years [ ] (e) More than 10 years [ ]

5. How many years have you worked with the air operator? ____________________

PART B: PERFORMANCE OF AIR TRANSPORT IN KENYA

6. In your opinion as an air operator, how is the current overall performance of the air transport in Kenya?

(a) Excellent [ ] (b) Good [ ] (c) Average [ ] (d) Low [ ] (e) Poor [ ]

7. a) As an operator, how has your general performance been in the last 3years?

(a) Excellent [ ] (b) Good [ ] (c) Average [ ] (d) Low [ ] (e) Poor [ ]

b) Kindly give a reason (s) for your response in Q. 7 (a)

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8. As an operator, have you in the last 10 years experienced any safety related air accidents or incidents in your operations?

(a) Yes [ ] (b) No [ ]

Kindly explain your response

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9. a) Please indicate the extent to which you agree or disagree with the following as measures of performance of the air transport in Kenya? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Performance of air transport	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
There is an increase in the number of air operators in the country					
Increase in air travel bookings and air service customers					

There has been noticeable reduction in number of air accidents.					
There is an increase in number of aircraft in CAA register.					
Increase in revenue in the general industry.					
There is expansion of air operation routes in region					
There has been continuous staff training by the air operators					
There is routine oversight surveillance on overall operation by the regulator					

b) How else in your view is performance of the air transport in Kenya measured?

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10. Please indicate the extent to which you agree or disagree with the following statements in regards to aviation safety standards and performance of the air transport in Kenya? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Aviation safety standards	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
Inadequate trained and qualified staff by the some air operators					
Loss of key working staff to competitions (turnover)					
Unethical practices, lack of integrity and conflict of interest by some workers					
Failure to collect safety data required to monitor trends and for safety information exchange					
Changes in political and economic environment in this country					

Inadequate airport facilities such as taxi ways, office-space, expansion.					
Airports congested and encroachment by city house developers.					
Slow phase in adoption of technology in air operation industry					

PART C: COMPLIANCE WITH AVIATION TRAINING STANDARD

11. a) Please indicate your level of agreement agree with the following statements on monitoring and evaluation of aviation training standards? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Aviation training standard	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
Continuous monitoring and evaluation of aviation training facilities to ascertain compliance of ICAO annex I training and state aviation training regulations.					
Aircraft Maintenance Organisations are not approved by CAA, hence do not comply to ICAO annex 1training requirements					
The course contents of aviation approved training organization are regularly reviewed to ensure it align with training requirements for type of training offered					
Existing culture of reporting differences between ICAO and training organization					
Services provided by KCAA for aviation industry use are deemed more expensive compared to other state CAA.					
KCAA carry out sufficient examination process before handing licenses to aviation personnel					

All staff undergo basic aviation safety training					
All staff undergo proper vetting to ensure they have adequate qualification training					
Training facilities are adequate in all institutions					
The learning environment in all institutions is conducive for learning					
I am satisfied with the level of compliance with training standards					

b) How else does compliance with aviation training standards influence performance of the air transport in Kenya measured?

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PART C: COMPLIANCE WITH CERTIFICATION PROCESS STANDARD

12. a) Please indicate your level of agreement agree with the following statements on monitoring and evaluation of certification process standards? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Certification process standard	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
I understand the procedure for Aviation industry certification processes					
The KCAA aviation certification department is very effective					
The time taken to complete certification process is not realistic					
Documents for certification applicants are well screened before certification					
Inspection of aircrafts are done by qualified and dedicated personnel					

Certification procedure is well documented and circulated to all parties					
The health of an aircrafts depend only on its condition as per the laid out requirements					
Aircrafts must conform to designs(TC) necessary for certification process					
All inspection requirements must be passed before certification processes is completed					
Aircraft records are documented and availed to KCAA upon request during certification process					
Aircraft certification process does not meet service charter stipulated by CAA.					

b) How else does compliance with certification process standards influence performance of the air transport in Kenya measured?

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PART D: COMPLIANCE WITH RESOLUTION OF SAFETY CONCERN STANDARD

13. a) Please indicate your level of agreement agree with the following statements on compliance with resolution safety concern standards? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Resolution safety concern standard	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
Compliance with resolution safety concerns is integral part of aviation performance					
The laid down procedures are followed all the time when a deficiency is found					

during inspection					
Technical guidance and procedures are provided early in the program of safety oversight improvement					
Analysis of safety deficiencies is done immediately after inspection and circulated to the concerned parties for corrective action.					
The period of time given by the CAA to correct deficiencies is reasonable					
There is a forum for disseminating resolution safety concerns compliance status to concerned parties					
Reporting system of deficiencies in aviation is non-punitive					
Lessons learned during resolution of safety concerns are disseminated to all CAA certified AOC, AMO and ATO					
Action taken for non-compliance is applicable to all					
Corrective action taken on safety deficiencies influence performance of air transport					
I am satisfied with the resolution of safety concerns process					

b) How else do compliance with resolution safety concern standards influence performance of the air transport in Kenya measured?

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PART E: COMPLIANCE WITH AIRPORT INFRASTRUCTURE STANDARDS

14. a) Please indicate your level of agreement agree with the following statements on compliance with airport infrastructure standards? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

Airport Infrastructure Standards	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
The number of runways are sufficient in all airports					
There is sufficient aircraft ramp parking for aircrafts in the airports					
The taxiing spaces in the aerodrome is sufficient					
Hangar construction spaces are sufficient for the fleet					
Runway inspection is done to check for debris, any loose material in order to promote safety					
Capacity of airports infrastructure is generally adequate to meet the demands of airport users at all times					
There is continuous monitoring and evaluation of airports infrastructure					
Data collected during monitoring and evaluation is disseminated to all parties					
Reports are utilized for the continuous improvement of the infrastructure					
Airport infrastructure influences performance of air transport					
KCAA oversight of airport service provider is effective in promoting safe air transport					

b) How else does compliance with airport infrastructure standards influence performance of the air transport in Kenya measured?

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PART F: MONITORING AND EVALUATION PROCESS

15. a) Please indicate your level of agreement agree with the following statements on monitoring and evaluation process? Indicate your response based on a 5-point scale by using a tick (√) or X to mark the applicable box.

M&E Process	**Strongly Agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
Adherence to M&E plans in aviation improves performance					
M&E leads to proper analysis of the client's needs hence boosting performance of air transport					
Methods of data collection determines the performance in air transport					
Data presentation contribute a lot in the performance of air transport					
Data is analyzed by experts so I never come to know what it was all about					
M&E has more evil than good and lower productivity in all ways					
M&E is the first step to great performance					
Tools of M&E help a lot in task accomplishment					
Dissemination of M&E results enhances visibility of an airline thus widening the market share					
The mode used to communicate					

results is very clear to me					
I am satisfied with the way M&E is done in air transport industry					

b) How else does monitoring and evaluation process influence performance of the air transport in Kenya measured?

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16. What challenges do you as the regulator face when monitoring and evaluating aviation safety standards?

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17. Please give suggestions/recommendations towards the influence of compliance with aviation safety standards on performance of air transport in Kenya and the moderating influence of monitoring and evaluation process.

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THANK YOU FOR YOUR TIME AND COOPERATION!!

APPENDIX IV: INTERVIEW GUIDE FOR MANAGERS AND DIRECTORS

1. How does compliance with aviation safety standards influence performance of air transport in Kenya?

2. To what extent does compliance with aviation training standards influence performance of air transport in Kenya?

3. How does compliance with Aircraft airworthiness certification process standards influence performance of air transport in Kenya?

4. To what extent does compliance with resolution of safety concern influence performance of air transport in Kenya?

5. How does compliance with aircraft infrastructure standards influence performance of air transport in Kenya?

6. How does monitoring and evaluation process influence the relationship between monitoring compliance with aviation safety standards and performance of air transport in Kenya?

7. Please give suggestions/recommendations towards the relationship between monitoring and evaluation of aviation safety standards and performance of air transport in Kenya

THANK YOU FOR YOUR TIME AND COOPERATION!!

APPENDIX V

AUTHORIZATION LETTER

NATIONAL COMMISSION FORSCIENCE, TECHNOLOGY ANDINNOVATION

Telephone:+254-20-2213471, 2241349,3310571,2219420
Fax: +254-20-318245,318249 .
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/17/91202/18748**

Date: **7th September, 2017**

Nelson Kyalo Mwikya
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Compliance with aviation safety standards, monitoring and evaluation process and performance of air transport in Kenya: A case of Airports in Nairobi County"*** I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **5th September, 2018.**

You are advised to report to **the Chief Executive Officer, Kenya Airports Authority, the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The Chief Executive Officer
Kenya Airports Authority.

APPENDIX VI:

APPROVAL TO CARRY OUT ACADEMIC RESEARCH

KCAA KENYA CIVIL AVIATION AUTHORITY

...iently managing air safety

KCAA/GEN/0046A/3 VOL. 8 **19th July, 2018**

Nelson Kyalo Mwikya
University of Nairobi
P.O. Box 30197
NAIROBI

APPROVAL TO CARRY OUT ACADEMIC RESEARCH

I am pleased to inform you that your request to collect research data for your PHD Thesis entitled "Compliance with Safety Standards, Monitoring and Evaluation and Performance of Air Transport in Kenya: A case of Airports in Nairobi County" has been approved.

Kindly note that the approval has been granted on the condition that the information provided by respondents will be treated confidentially and used exclusively for academic purposes. You will be required to avail a copy of the completed project to us for perusal.

On behalf of the Authority I take this opportunity to wish you every success in your research study.

Alice Kamau
FOR: DIRECTOR GENERAL

Copy to: MHR&A
KCAA, HQS

House, JKIA
30163 - 00100 GPO Nairobi
020 6827470 - 5, +254 734 000 491/492, +254 728 606 586/70, +254 709 725 000
020 6827 808, 6822 300

Website: www.kcaa.o
E-mail: info@kcaa.or.k

APPENDIX VII:

OBSERVATION GUIDE

S/N	PHYSICAL ITEMS	YES	NO	REMARKS
1	**Training Programme**			
	i). Does the Training manuals exist			
	ii).Are there Well displayed schedules for training?			
	i) Are here suitable operators in-house training facilities			
2	**Certification process**			
	iv) Does the operator have an established office			
	v) Does the operator have adequate tools and equipment for category approved by authority.			
	vi) Does the operator have roster for supervisory personnel			
3	**Airport Infrastructure**			
	v) Does the airport have adequate aircraft parking bays			
	vi) Does the airport have dedicated aircraft taxiing space			
	vii) Is there expansion space construction of aircraft facilities			
	viii) Is the airport free from encroachment by illegal developers			
4	**Monitoring and Evaluation**			
	ii) Are there well displayed Monitoring and Evaluation work schedules			
	iii) Is there evidence of Monitoring and Evaluation results dissemination meetings			

APPENDIX VIII

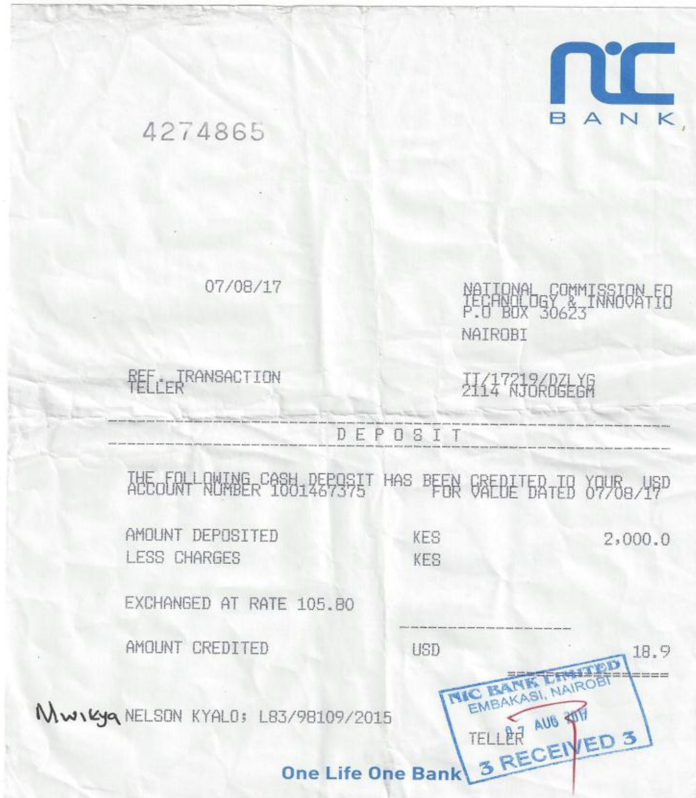
SAMPLE SIZE TABLE

Required Sample Size†

Population Size	Confidence = 95%				Confidence = 99%			
	Margin of Error				Margin of Error			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	196	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1067	427	636	827	1119
1,500	306	515	759	1297	460	712	959	1376
2,000	322	563	869	1655	498	808	1141	1785
2,500	333	597	952	1984	524	879	1288	2173
3,500	346	641	1068	2565	558	977	1510	2890
5,000	357	678	1176	3288	586	1066	1734	3842
7,500	365	710	1275	4211	610	1147	1960	5165
10,000	370	727	1332	4899	622	1193	2098	6239
25,000	378	760	1448	6939	646	1285	2399	9972
50,000	381	772	1491	8056	655	1318	2520	12455
75,000	382	776	1506	8514	658	1330	2563	13583
100,000	383	778	1513	8762	659	1336	2585	14227
250,000	384	782	1527	9248	662	1347	2626	15555
500,000	384	783	1532	9423	663	1350	2640	16055
1,000,000	384	783	1534	9512	663	1352	2647	16317
2,500,000	384	784	1536	9567	663	1353	2651	16478
10,000,000	384	784	1536	9594	663	1354	2653	16560
100,000,000	384	784	1537	9603	663	1354	2654	16584
300,000,000	384	784	1537	9603	663	1354	2654	16586

APPENDIX IX

NACOSTI RECEIPT



4274865

NIC BANK

07/08/17

NATIONAL COMMISSION FO
TECHNOLOGY & INNOVATIO
P.O BOX 30623
NAIROBI

REF. TRANSACTION TT/17219/DZLYG
TELLER 2114 NJOROGEGM

D E P O S I T

THE FOLLOWING CASH DEPOSIT HAS BEEN CREDITED TO YOUR USD
ACCOUNT NUMBER 1001467375 FOR VALUE DATED 07/08/17

AMOUNT DEPOSITED	KES	2,000.0
LESS CHARGES	KES	
EXCHANGED AT RATE 105.80		
AMOUNT CREDITED	USD	18.9

Mwikya NELSON KYALO; L83/98109/2015

NIC BANK LIMITED
EMBAKASI, NAIROBI
07 AUG 2017
TELLER
3 RECEIVED 3

One Life One Bank

APPENDIX X:

ORIGINALITY REPORT

COMPLIANCE WITH AVIATION SAFETY STANDARDS, MONITORING AND EVALUATION PROCESS AND PERFORMANCE OF AIR TRANSPORT IN KENYA A CASE OF AIRPORTS IN NAIROBI COUNTY

ORIGINALITY REPORT

15%	13%	4%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

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