AN ASSESSMENT OF SAFETY STRATEGIES IN HANDLING FIRE EMERGENCIES IN KENYAN AIRPORTS: A CASE STUDY OF WILSON AIRPORT NAIROBI

BY

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF A MASTERS OF ARTS IN SOCIOLOGY (DISASTER MANAGEMENT) IN THE UNIVERSITY OF NAIROBI

DECLARATION

I declare that this research project report is my original work and has not been presented in any other university or institution for any academic award.

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DEDICATION

I dedicate this work to my family members who includes: my wife Mrs. Caroline Mwanguya, my Son MacDenzel and Daughters Michelle and Malia for their moral, spiritual and financial support. I also dedicate it to my late mother, Esther Nambuya who passed on before completion of the course but left me with inspiring words that this course will determine my destiny. This work is also dedicated to the individuals who value the place of protection and safety against all form of harm for humanity. Finally, the work is dedicated to the Almighty God to whom I am grateful for guiding me, offering strength and protection while I was pursuing this study. To all of these, I am forever grateful,

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ABBREVIATIONS AND ACRONYMS

ADB: Approved Document B

AfDB: African Development Bank

APEX: Airport Excellence

ARFF: Airport Rescue and Fire Fighting

BRE: Building Regulations for England

ESA: European Space Agency

FEMA: Federal Emergency Management Agency

GOK: Government of Kenya

ICAO: International Civil and Aviation Organization

ISDR: International Strategy for Disaster Reduction

JKIA: Jomo Kenyatta International Airport

KAA: Kenya Airports Authority

MPP: Master of Public Policy

NDMU: National Disaster Management Unit

NGO: Non-Governmental Organizations

REDSO: Regional Economic Development Support Office

SFDRR: Sendai Framework for Disaster Risk Reduction

SOPs: Standard Operating Procedures

SPSS: Statistical Package for the Social Sciences

UK: United Kingdom

UNESCO: United Nations Educational, Scientific and Cultural Organization

USA: United States of America

USAID: U.S. Agency for International Development

ABSTRACT

The purpose of study was to assess the safety strategies in handling fire emergencies in Kenyan airports. The assessment was done using the National Emergency Response Plan and Standard Operating Procedures (SOPs) that have been adopted by the National Disaster Management Unit (NDMU) to provide a strategic, operational and tactical guide for NDMU, government agencies and private partners during emergency incidents in the country. The specific objectives were to identify the strategic planning measures that Wilson Airport has put in place to handle fire emergencies, to examine the adequacy of strategic planning for fire emergencies in Wilson Airport Nairobi, to assess the form of human resource training that informs the emergencies in Wilson Airport Nairobi, to appraise the capacity of the infrastructural set up in addressing fire emergencies in Wilson Airport Nairobi and to identify the challenges facing Wilson Airport in its appropriate response to fire emergencies. The theories adopted for this study included the Chaos Theory and the Systems Theory. In this research, a descriptive survey research design was utilized across a sample of 323 airport staff members, 10 airline managers and 12 trained firefighters. Questionnaires and interview guides were employed as the tools of study. The research findings established that human resource training for fire emergencies at Wilson Airport entails activities such as: fire drills for the staff to constantly gain skills, educational campaigns, response team training and emergency situation rehearsals. In regard to infrastructure, the study established that that the airport has various facilities such as firefighting agencies that are part of its infrastructural set up for fire emergencies. The study recommends the implementation of new policies and objectives that are meant to guide fire safety handling at Wilson Airport. Additionally, it is recommended that the effectiveness of the strategic planning measures need to be addressed which will entail collaboration between departments as well as improved communication that have been highlighted as great determinant in strategic planning. Lastly the study recommends more training on evacuation procedures to be conducted as well as regular checking and maintenance of all equipment that is vital in fire safety handling to ensure that the infrastructural set-up at the facility can handle a fire outbreak.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The efficiency in managing airport facilities, aircraft and employees against fire emergency is paramount to effective operations. Some common hazards found within airport environments include motor vehicles operating within the premises, people walking around the premises, weather conditions, commodities that are labeled dangerous, debris, and spillage of fuel (Sumathi et. al, 2018). These are the hazards that usually lead to fires and explosions in airports resulting into loss of properties and lives. Planning, human resource and infrastructural challenges are commonplace in airports. Majorly, they affect the quality of services and can lead to loss of revenues. An investigation by Rosenthal (2008) showed that 100 percent of the respondents claimed Heathrow was Europe's worst airport. Due to the waiting time and congestion, one of the respondents further noted that he had to literally sprint to get between gates to board the aircraft.

Planning is crucial during fire emergencies in airports primarily because it ensures there are proper communication, collaboration, and coordination procedures of activities in emergency scenarios. This is because emergencies differ depending on different factors that may include duration, degree of impact and extent of warning. Therefore, it is important to note that emergencies may not be predictable but can be handled through careful planning since they can be anticipated (Airports Council International, 2014). Kapoor (2009) notes that strategies aimed at recovery whether long or short term, incorporates the return of airport systems to the proper functional standards.

Firefighting strategies usually involve the reaction, withdrawal, mitigation of hazards and the rescue of commodities and individuals that may be trapped within a scene in which a fire disaster has occurred. In fact it is most important to start with saving lives in such an emergency (FEMA, 2006). Adequate preparedness involves the prevention as well as implementing of disaster response plans in the event of such a disaster. Plans that are implemented to counter fire disasters must incorporate people across all departments within the airport premises. Additionally there should be a fire response team that is on call 24 hours to ensure that there is no delay in handling a fire emergency should one occur (Salvano, 2002). According to Irandu and Rhoades (2006), air transport in Kenya has become popular in recent times with ordinary citizens opting to use it. It is no longer a preserve for the wealthy and senior officials within government and corporate circles. This new trend will lead to the aviation industry thriving. The opportunity for the industry to thrive is created in large by a growing populace, huge size of the country, poor surface transportation, increasing trade between Kenya and the developed world, which will eventually lead the beginning of a developmental process (USAID/REDSO/ESA, 2001).

Regionally, a research conducted by APEX (2019) shows how airports across Africa have poor infrastructure that places them at risk of fire outbreaks. In the research, there are specific infrastructural gaps in airports across Africa that include: lack of pavement management systems, lack of data on years of construction, runway strip and graded areas are non-existent or out of compliance in many cases, lighting system is often old and obsolete which causes for high maintenance repair or need for full rehabilitation, signs are often missing or not to standard, missing lights and old wiring, and electrical systems are obsolete and over 40-45 years old (APEX, 2019). Airport infrastructure is therefore critical to implementing safety handling

strategies for fire emergencies especially for an organization like the Kenya Airports Authority (KAA), which is mandated with managing all airports in Kenya including Wilson Airport.

Locally, there are infrastructural gaps in Airports. Mokaya and Nyaga (2009) note how Airports in Africa lack the capacity to handle disasters since they have inadequate resources. Further, Mokaya and Nyaga (2009), state that the problem is worsened by the fact that in Kenya, resources are allocated more to relief and restoration, rather than prevention. In another study by Kanyi, Kamau and Mireri (2016), it was established that although Wilson Airport may have the required infrastructure and facilities, there is need to improve on the fire handling strategies to guarantee that the airport is free from fire disasters (Kanyi et al, 2016). Infrastructural weaknesses at Wilson Airport in the study by Kanyi et al (2016) is revealed since, it is indicated that there are institutional weakness and inadequate management whenever disasters occur at Wilson Airport. This was evident through the dilapidated fire engines as attested by findings in the study that only a single fire engine was operational (Kanyi et. al, 2016). As an indicator of inefficiency in firefighting at Wilson Airport, the study noted how fire fighters used buckets to put off fire after the fire engines had failed (Kanyi et. al, 2016). Conclusively, Wilson airport does not have adequate infrastructure to handle a fire emergency should one occur.

The Kenya Airports Authority is has the mandate of managing all airports in the country including Wilson airport. In relation to fire emergencies it is tasked with: implementing emergency orders at the airport as per plan, assisting in provision of additional fire tenders or any other appropriate machinery as per need, in case of a fire, assisting in provision of fire rescue services at the scene of fire, and assisting in provision of sufficient number of skilled or unskilled persons to handle fire emergencies (Republic of Kenya, 2014). The other key stakeholders in regard to fire emergencies are The County Government of Nairobi who are responsible for

provision of firefighting services and the National Police Service responsible for coordination during a fire outbreak at any major airport within Kenya (Republic of Kenya, 2014).

The strategies developed by the key stakeholders apply to Wilson Airport and can be found in the Emergency Response Plan and SOPs designed by National Disaster Management Unit (NDMU). The strategies for handling fire emergencies include: providing leadership, coordination, command and control of fire emergencies, hiring or procuring equipment, mobilizing resources, planning, budgeting for and implementing disaster management programmes, undertaking research and documentation, undertaking capacity building in collaboration with other stakeholders, monitoring and evaluating disaster management initiatives, strategies and programs (Republic of Kenya, 2014). However, research shows that implementation of the strategies at Wilson Airport has fallen short of expectations. Mukaria (2013) attests to the fact that majority of staff at Wilson Airport have knowledge awareness experience on emergency procedures, and that there is enough working force with various skills and capacity as pertains safety management systems. Additionally, the available emergency gear is functional but with minor defects (Mukaria, 2013). However, communication and coordination among stakeholders is average causing low cooperation in the cases of emergency Wilson Airport, and there are restrictions on documents like contingency plans which are not easily available to all stake holders (Mukaria, 2013). Lastly, there are also constraints in resources and lack of collaboration among stakeholders which stand in the way of ensuring emergency preparedness at Wilson Airport (Mukaria, 2013). It was important therefore to address the planning, human resource training and infrastructural strategies that can secure Wilson Airport in Nairobi, Kenya against fire emergencies.

1.2 Statement of the Problem

Wilson Airport Nairobi is located in Nairobi County and serves the region's travelers both locally and within Africa. As earlier noted, air transportation is no longer a preserve for the rich as airports such as Wilson offer cheaper domestic and international flight connections. Furthermore, the airport serves commercial purposes that cater for the tourism, agricultural and health sectors of the Kenyan economy (Kanyi et. al, 2016). Handling mostly Kenyan and regional flights, the airport is estimated to handle approximately 120,000 arrivals and take-offs annually. Interestingly, the services in regard to checking in are handled faster with minimum delays at the facility which makes it preferable to many travelers (Mirichu, 2004). This has increased the traffic in the airport thus creating the need for proper fire handling strategies in case of an emergency.

In Kenya, there are comprehensive policies on aviation safety and preparedness. However, aviation accidents and disaster preparedness in airports persist across the globe. A study by Mukaria (2013) notes that the main causes for these accidents are faults that may be human, mechanical or those associated with nature such as weather. The faults are linked to poor plans, inadequate human resource training and poor infrastructural set up. The study further indicates that there have been several accidents by small aircrafts taking off or landing at Wilson Airport in Nairobi that have been reported (Mukaria, 2013). These observations highlight the existing challenges that can lead to fire disasters at the airport. Specifically, the influx of air passengers has led to growth of air travel and development across all areas within the airport premises. Increasing structures and high risk business developments have raised safety and security concerns in the airport since they pose fire threats to the facility's activities.

Studies have been conducted in Wilson airport in Nairobi County. Kanyi et. al (2016) undertook a research that examined how appropriate and adequate the existing physical infrastructure are towards alleviating flight risks at Wilson Airport. The study established that although Wilson Airport did not lack infrastructure and facilities, there was need to improve on these two aspects so as to guarantee safety at the airport premises. Another research was done by Obwaya (2010) on strategies implemented at Jomo Kenyatta International Airport (JKIA) to reduce risks associated with fire emergencies. It was concluded that planning, infrastructure and human resource that was necessary for disaster risk reduction at the airport was inadequate.

The magnitude of fire disasters in airports has been highlighted by Amboka (2013) where he states that property worth hundreds of millions was destroyed when fire broke out at the Jomo Kenyatta International Airport. Further, it took the government of Kenya and other stakeholders a hundreds of millions of shillings to reconstruct the airport (Amboka, 2013). This study therefore looked at the specific safety strategies; infrastructural set up, human resource training and strategic planning that could be utilized in handling fire emergencies at Wilson airport to reduce and prevent a fire emergency from causing such great loss or damage to people and property. Further, although there have been various studies regarding airport safety, literature regarding fire safety handling strategies seems to be inadequate (Kanyi, 2016; Amboka, 2013; Mukaria, 2013; Obwaya, 2010; Mirichu, 2004). This study therefore sought to assess safety strategies in handling fire emergencies in Kenya airports in the case of Wilson Airport Nairobi.

1.3 Research Questions

i. What strategic planning measures does Wilson Airport have for fire emergencies?

ii. How adequate are the strategic planning measures for fire emergencies at the Wilson Airport?

iii. What is the form of human resource training that informs response to fire emergencies in Wilson Airport?

iv. What is the capacity of the infrastructural set up at Wilson Airport for addressing fire emergencies?

v. What specific challenges does Wilson Airport have for appropriate response to fire emergencies?

1.4 Objectives of the Study

This study had its main purpose as the assessment of safety strategies in handling fire emergencies in Wilson Airport Nairobi, Kenya.

i. To identify the strategic planning measures that Wilson Airport has put in place to handle fire emergencies.

ii. To examine the adequacy of strategic planning for fire emergencies in Wilson Airport Nairobi.

iii. To assess the form of human resource training that informs the emergencies in Wilson Airport Nairobi.

iv. To appraise the capacity of the infrastructural set up in addressing fire emergencies in Wilson Airport Nairobi.

v. To identify the challenges facing Wilson Airport in its appropriate response to fire emergencies.

1.5 Justification of the Study

The current research is significant to stakeholders within the aviation industry including government since it has the potential to diversify knowledge in airport disaster preparedness and corresponding interventions. The study findings may provide the government with information

on how to address fire emergency situations in Wilson Airport. The government was also expected to gain some insights on what they haven't been doing right as regards fire emergencies. Further, the study would inform the government to review policies and standard procedures that create an impact on disaster preparedness and fire emergencies in Wilson Airport.

The study would be significant since there have been previous studies conducted on airport emergency situations including planning nightmares, human resource training as well as infrastructural challenges experienced but none had answered the question of safety strategies that can be utilized in handling fire emergencies in airports (Kanyi et. al, 2016; Mukaria, 2013, Obwaya, 2010, Rosenthal, 2008). The current study thus addresses that knowledge gap through identifying specific safety strategies that could be utilized in handling fire emergencies in Wilson Airport.

The study will contribute to knowledge on emergency operations in airports not only to Wilson Airport Nairobi but also to the other airports across the globe. Conclusively, it will contribute more information that may assist in planning, human resource training as well as infrastructural strategies for fire emergency operations at Wilson Airport Nairobi, Kenya. Additionally, the study would come up with management skills relevant to fire emergencies in airports. To academicians, the study would provide literature on management and preparedness of fire disasters. It would also encourage further research on fire emergencies in other economic sectors.

1.6 Scope of the Study

This study was undertaken at Wilson Airport within Nairobi County with a major interest on the assessment of safety strategies in handling fire emergencies in Kenya airports in a case study of Wilson Airport Nairobi. The study sought to examine the various safety strategies in handling fire emergencies at the airport as well as the challenges that can be encountered. Specifically, the

study addressed the following issues: the strategic planning measures that Wilson Airport has put in place to handle fire emergencies, the adequacy of strategic planning for fire emergencies in Wilson Airport Nairobi, the form of human resource training that informs the emergencies in Wilson Airport Nairobi, the capacity of the infrastructural set up in addressing fire emergencies in Wilson Airport Nairobi and the challenges facing Wilson Airport in its appropriate response to fire emergencies.

1.7 Limitations of the Study

There were limitations in terms of access to some of the restricted areas where the researcher would have interacted with more respondents. To overcome this a request was made to the security management to allow access passes but the same was only allowed for two days. The two days were not sufficient to cover all the hangars, air traffic control area, fuel deport offices and other offices situated in the restricted areas. Researcher was however allowed access to all non-security restricted areas where he interacted with available respondents during brake times.

Some of the respondents targeted would not co-operate thus limiting the study. This was simply because some of the employees working within the airport were not willing to share internal information. To overcome this limitation, more time was created so that the participants' consent was sought and to establish a connection with the junior staff as well as the management members.

Other study limitation was due to vast infrastructural areas of the airport, movement from one corner of the airport to the other required a lot of time. Access to security restricted areas also required special safety clothing which the research had to acquire to be allowed access. To mitigate on this, the researcher employed use of airport taxi which was costly but served to mitigate on time so as maximize on the approved time allocated for the data collection.

1.8 Definition of Key Terms and Concepts

Adequacy of strategic planning: level of satisfaction achieved as a result of strategic planning in the airport.

Infrastructural capacity: the best that can be produced as a result of the infrastructural set-up in the airport.

Fire emergency: This refers to a fire outbreaks which lead to loss of lives or property and poses a danger of causing serious injury to people within an airport facility.

Human Resource Training: set of learning activities to acquire better skills and knowledge needed to improve on safety handling of emergencies around the airport. Conducting these activities improves on productivity and safety in operations within the airport.

Infrastructure set up: The tangible capital stock owned by the airport that includes: protection facilities and equipment, human capital investment and immovable capital goods. It may also include a set of attributes around the airport such as transportation, communication, energy supply, water supply and health services and so on.

Safety strategies: These are plans for achieving the airport's safety in terms of prevention of damages that can result from a fire outbreak. It can incorporate training of employees or setting benchmarks. Additionally, it can involve setting targets such as improved first-aid facilitation and implementation of faster response mechanisms within the airport.

Strategy: The long-term course taken at the airport in regard to fire safety which takes into consideration the changing environment and resources available to achieve it.

Strategic planning: Involves the strategy in which activities are identified and implemented at the airport to improve on fire safety. These activities are long-term and take into account that the internal skills and resources the airport organization has needs to match its external environment.

Disaster: Refers to an event that disrupts the normal functioning of an organization. It leads to serious damage or loss of lives and property within the organization it has occurred in. The level of severity depends on how the environment in which it occurs has been designed to handle its outbreak.

Preparedness: These are activities or measures undertaken to prevent damage and loss of property and lives as a result of a fire emergencies. The measures may include employee training of fire handling, facilitation through installation of fire-fighting equipment, evacuation procedures and emergency response procedures.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter constitutes a review of relevant literature on fire emergencies on previous research on the key thematic issues derived from the study objectives. The objectives covered include: strategic planning measures for fire emergencies in airports, adequacy of strategic planning for fire emergencies in airports, human resource training for fire emergencies in airports, capacity of infrastructural set up for fire emergencies in airports and challenges facing airports in response to fire emergencies. Lastly, the theories guiding the study, conceptual framework and existing gaps shall be addressed.

2.2 Strategic Planning Measures for Fire Emergencies in Airports

Strategic planning dates back to the public-sector where it was commonly associated with the military and Freedman (2013) indicates that strategic planning involved managing of government affairs using statecraft. During the 1960s, the ideologies behind strategic planning started getting implemented in businesses that were aiming at generating profits. Its implementation within industries in these sectors was undertaken to improve on the businesses' market share, generate higher profits and attain effectiveness (Freedman, 2013). Essentially, strategic planning in the public sector was all about attaining efficiency in operations, improving on profits generated and achieve set goals. Further, the adoption of strategic planning within the public sector is meant to answer questions related to how and what the organization should be doing (Bryson, Crosby, and Bryson 2009).

In the aviation industry, safety has always been a priority and airport staff have consistently demonstrated due diligence in learning process by addressing their mistakes and accepting

changes implemented for the sake of safety at the workplace (Ayres, 2009). It is this diligence in learning and reviewing processes after emergencies that has resulted in decline of accidents to a fairly stable level. However, the cause for concern is that despite such improvements in safety, travelers have increased over the years and it is anticipated that as they grow, chances for disasters such as fire emergencies also increase (Ayres, 2009). Efforts to understand the real cause of accidents at airports have concluded that the most probable causes of accidents are commonly associated with human error. Ayres (2009) therefore indicates that to contain accidents, there should be a change in the people involved as well as looking into the causes (Ayres, 2009). It is for this reason that strategic planning measures to address fire emergencies at airports play a critical role.

Fire occurrence results due to three main components (Coules and Eskell, 2000). These include: solid, liquid or gaseous fuel, oxygen, and a source of ignition such as heat energy. A fire disaster has dire consequences. Fire and smoke inhalation if not dealt with quickly is toxic and kills. This is because the smoke contains some poisonous elements such as carbon monoxide that can lead to death if inhaled in an enclosed environment without proper ventilation (Coules & Eskell, 2000). An airport facility as already noted by Ayres (2009) with its high traffic rates remains highly vulnerable to fire disasters. Fires that can damage structures and cause medical emergencies can break out at any time and place within the airport facility. It is therefore important to utilize strategic planning to contain the risk of fire emergencies.

Strategic planning for fire emergencies at airports incorporates a disaster management system. Ideally, whenever a fire breaks out, there has to be some activities set out that aim to meet the needs of the fire victims, rehabilitate them and restore any structures that have been damaged or destroyed. Specifically, Kapoor (2009) indicates that restoration involves short-term and long-

term measures that are critical in returning systems to their best operational standards. The enactment of disaster management systems should be systematic since haphazard response can be problematic in the event of a fire outbreak. Specifically, it should entail institution of policies and objectives that are tested over time to guarantee their success (FEMA, 2006).

Strategic planning for fire emergencies also involves coordination as and that is a critical part of the disaster response plan. Coordination reflects upon how operations are arranged and prepared to prevent a disaster once it occurs. Salvano (2002) attests to the fact that coordination must be must coordinated across all departments so that all the airport staff should are active in case a fire emergency occurs. Additionally, the airport staff should be on call 24 hours a day so that there can be no delays in response to a fire outbreak within the airport premises (Salvano, 2002). Strategic planning also involves resource allocation. Ideally, strategic planning entails resource allocation which acts as a back-up to those people involved in the fire emergency response plan. Lack of these elements in strategic planning will lead to operations that rapidly disintegrate and are poor in responding to fire emergencies at the airport. Additionally, achieving effective response incorporate decision making that should be well structured for coordination purposes. Of importance to note is that as part of strategic planning for fire emergencies in airports, a disaster management system should incorporate all the activities have been agreed upon by various stakeholders and can be supported by the available resources (Salvano, 2002).

Strategic planning for fire emergencies as indicated by ISDR (2003) involves community outreach. Specifically, must involve people from the community in which the airport operates in to know what to do and how to do it, which is otherwise known as enabling a community towards fire disaster mitigation (ISDR, 2003). As part of disaster management, recovery plans implemented should involve creating consciousness among people from the community within

whom a fire outbreak can affect grossly. Such people could be the residents within the estates neighboring the airport facility.

Strategic planning should also be keen on decision making and its appropriateness. It is a cyclical process in which there is no specific order as to which action takes place after another rather incorporates all the aspects discussed in this sub-section. It only remains important to incorporate timely decision-making and communication to reduce vulnerability and prevent future disasters. In essence a complete cycle should ensure that policies and procedures that address the causes of fire disasters as well as mitigating its effect (Carrilo, 2010). Carrilo (2010) further indicates that this policies and procedures should continuously be re-evaluated to improve on response plans during fire emergencies. As discussed earlier empowering the community should also be incorporated since the airport staff may not have the capacity to handle a fire emergency and as such provide basic services and infrastructure to support those in the airport (Garatwa & Bollin, 2002).

In strategic planning for fire emergencies, there has to be incorporated a response phase in which steps are taken to assist and provide some essential services or goods to the victims of a fire tragedy. Examples of these essential services and goods include medical care, shelter, food, repairs, evacuation and communication (Garatwa & Bollin, 2002). In dealing with fire emergencies, a rehabilitation stage should be incorporated whereby actions are taken to return everything to normality including restoration of the victims to their normal psychological and emotional state. In this phase some of the actions undertaken may include: job creation and provision of credit facilities (Garatwa and Bollin, 2002). Additionally, in strategic planning for fire emergencies at airports, should involve a reconstruction phase in which operations, people

and facilities are returned to their normality but within new priorities meant to meet its emerging environmental needs (Garatwa & Bollin, 2002).

Braithwaite (2001) exemplifies the application of the above strategic planning aspects in a study in Australia in which it was established that coverage at airports was not effective since there was a reduction in Airport Rescue and Fire Fighting (ARFF). Essentially, regardless of the airport size, location or any other unique features it may possess, it is important as a safety handling strategy for fire emergencies to ensure there is adequate ARFF coverage. This view is substantiated in a study by Cooke (1999) on rescue operations and coverage of fire in British and US airports where arguments were brought forward on reasons to raise fire rescue services in those airports within the two nations. In a study in Kenya at Jomo Kenyatta International Airport, it was discovered that infrastructure was inadequate (Obwaya, 2010). Specifically, personnel who were trained were few and evacuation routes were also minimal (Obwaya, 2010). In the study, Obwaya (2010) further notes that there was lack of proper mechanisms that integrate various stakeholders to handle emergencies at the airport. In the end, it was recommended a disaster management system be implemented through adequate provision of exit routes, public address systems which would be reliable in the event of a disaster (Obwaya, 2010).

Essentially, strategic planning for the handling of fire emergencies, it is critical to involve various stakeholders in the airport industry who include the staff and community. Strategic planning should also take into account the available resources and incorporate policies and processes that are clear. It is also a process that should incorporate a disaster management plan in which there are important stages of mitigation, rehabilitation and recovery. Further, airport staff and the community are valuable resources in handling fire emergencies in airports. Only when

strategic planning measures are implemented at Wilson Airport, can there be a guarantee of safety against any damage that can be caused by fire emergencies at the facility.

2.3 Adequacy of Strategic Planning for Fire Emergencies in Airports

The airline industry has significantly contributed to economic activities in the last quarter of the 21st century thus ensuring the world has become one global village. However, strategic planning which involves the safety of travelers, efficiency and cost effectiveness of movement of goods and services has become a necessity. This is due to the fact that although flying may be considered the safest mode of transport globally, it has been hit by media headlines on the increasing accident rates associated with it and Africa being the most vulnerable region globally (Kwiatkowski, 2001). In addition, the airline industry has also attracted a lot of interest from investors with need particularly aircraft manufacturers, movers, and other stakeholders in the airline industry for larger plane sizes thus increasing the number of flights across the globe. Ayres (2009) highlights that this renders airports to be exceptionally full of activity creating problems such as congestion at airports and inadequacy of facilities. Airports are thus exposed to risks that include fire outbreaks. This section therefore looks at how fire emergencies in airports that can be addressed through proper strategic planning.

Strategic planning for fire emergencies in organizations such as airports primarily involves preparedness and response plans that are initiated to tackle fire outbreaks. Through strategic planning, lines of authority and responsibility are identified as well as resource utility, situation analysis and decision making in the event of a fire disaster. A perfect example is the guidance document that provides direction on who is to be involved in the event of a fire disaster as well as the logistics, medical care and security required (Amboka, 2015). In handling fire emergencies, strategic planning should also involve activities that ensure the fire emergency is handled

efficiently. Such activities may include: drills, training for staff and community. Through strategic planning, policies can be identified as well as vision and mission statements. Further in strategic planning, there has to be developing and utilization of the relevant authorities; setting targets and assignment of duties that oversight and coordinate the mitigation of fire disasters (FEMA, 2006).

Strategic planning in fire disasters is wide and therefor there has to be mutual trust and coordination between the various stakeholders. It involves both internal and external stakeholders. Specifically, some of the stakeholders in a fire disaster emergency in an airport include the affected local population and government agencies, fire departments, medical staff, NGOs for example, Red Cross. This coordination in such a disaster requires strategic planning that guarantees the maximum utility of resources to combat fire disasters within the shortest time possible. Through strategic planning, direct coordination and response teams should be able to assign duties and plan appropriately. Ideally, when the various individuals involved in a disaster management plan through strategic planning, they are able to identify their strengths and weaknesses and understand the overall goals and objectives. Consequently, they will be able to plan on bridging any gaps to improve on the actual fire emergency response. Strategic planning for fires disasters in airports involves generating a memorandum, instituting policies as well as preparation for coordination purposes. In strategic planning, the airport authorities should work closely with the government to come up with a proper plan on how to deal with fire disasters at the airport.

Strategic planning for fire emergencies should create a bigger picture on what is to be attained so that a framework on how to achieve it can be developed and implemented (Elbanna, Andrews and Pollanen, 2016). It is for this reason that it requires a lot of expertise and proactive approach.

A look at the strategic planning challenges would be ideal in understanding the inadequacies it creates to airports specifically during emergencies. Challenges associated with strategic planning are common in airports across Europe. Majorly, they affect the quality of services and can lead to loss of revenues. Rosenthal (2008) conducted a survey in which 100 percent of the respondents claimed Heathrow was Europe's worst airport. Customers generally claimed it was horrible due to the waits and too congested. One of the travelers stated that a passenger has to literally sprint to get between gates. Poor procedures were observed from the staff that segregates passengers since they help a few of those flying first class (Rosenthal, 2008). A business consultant, Mr. Jeffry Pappin, attested how it was always amusing to look at the signs informing passengers that it takes 25 minutes to walk to a particular gate (Rosenthal, 2008). Furthermore, he claims that a passenger can only know where the restrooms and business lounges are located through experience which is clear indication of the inadequacy of equipment and facilities.

Charles de Gaulle Airport outside Paris came in a close second. One traveler termed the experience within the airport like being in an Escher print (Rosenthal, 2008). Terminals are identical and broadly spread out. Signage is poor and more often any assistance you get from airport staff is usually bad advice. There is also lack of enough human resources in the area of security at Charles de Gaulle Airport since the security lines for check-ins, particularly for flight transfers leaving the EU, are endless, ineffective and poorly structured (Rosenthal, 2008). Therefore, any traveler should forget about making tight international connections. One passenger, Nada Kranjc of Ptuj, Slovenia, indicated how difficult it was to find things in the airport if you do not know (Rosenthal, 2008). The worst thing that can happen to a passenger is missing a flight and trying to figure out the line leading to their connecting flight.

Strategic planning plays an important role during fire emergencies since it entails proper communication, collaboration, and coordination of activities. Precisely, when a fire emergency ensues, communication between airline companies, agencies within the government and aviation stakeholders is very poor. In a similar trend poor communication, collaboration and coordination of activities during fire emergencies increases the frequency, duration, and impact on passengers in terms of lengthy onboard ground interruptions (National Task force to Develop Model Contingency Plans to Deal with Lengthy Airline On-board Ground Delays, 2008).

As a first step in ensuring adequacy of strategic planning, any plan should comply with local fire regulations. In England for example, regulations pertaining structures and to be more specific, Aproved Document B – Fire Safety (ADB) provides guidelines on evacuation and public address in the event of a fire emergency (BRE, 2019). Secondly, planning should incorporate occupancy in airports that can ensure proper evacuation and rescue of passengers during fire emergencies. Although it is unsuitable for airports, the Approved Document B – Fire Safety (ADB) has guidelines on maximum occupation within various spaces around airports (BRE, 2019). Specifically, the airport should have a space that allows for effective and efficient operations and put into consideration disruptive events such as fire outbreaks. Another study by Ojo (2014) of Murtala Muhammad Airport concluded that its international wing was not performing at its best despite the fact that it is the business hub for travelers in West Africa. With regards to fire emergencies, the case study provides the perfect example on how infrastructure is vital for the strategic planning process. Among the suggestions that were hindering the achievable set targets included; Physical location which contributes greatly to traffic and poor infrastructure that renders ground access to Murtala Muhammad Airport to be rather costly (Ojo, 2014). To make matters worse, travelers are unable to carry their luggage within the premises since there are

inadequate facilities and personnel to handle such services. Poor infrastructural planning as exemplified in the Murtala Muhammad Airport has led losses economically. Furthermore, such poor infrastructure makes the airport vulnerable to fire outbreaks. As earlier observed, this contributes to the economic activities of an airport considered to be West Africa's business hub. In his study Ojo (2014), recommends strategic planning that will reduce the hold-ups that are consistent in the airport.

Strategic planning may be utilized across all organizations but needs to be tailor-made to suit the specific organization in which it is being applied in this case an airport facility (Bryson, 2011). In an airport for instance, strategic planning involves consultation and collaboration with the various stakeholders involved to come up with a fire response mechanism that is ideal for airports (Bryson, Crosby and Bryson, 2009). As earlier indicated among challenges associated with strategic planning in airports across Europe, Asia and Africa, another important aspect of strategic planning must be incorporated. This involves the active participation of managers with support from stakeholders in the implementation process on addressing fire emergencies (Elbanna, Andrews and Pollanen, 2016).

Evacuation remains a critical solution to addressing fire emergencies in organizations such as airports. In fire emergencies, buildings around the airport have an increased capacity and require coo-operation of all the staff for proper evacuation. Strategic planning entails need for human resource training. Precisely, airports must have evacuation teams who have a duty to ensure that all the staff in an airport understands their roles and responsibilities during an evacuation (BRE, 2019). The Approved Document B – Fire Safety ADB also recommends fire response teams who should also be available to estimate and handle the traffic in a fire emergency (BRE, 2019). As part of strategic planning, Menya (2016) mentions specialist services as essential in terms of

human resources capacity in particular; a fire engineer must always be available to coordinate with the response teams for effective strategies in handling fire emergencies. It is imperative therefore that all those who visit or work at the airport be on the necessities and processes of operation in case of a fire emergency.

Strategic planning should also entail compartmentation within airports. Fire engineers can utilize a number of approaches in cases of fire emergencies that ensure business continues as usual. For example, areas that are classified as high risk in terms of fire emergencies should be separated from other areas within the airport through compartments that have special fire resistance walls (BRE, 2019). The strategic plan behind this is to contain fire hazards and prevent them from spreading the damage and causing extreme loss of property and lives. Compartmentation brings to light the fact that the infrastructure around an airport consists of interlinked areas which require evacuation zones. A perfect example is a fire outbreak in the baggage claim compartment which compromises movement and evacuation route is thus required. To achieve this, signage that indicates an instruction “do not enter” can be adopted (Department for Communities and Local Government, 2012).

Any emergency for instance a fire outbreak could interrupt communication which is critical for ATC in their duties to communicate, collaborate and coordinate flight operations. It is even difficult to control gathered crowds in an airport in cases of fire emergencies whenever communication is broken down (Obwaya, 2010). In a report on the Busia plane crash in Kenya, which is an aviation disaster that occurred in 2003, it was alleged that several strategic planning challenges led to the crash which include: ineffectiveness, anomalies and unethical operational procedures (The East African, 2004). Another strategic planning aspect witnessed from other airports in terms of human resource capacity to handle emergency situations was also highlighted

in the report. Specifically, it stated that adequate security should be deployed at Kenyan airports so as to counter problems such as illegal immigrants, drug smuggling and terrorism (Obwaya, 2010). The report also mentioned lack of training in the firefighting, inspectorate and traffic control departments. It is important therefore to address the above planning challenges to secure Kenya's 4 major airports, which were not the focus of the Busia report.

Airports in Kenya urgently need to implement a comprehensive strategic planning framework that will boost the airports and passengers' safety and security as well as ensuring efficiency in operations to provide the best quality of services. Some of the strategic planning measures associated with fire emergencies that have been addressed in this section and for which the management at Wilson Airport has to look into include: policies, communication, collaboration, and coordination, low safety and environmental standards, managerial participation and airport physical layout.

2.4 Human Resource Training for Fire Emergencies in Airports

As earlier indicated, fire remains the most common disaster in any workplace. Over the recent years, Kenya and other countries have encountered a rise in occurrences where fire has burnt down and destroyed structures as well as possessions. Absence of catastrophe preparation has continued to be one of Kenya's lasting growth challenges for long times. Colonna (2001) in a study once noted that there are over 75,000 fires in workplaces occurring annually across the globe. Once a tragedy has transpired, a set of measures have to be put in place, targeted at initially sustaining the meeting the urgent needs of the fire victims and restoring operations at the fire scene. Emergency preparation as well as human resource directly affects the response to an emergency such as a fire. Airports should have personnel who are well-prepared with properly developed preparation mechanisms that would probably lead to reduced property destruction and

less severe worker injuries (Colonna, 2001). For this reason, training of airport personnel on precautions and measures to prevent or deal with fire emergencies is very important. The airport staff should be consistently drilled on how to handle fire emergencies specifically what to expect in order to understand the dynamics and how its disastrous effects can be countered (Ayonga, 2016)

Accordingly, fire disaster preparedness in airports has to be supported by human resource training. Activities associated with human resource training for fire emergencies in airports include: education, response team training and rehearsals or drills. The aim of these human resource training is the enabling of staff to be alert and well prepared to work with other stakeholders in ensuring the airport is safe from the disastrous effects associated with fire emergencies (Amboka, 2015). Once a disaster preparedness plan is complete, it is important for the workforce to practice what it entails. It is important to conduct rehearsals since aspects that were overlooked can be addressed in handling fire emergencies. In training, it is important to ensure that rehearsals are wide and engage as many industry players as possible to be most effective. Further, the workforce is kept abreast always on how to handle fire emergencies. Therefore, in human resource training to address fire emergencies in airports, rehearsals are the most important. This is because they ape rescue procedures, the provision of first aid, coordination activities as well as many other aspects of fire emergency response (Ayres, 2009).

Research in Australia by Air services (2012) established the human resource training undertaken at Sydney Airport in November 2012. The training saw a group of 19 trainee fire fighters put through a sequence of situations to improve and refine their skills in the professional ground of aviation firefighting and rescue processes. The group used hands-on training aids accessible at Air services Sydney fire station as well as a model of an airplane fuselage and smoke house. The

Air services spokesman Rob Walker said that the training would contain the making of huge quantities of fire and smoke as the trainees polish up their firefighting skills (Air services, 2012).

International Civil and Aviation Organization [ICAO] Annex 14 indicates that workforce must be trained on how to undertake their responsibilities, how to utilize all aircraft and firefighting equipment and participate in fire drills. Further, it indicates that there shall be a curriculum provided that will provide instructions on how to familiarize with the airport premises, the personnel responsible for fire safety, systems of communication in a fire emergency and warning systems. It shall also provide instructions on how to use a fire hose and nozzle, how extinguishing agents are applied, evacuation procedures, goods considered dangerous and which should be avoided in a fire emergency, duties of firefighting personnel and the clothing available for use in a fire emergency including respiratory protection.

In regard to human resource training it is important to note that ICAO does not guide on how frequent it should be conducted. The frequency varies from country to country among the member states. In some parts of the world, the firefighting equipment are rarely serviced which reduces the level of cover and makes the airport more vulnerable to fire disasters. However, manufacturers of aircraft provide directions on how any fire-fighting equipment within their aircraft is to be serviced and used in addition to how the aircraft itself is to be handled in times of fire emergency. AviAssist Foundation have conducted best practice training for fire fighters in Rwanda Kigali International Airport, as part of its promoting professional excellence in the safety handling for fire emergencies in the aviation industry (African Aerospace, 2013).

Local fire safety regulations in line with Fire line Safety Kenya, state that human resource training is intended to increase consciousness about fire outbreaks in an organization and the

handling process including how the firefighting equipment are used in the event of a fire emergency. The firefighting trainees are trained on the following areas of fire prevention and containment: identifying fire hazards, using fire-fighting equipment, regulations pertaining fire safety, the chemistry of fires, evacuation procedures, warning systems, how to contact the fire brigades and practical usage of fire extinguishers.

In Kisumu Airport Kenya as stated by Kiptoo (2010), there is inadequate human resource training since staff are only trained on first aid and no refresher courses are conducted. However, the regulatory agencies noted that personnel have adequate training on fire containment (Kiptoo, 2010). Specifically, Kiptoo (2010) indicates that training of personnel involves first aid, search and rescue, procedures of evacuation in land as well as water. The study also confirmed that the airport has high staff turnover due to frequent transfers, retirement of workers and departures hence the need to conduct repetitive trainings (Kiptoo, 2010).

From various studies at the international to the local level, it can be concluded that human resource training for fire for fire emergencies at the airport is not a responsibility of aviation experts alone rather, it involves the government and other disaster entities. There is need to train local the local citizens and organizations with a stake in the aviation industry so that they can have an active role in safety handling during fire emergencies. Ideally, human resource training can is vital in instilling skills and knowledge required for spontaneous actions especially in the event of a fire emergency. Some of the spontaneous actions range from search and rescue, first aid to medical services (Ayres, 2009).

From the literature review on human resource training for fire emergencies in airports, it has been noted that constant rehearsals provide an environment through which safety handling

strategies can be tested in the event of a fire emergency. Essentially, human resource training allows for departments to coordinate and come to terms with each other's capabilities as well as unique features that will contribute to fire containment. Moreover, human resource training involves comprehensive test for emergency plans, processes, airport infrastructure and fire-fighting equipment. Lastly, human resource training informs the airport staff members on how to undertake and enhance the process of handling fire emergencies (FEMA, 2006).

2.5 Capacity of Infrastructural Set up for Fire Emergencies in Airports

In line with the International Civil Aviation Organization (ICAO) (2018), airports have transformed from the conventional gravel runways to sophisticated mini cities with commercial travelers and cargo operating within their premises. It is for this reason that they utilize large landscapes to build their structures and support their aviation activities (AfDB, 2013). It is projected the by the year 2030, movement of people and commodities by air across the globe will double and it is hence critical for countries to invest in infrastructure that will meet this rising demand.

Infrastructure is a major factor contributing to the growth of the aviation industry. Specifically, the rising trends indicated have led to the development and sustainability of airport cities across the globe. In Asia, for instance India has an outdated airport which has led to its redevelopment to meet projected investment forecasts in line with anticipated traffic growth in the future. A study was conducted by Konstantin (2018) in Bangkok and Manila on how inadequacy in infrastructure affects the aviation industry. The study specifically indicated that the infrastructure was not being developed at a pace that meets the current market needs and in places such as Jakarta, it had led to slow operations within the airport.

According to Sidik and Ahmad (2008), the development of the cutting edge air terminal has entangled the issue of traveler evacuation during crisis occasions. The air terminals of the 1950s, 1960s, and 1970s used to comprise of genuinely sterile spaces, gave exclusively to the elements of the air terminal, with minor pleasantries for the voyaging traveler. The present air terminals are depicted by some as strip malls with airship stopped outside. Air terminals have significantly expanded retail contributions and attractions that improve the traveler experience. Strolling down a concourse in a cutting edge air terminal, travelers will pass booths, retail signage, customer-facing facades, and other visual interruptions that can cause a common standard 'EXIT' or 'Running Man' sign to be hard to discover among the visual mess.

In Africa, infrastructural challenges are mainly based on unreliable handling of equipment as a result of neglect which has been the major challenge in airport operations. A study was conducted by Chinedu (2018) in Nigeria addressing the Airport infrastructure deficit. The study findings showed there was inadequate funding for equipment that includes navigation aids, lighting for the airfields as well as communication equipment. Additionally, meteorological equipment was inadequate which are vital for reporting on weather conditions for safer flights. Nonetheless, the study indicated that there have been increased efforts to provide meteorological equipment such as wind shear detectors, laboratories for research purposes among others (Chinedu, 2018). Similarly, in Brazil infrastructure is at risk of buckling beneath demand (Chelsea & Magan, 2014).

Infrastructural challenges facing airports in Kenya mainly center on security and the operational facilities. McEntire and Dawson (2007), in a study found that a proper infrastructure provides an environment where all the members of staff have responsibilities in all the disaster management phases within a fire emergency. Infrastructural set-up at the airports should incorporate

organizations from the public, NGOs and private sectors. In the similar vein, Waugh and Streib (2006) opine the success of a disaster management framework relies upon the infrastructural set-up and how well coordinated it operates between the various stakeholders. Therefore mangers in these plans should come up with set targets for successful handling of fire emergencies. The most important tool here is communication. Communication will ensure that coordination occurs in a manner that meets the set targets in the event of a fire emergency.

McEntire and Dawson (2007), state that there are three important aspects of communication. First is that pre-disaster ties are vital in the communication procedure during a disaster. Second, is that coordinating entities or stakeholders must establish a common platform to communicate that requires proper and adequate infrastructure. Without proper technological infrastructure, communication would be affected and fire rescue operations rendered unsuccessful. Finally, is that the stakeholders should have the goodwill to coordinate which would otherwise hinder the success of their pre-disaster ties.

In Kenya, Oladele (2005) notes that regulations demand airports to be developed on flat terrains that are free from any form of obstruction. The same goes for other nations across the globe. Consequently, airports that have been developed on such sites affect the environment around them. Airports are increasingly becoming entrenched within cities as the very cities within which they are located are growing at after rate than anticipated. Citing a Nairobi News Magazine April 18, 2018, Kenya Ports Authority was on the spot accused by Governor Mike Mbuvi Sonko of neglecting toilet facilities which led to his electrocution. This is one of the many infrastructural challenges that hinder airport operations in Kenya. In another incident, Kisumu airport was also reported to have infrastructural challenges during the rainy seasons where operations were hindered as a result of floods.

2.6 Challenges facing Airports in Response to Fire Emergencies

Challenges affecting the response to fire emergencies in airports are important when assessing the safety handling strategies that can be applied to mitigate and lower the risk of damage. According to the National Task force to Develop Model Contingency Plans to Deal with Lengthy Airline On-board Ground Delays (2008), a major challenge facing airports during emergencies is communication, collaboration, and coordination of activities. Specifically, when an emergency such as a fire outbreak ensues, communication between the various departments, organizations, Government agencies, and other aviation stakeholders is very poor (National Task force to Develop Model Contingency Plans to Deal with Lengthy Airline On-board Ground Delays, 2008).

Challenges posed by poor communication, collaboration and coordination are curtailed in an airport emergency plan. Precisely, an emergency plan reduces the risk of damage occurring in airport facilities precisely within a radius of 8km radius, by offering directions for rescuing lives and property thus restoring operations at the airport to normalcy (Kenya Advisor, 2010). People within the airport such as staffs and passengers should be provided with evacuation routes that are easy to locate and near. Interestingly, poor coordination, collaboration and communication, might affect travelers and airport staff in identifying these evacuation routes since they will be unfamiliar with them (British standards Institution, 1997).

Another challenge facing airports in fire emergencies response is highlighted in a study by Njuguna (2013) on airports in Africa. The study established that the last several decades have seen the performance of this industry lag behind the rest of the world. Among the challenges highlighted include: low safety and environmental standards; worn-out aircraft fleet; authorities who are not self-sufficient; inadequate infrastructure and inadequate training of staff; lack of

collaboration between airline carriers and open skies agreements (Njuguna, 2013). Generally, the infrastructural set-up and resources are lacking, which poses a challenge. Further, most airports within Africa do not meet safety regulations as stipulated by ICAO standards (UNESCO, 2009). Specifically, most of these airports have dilapidated airstrips, taxi and parking spaces, passenger terminals, freight terminals and inadequate cargo handling equipment which can pose a great risk to airports as they are ill-equipped to handle emergencies such as fire outbreaks.

Locally, airports face the challenge of inadequate rescue capacities in the event of emergencies such as fire disasters. Mirichu (2004) highlights the case of Wilson Airport that has a reputation of being the busiest airport handling over 500 flights a day. Obwaya (2010) further notes that the aerodrome transports more cargo than passengers, since it transports 1000 passengers per day. Elsewhere, Mirichu (2004) also points out that Jomo Kenyatta International Airport, handles more than 20 flights and 10,000 passengers daily. For this reason, any form of emergency will result in a great economic loss. With such a number of passengers travelling in and out of these airports, the losses incurred once a there is an outbreak of fire cannot be estimated.

Challenges associated with inadequacy of rescue capacity are highlighted in a study by Obwaya (2010) where it was found that Kenyan airports are faced with a common emergency situation which is air crashes. The study further indicates that around the world, whenever a crash occurs and fire fighters at the airport reach crash victims within the next few minutes, there is a chance of 100% survival rate (Obwaya, 2010). However, airports in Kenya lack capacity as a result of few staff members and equipment (Obwaya, 2010). As a challenge, it places lives, properties, staff and fire response teams at risk should a fire outbreak occur. Ayres (2009) estimates that with over 350,000,000 individuals and aircrew operating in airports annually, the damage of a fire emergency can be worse than it was anticipated.

Locally, there are challenges associated with planning in regard to emergency handling. In research by GOK (2004) in Jomo Kenyatta International Airport, it was discovered that project implementation at the airport has been a combination of disaster, tragedy, dishonor, condemned anticipations of stakeholders and a puzzle that is difficult to understand. Furthermore, the challenge with planning is highlighted when efforts by Kenya Airports Authority (KAA) to expand and modernize the airport were rendered futile due to termination of plans and most importantly a fire disaster that took place in 2013 (GOK, 2004; KAA, 2012). Additionally, there have been misunderstandings between participants and players who are vital to implementing projects at JKIA which makes planning a challenge (Omondi and Kimutai, 2018). Elsewhere, Mokaya and Nyaga (2009) found out that the capacity to implement projects was inadequate at JKIA due to poor culture, lacking human resources and unclear clear policies, all which are critical factors when implementing safety programs that are meant to deal with disaster outbreaks such as fire emergencies.

Locally there are challenges associated with ineffectiveness, anomalies and unethical issues operation wise have also been highlighted by various studies (The East African Standard, 2004). In Kenya, there was a report that was released by Kenya Airport Authority (KAA) on a plane crash which occurred in Busia in 2003 which indicated that the crash occurred due to challenges that included unethical operational practices, incompetence and anomalies (The East African Standard, 2004). The other challenge witnessed from other airports in terms of human resource capacity to handle emergency situations was also highlighted in the report. Specifically, the report stated that adequate security should be deployed at Kenyan airports so as to counter risks associated with terrorism and drug smuggling (Obwaya, 2010). The report also mentioned lack of training in the firefighting, inspectorate and traffic control departments. It is important

therefore to address the above challenges to secure Wilson Airports from extensive damage in should there be a fire outbreak.

There is need for Wilson Airport to develop a comprehensive fire emergency plan that will boost the airports and passengers' safety and security as well as mitigating risks associated with fire outbreaks. This is particularly important in times of fire emergencies. Generally, the challenges associated with fire emergencies that have been addressed in this section and for which Wilson Airport needs to address include: lack of facilities, poor communication, poor collaboration, poor coordination, low safety and environmental standards, authorities within the aviation industries who are not independent, inadequate infrastructure and lack of training of staff. Other important challenges that can be addressed are linked to ethical considerations, efficiency in operations and conflict resolution processes especially among the management team.

2.7 Strategies to Counter Fire Emergency Challenges

A study by Bang (2013) on disaster management indicates that for a longer time fire has caused major catastrophes in human life. Sometimes fire may occur naturally or artificially. Another study by Brown and Smith (2000) also categorizes causatives of fire disaster into natural phenomena for example volcanic eruptions, and lightning strikes; and artificial causes of fire which includes human or machine errors. Airports are susceptible to fire disasters due to either artificial or natural causatives. However, strategic plans have to be placed across in order to address fire emergency challenges in airports.

Johnstone et al, (2012) defines a strategy as a technique or an idea selected to take along an anticipated future, such as goal achievement and elucidation to a problem. Just like other phenomenon, fire is a great disaster that requires to be managed in order to prevent property loses, destruction and loss of lives. There is therefore a need to put across some strategic plan in

order to curb the challenges brought about by the emergency fire. This section covers the strategies that can be utilized to address challenges associated with fire emergency. Strategies covered include the following: adoption of the Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR), special training and awareness creation, fire evacuation strategy, evacuation procedures, warning systemization, installation of firefighting facilities and construction of fire proof compartments.

A major step towards fire emergency safety handling at Wilson Airport would be the adoption of SFDRR as a guiding framework towards disaster mitigation. SFDRR is the first global policy framework of the United Nations' post-2015 agenda, developed by the United Nations Office for Disaster Risk Reduction (UNISDR) as a step in the direction of global policy coherence with explicit reference to health, development, and climate change (Aitsi-Selmi, Egawa, Sasaki, Wannous and Murray, 2015). The framework came about as a necessity to guarantee that disaster risk reduction policies across the globe reflect an understanding of the complexity of disaster risk in the twenty-first century. Specifically, it presents four priorities for action that include: understanding disaster risk, strengthening disaster risk governance to manage disaster risk, investing in disaster risk reduction for resilience, and enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction (Aitsi-Selmi, Egawa, Sasaki, Wannous and Murray, 2015).

In implementing, the SFDRR, it is anticipated that each priority identifies opportunities for local, national, regional and global actions. The first priority establishes a firm support for evidence based policy making, through calls for structured data collection, multi-hazard interactions, and for capacity building and technology transfer (Pearson and Pelling, 2015). The second priority aspires to integrate governance issues across the disaster cycle from preparedness to response

and recovery (Pearson and Pelling, 2015). The third priority covers a wide agenda including support for risk sensitive land-use planning, health systems (going beyond protecting buildings to ensuring staff training and human resource), promoting insurance, employment safety and safety for people with disabilities and for financial systems (Pearson and Pelling, 2015). The fourth priority focuses first on building capacity for preparedness in addition to government integrating post-disaster reconstruction into the economic and social sustainable development of affected areas (Pearson and Pelling, 2015).

From the framework, the third and fourth priorities are the applicable to this study since they highlight effective strategies for fire disaster mitigation at organizations such as Wilson. At the national level, which involves the government agencies (KAA, County Government of Nairobi and NPS), there is need to plan, implement human resource training, and improve on the infrastructural set-up at Wilson Airport. It is such efforts that contribute towards building capacity for preparedness in handling fire disasters at Wilson Airport. Essentially, SFDRR as a framework reflects the understanding that disaster risk reduction strategies (planning, human resource training and infrastructural set-up) should be formulated based on scientific evidence as has been attested in the literature review within this study. It is only then that the management and relevant stakeholders at Wilson Airport can be able to uncover improved ways to prevent, mitigate, prepare for, recover from, and respond to fire disasters and reduce effects arising from disasters

There are studies that have been conducted globally on the challenges associated with airports in their response to fire emergencies. Braithwaite (2011) undertook research in Australia on fire coverage and discovered that the ARFF (Airport Rescue and Fire Fighting) coverage was low owing to the fact that the main goal at airports in Australia is to keep accident rates at a

minimum. The study further indicated the need to guarantee passengers of their safety through provision of adequate Airport Rescue and Fire Fighting coverage in case a fire emergency occurs (Braithwaite, 2011).

To counter challenges associated with fire emergencies at airports, there needs to be special training and awareness creation that involves properly trained fire response team with firefighting responsibilities. This team should also be capable of warning the entire staff at the airport in the shortest time possible as well as coordinate with various stakeholders such as other fire brigade to handle the fire emergency. It is a team that can be able to evacuate people from the fire scene without causing any harm or danger to victims as well as remove any commodities that can be destroyed and which is considered important (Amboka, 2015).

Another strategy to counter challenges associated with fire emergencies is the utilization of fire wardens who are hired based on the size of the airport facility. Specifically, wardens could be placed on each floor and are held accountable for persons within that floor in case there is a fire outbreak. It is important to note that these wardens require some special form of training specifically on fire emergency handling that is unique to that which is offered to regular staff at the airport (Kim, Kim and Bang, 2013). These trainings should equip them with knowledge on usage of fire extinguishers, fire prevention and identification of hazards that can cause fire as well as knowledge on the fire regulations of the area within which the airport facility is located (Kim et al, 2013).

A strategy to counter challenges associated with fire emergencies would be usage of warning systems specifically alarms and lighting. Fire alarms and lighting mechanisms need to be put across to safeguard the areas. Consideration has to be put in mind as to how evacuation routes

will be arranged with specific lighting to indicate passage within these routes. The strategies that deal with warning systems will involve fire alarms which ring once there is a fire outbreak. Evacuation of travelers and staff begins once the alarm is raised and the staff is directed to an assembly point which is safely outside the area of fire disaster.

Another strategy that can be adopted in dealing with challenges relating to fire emergencies in the utilization of proper positioning of evacuation routes and exits. Specifically, an evacuation plan should incorporate three exits (Kim et al, 2013). There has to be a primary exit that is normally located in the upper left side of the passenger and freight terminals and is designated by a signage with red arrows. A second exit is usually located on the right side of the passenger and freight terminals that is adjacent to the outer wall of the airport buildings. It also has signage in tan arrows for both male and female persons. Evacuation routes and exits should also factor in the handicapped persons and it for these reasons that hallways which have sloping corridors to the assembly points are designated parallel to these evacuation routes. All these evacuation routes must be connected from the top to the bottom of the building (Kim et al, 2013)

Through Securing of facilities for fire brigade: The fire stations support the air force fighters with a mission of providing a safe and secure flight line and security of facilities on base. As a strategy, one should ensure that the firefighting brigade responds in time to the flight lanes, runways and facilities in the airport in 3 minutes' time before the flight. Bases with dual runways or poorly located large fire stations that cannot respond in time need to pursue the need of small fire station to supplement the existing emergency response services; the flight line should be visible from the communication control room.

To counter challenges associated with fire emergencies, fire-fighting equipment and correct installation should be considered. These vehicles which will operate within the airport should be equipped with a nozzle that has been mounted on the roof and that is able to shoot from a far distance. It will enable the proactive approach of trying to extinguish fire while the vehicle is approaching the specific fire scene. Additionally, sophisticated fire-fighting vehicles are equipped with a nozzle that has an extendable boom which is capable of piercing an aircraft to deliver water and prevent the spread of fire as a result of fuel spillover from an aircraft (Mashimo 2002).

Protective gear is also another strategic move towards addressing the challenges associated with fire emergencies. A study by Gustin (2010), highlights the use of protective wear that specifically states firefighters should have an ensemble that protects them from fire by reflecting heat away from the body. The gear is able to reflect heat due to its silver coating. Further, fire response teams require breathing gear that can enable them work through a rescue mission within an enclosed area that has fire which is full of smoke and heated gases (Gustin, 2010).

Another strategic process is the fire rating of compartments within the airport more specifically the rooms within which operations are ongoing. Precisely, barriers and partitions that are fire rated are supported by structures that are constructed and continuously scrutinized to ensure they are up to standard. Their usage however depends on the nature of occupancy and potential for hazards. In other cases, the walls are constructed as bomb-proof walls capable of resisting explosions.

As a strategy to counter fire emergency challenges, airports should ensure there is adequate provision of fire extinguishers. Cooke (2009) conducted a study in airports across the US and Uk

and presented arguments supporting the need to raise fire and safety standards. In the airports especially the larger ones, one of the arguments was the need to have fire-fighting equipment such as fire extinguishers installed at strategic points of the airports. Another study by Wambugu, Mburu and Gatebe (2016) on disaster preparedness at JKIA, there was focus on Fire and terrorism. It was discovered that the airport does not have enough evacuation routes as well as fire response teams. The fire extinguishers placed at the facility were inadequate in comparison to the size of the facility. This shows how fire extinguishers were insufficient taking to account the critical role they play in handling fire emergencies in airports.

2.8 Theoretical Framework

A theory as defined by Croyle (2005) is a systematic way of describing the relationship between variables in a study. Accordingly, it shapes our reasoning behind actions and circumstances in a study. The theoretical framework will be appropriate for this study since it will outline the existing safety strategies for handling fire emergencies and how to implement those strategies into sustainable processes that can be used to prevent and reduce the damage that can be brought about by a fire disaster within the airport. An understanding of the theories that will support this study will thus be helpful in bringing about change in the entire organization of Wilson Airport and its surrounding environment. Further, the theories that support the study have an assumption should there be difficulty in coordination of the specified variables under study; an organization applying the principles under study will not achieve the desired objectives, hence the need to have all appropriate safety strategies in handling fire emergencies at Wilson airport.

The theory that will guide this research is chaos theory. It lays emphasis on the fact that the unpredictability of casualties arising from a disaster is applicable in understanding how to manage crisis. It is built on the idea that systems as much as they may be complex usually have

some order beneath. Additionally, the theory is built on the notion that small changes within a system can result in outcomes that are complex. Cognizance of this multi-directional interaction is the reason behind its application in crisis management (Seeger, 2002). Further, the theory stipulates that various factors interact in an unknown way to create a disaster making it difficult to establish a clear cause and effect association.

In applying the chaos theory to this study, there is an assumption that the regular operational procedures at Wilson Airport have a defined system with definite outcomes. The theory dictates that there errors can occur in measuring the system which affects prediction and any method utilized to predict a cause and effect becomes futile. Ordinarily, in this study, there is the intent to establish new and better methods and technologies that can be applied in handling fire emergencies at Wilson Airport hence the need for applying this theory. As the theory indicates, methods that are non-linear can achieve prediction of a cause and effect whenever an emergence occurs.

The relevance of chaos theory in a sociological study is exemplified by Crossman (2019) who indicates that some social systems are highly complex, and the only prediction you can make is that it is unpredictable. Ideally, chaos theory looks at this unpredictability of nature and tries to make sense of it (Crossman, 2019). In a sociological study such as fire emergencies and safety handling strategies at Wilson Airport, the chaos theory is suitable as it aims to find the general order of social systems within the organization and particularly social systems that are similar to each other. The assumption is that the unpredictability within the system can be represented as the overall behavior, which gives some amount of predictability, even when the system is unstable like in the case of a disaster such as a fire outbreak (Crossman, 2019). From a sociological perspective, the theory dictates that chaotic systems may have a butterfly effect

whereby a disaster can cause change in the outcome of things, but the system has some equilibrium that represents a state to which the system finally settles.

Chaos theory would fit in this study since it suggests that a disaster can be handled by looking at the variables in the study namely: planning, human resource management and infrastructural set-up at Wilson Airport. Further, it is a theory that suggests that the universe does not depend on a linear relationship in which there are expected causes and their effects. In application of this theory, there is an assumption that the earlier conditions leading to a disaster are measurable for a certain period. Therefore, systems that are chaotic limit our abilities to predict with certainty the occurrence of events. Interestingly, a study of chaos theory does not confirm whether chaos can produce ordered structures in a wider scale. Chaos theory in this study is hence used to explain how certain responses to fire emergencies may not yield the expected outcome thus compromising the disaster management process. In attempting to understand how airports should prepare to reduce the risk associated with fire emergencies, chaos theory simply notes that the understanding of multiple variables can compromise handling of fire emergencies.

In this study, the chaos theory is considered a significant subject as it offers a new management paradigm for managers. This paradigm lays its basis on the notion that everything can be known but a few things always remain unknown. Thus, looking at disasters such as fire emergencies from a different aspect and updating the existing data is seen as compulsory. Consequently the chaos theory pushes for any organization attempting to deal with disasters to adopt a structure that is flexible and decentralized supporting a consistency in information flow which is based on following of instructions (Sellnow, Seefer and Ulmer, 2000).

The application of chaos theory in this study is ideal as it associates with a fire disaster which is chaotic in nature especially during its early hours of outbreak (Sellnow et. al, 2000). During an emergency outbreak, the people tasked with handling the crisis may be incapable of eliminating the disaster and it is at this point that crisis management becomes essential. Various stakeholders can thus contribute to mitigating the fire disaster. The may include military forces who are supposed to undertake an important responsibility as an assistive mechanism. Although they are supposed to take initiative, their organizational structure contrasts with the basic assumptions of chaos theory and this situation may lead to undesirable results so it becomes highly important to establish balance.

According to literature, the chaos theory will deliver a solution based on an understanding of non-linear interactions that are characteristic of chaotic occurrences such as fire emergencies. It is not based on traditional scientific descriptions that are based on an understanding of individual aspects (Rickles, Hawe and Sheill, 2007). Based on its approach, the theory has its foundation on relationships that are dynamic in this case non-linear relationships which are impossible in terms of predictability and such is fire emergencies (Rickles et. al, 2007). Such dynamic systems and nonlinear relationships are characteristic if fire disasters in an airport environment. This study will therefore adopt the use of chaos theory in assessment of safety strategies in handling fire emergencies in Wilson Airport Nairobi.

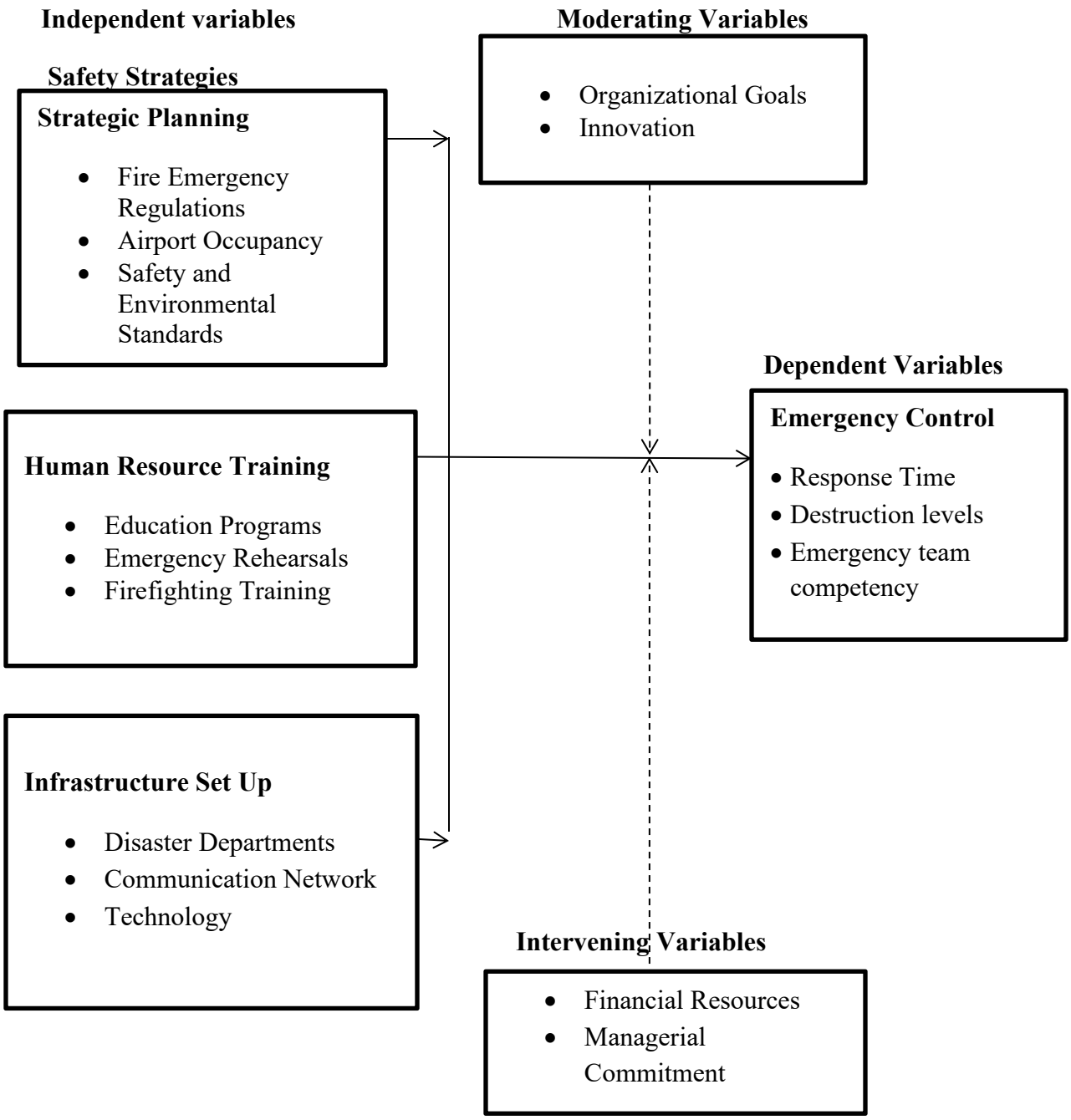
Incidentally, in this study, the chaos theory alone cannot fully support the assessment of safety strategies in handling fire emergencies at Wilson Airport. The study also adopted the systems theory. System is as a set of common, natural, technical or measurable variables that coordinate for a specific goal (Mele, Pels and Polese, 2010). The theory is a logical guideline describing systems as immaterial entities which are not affected by factors such as time or space. The theory

is appropriate for this study as it helps understand how a social system which is the airport comprises of various parts that contribute to its performance as a whole (Mele et. al, 2010). Teamwork is appropriate in making a system function since it calls upon its members to improve on their potential and coordinate in a synergy that will generate positive outcomes. The systemic performance is critical in handling fire emergencies especially when applying the safety strategies once there is a fire outbreak.

In applying the systems theory to this study, there is emphasis on learning of teams in which there is focus on how to improve teamwork skills through dialogue (Mele et. al, 2010). In similarity to a system, Wilson Airport has departments that contribute to safety at the airport in cases of fire emergencies. Parts comprising of the airport include the airlines and numerous organizations that must be provided for a safer environment that can handle fire outbreaks. Therefore, in understanding this theory, the airlines and various stakeholder organizations are constituent parts of Wilson Airport as a system. These airlines and stakeholders should coordinate through sharing of resources towards ensuring that the airport has the capacity to handle fire emergencies (Obwaya, 2010). Some of the resources may include trained human resources and establishment of committees to mitigate the risks associated with fire emergencies.

2.9 Conceptual Framework

Figure 2.1: Safety strategies in handling fire emergencies



As shown in Figure 2.1, there are safety strategies in handling fire emergencies in Wilson Airport, Nairobi. These safety strategies include strategic planning, human resource training and infrastructural set up.

2.10 Use Dependent and Independent Variables

Strategic planning is important in handling fire emergencies at Wilson Airport through implementation of fire regulations, planning on the structure of the airport's occupancy. Additionally, in strategic planning, the safety and environmental standards have to be met to mitigate fire disasters.

Human resource training also contributes to fire handling emergencies at Wilson Airport Nairobi. It entails education programs for the staff at the airport as well as frequent emergency rehearsals. Further, staff requires training in firefighting to enable them control fire disasters that can occur in the future.

The infrastructural set up at the airport is also crucial to handling fire emergencies at Wilson Airport Nairobi. Specifically, the airport should ensure there are disaster departments around the airport that can handle fire emergencies, a proper communication network and appropriate technology to handle fire emergencies.

Certain factors affect the safety strategies in handling fire emergencies in Wilson Airport, Nairobi. These include organizational goals which take precedence over any form of action instituted at the airport to handle fire emergencies, and the type of innovation that is appropriate in handling fire emergencies. Additionally, the availability of financial resources can affect the safety strategies as well as commitment from the management.

2.11 Summary of the Literature Review

Safety strategies in handling fire emergencies around Wilson Airport will not only involve some environmental friendly practices. Mitigating fire emergencies is a complicated task that entails strategic planning which touches on policies, communication, collaboration, and coordination, low safety and environmental standards, managerial participation and airport physical layout. Further, there is need for human resource training specifically in rehearsals that involve the consistent testing of emergency plans, number of personnel, skills training particularly on usage of firefighting equipment. Lastly, the infrastructural set up at the airport is key to handling fire emergencies especially fire safety and operational facilities around the airport. These will provide strategies that counter the challenges associated with fire emergencies. Precisely, the strategies include provision of firefighting equipment, fire fighting vehicles, fire rating the doors, walls and floors in the airport area among others. Strategies' outlined in the literature review should be adopted to ensure Wilson Airport is adequately prepared for a fire emergency.

Every emergence in its own nature is bound to be chaotic even where systems have been put in place to mitigate the effects of the specific occurrence. Chaos theory by Crossman hence is suitable as it aims to find general order of social systems within organizations with assumption that unpredictability within a system can represent the overall behavior which gives some amount of predictability even when the system is unstable.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This section covers the methodology employed in this research. Specifically, it reflects on the design, population of study and sample. Further, it discusses the research instruments, data collection, validity and reliability tests, research ethics as well as analysis of data and presentation.

3.1 Research Design

By definition, the research design is a blueprint that helps in identification of participants, an area of study processes involved in collecting data that align with the objectives under study (McMillan and Schumacher, 2001). In this research, a descriptive research design was employed as it would enable the study collect and analyze quantitative as well as qualitative information. Specifically, in employing descriptive studies, data could be directly gathered from the respondents on safety handling strategies at Wilson Airport thus offering the opportunity to make descriptive assertions with regard to the subject under study. Lau and Kuziemsky (2017) indicate that descriptive studies gather data about the attitudes, opinions and habits of people on any issue through the sample administration of research tools to individuals. The design was hence ideal as it would cover a larger population over a shorter period making it relevant in analyzing several variables at once through questionnaires, interviews and focus group discussions. In this study it will hence be ideal since there is a large sample to represent the respondents at Wilson Airport. Lastly, it was appropriate because data would be generated on facts and characteristics that reflect upon fire emergency operations in the selected airport.

3.2 Target Population

The target population as described by Frankel and Wallen (2000) is part of the population from which a research aims to generate findings. It is based on the fact that any study aims to involve participants from a particular populace who will be subjected to a survey and give the required information as pertains the study objectives. This study targeted a population that comprised airline staff members, managers and members of staff at the Kenya Airports Authority Training Academy that trains airport staff on handling on fire and safety courses. An updated list of airlines operating at Wilson Airport (See appendices) indicated that there are 25 airlines at the airport (Mbiriti, 2019). From each of these airline organizations, the study targeted all the workers of the 25 airlines at Wilson Airport, and the 25 managers of the airlines. Among the mandates of KAA as constituted in an act of parliament in 1991, under the Laws of Kenya (The KAA Act, cap395), is that resource and equipment used for firefighting must be provided at airport facilities (KAA, 2020). The KAA training academy specifically handles fire and rescue operations at all airports. It is from this department that the study targeted 2 of its senior officials as key informants.

Table 3.1: *The Profile and Number of Respondents of the Target Population*

District	**Target population**
Airline Staff Members	323
Airline Managers	25
KAA Training Academy Officials	2

3.3 Sample Size and Sampling Techniques

The study considered the airline staff, fire emergence experts and government agencies all of whom had an equal opportunity to be selected to participate in the research. By use of proportionate quota sampling techniques, the study was able to select study participants without any biases.

3.3.1 Sampling Techniques

In sampling for this study, there was only consideration of workers and experts within the field of aviation and fire departments. This is because they are more conversant with the subject matter. The study utilized non-probability methods of sampling. Non-probability method of sampling involved quota sampling and purposive sampling methods. The quotas were the twenty-five airline companies operating within Wilson Airport whereby all the people stood an equal chance of selection to participate in this research (Schmidt & Brown, 2012). Thereafter, proportionate quota sampling was utilized to choose subjects from the quotas. In this research, there was the use of the table by Krejcie and Morgan (1970) to determine respondents who would participate in the study (See appendices). In relation to social research, they recommend a 95% confidence level and ±5 per cent margin of error. Krejcie and Morgan (1970) formula is as follows:

$$n = \frac{Z^2 \times p\,(1-p)}{M^2}$$

Where:

n = Sample Size for infinite population

Z = Z value (e.g.1.96 for 95% confidence level)

P = population proportion (expressed as decimal) (assumed to be 0.3 (30%)

M = Margin of Error at 5% (0.05)

$$n = \frac{1.96^2 \times .3(1-.3)}{.05^2}$$

$$n = \frac{3.8416 \times .21}{.0025}$$

$$n = \frac{.8068}{.0025}$$

$$n = 322.72 \sim \mathbf{323}$$

Therefore 323 respondents were the target population across all the 25 airline companies. Further, 152 staff members out of the 323 respondents were to be selected using quota sampling across all the 25 airline organizations to participate, since the target population was unknown. The choice of 30% in the formula adopted by Krejce and Morgan is justified by separate pronouncement of researchers and Scholars Sekaran and Bougie (2010) who assert that 30 percent is a considerably representative sample and is viable in social sciences study. Additionally, one airline manager from each of the 25 airlines were subjected to focus group discussions while 2 senior officials from the KAA Training Academy were the key informants subjected to interviews.

Non-probability method of sampling also involved purposive sampling. Specifically, it involved selecting key informants from the aviation industry and fire departments who were the airline managers and trained firefighters from the Fire and Rescue Services in Nairobi County.

Table 3.2: *Sample Population per Scope for Every Category*

Category	**Scope**	**Population (N)**	**Sample (n)**	**Sample Size (%)**
i. Airline Staff Members	Wilson Airport	323	152	47
ii. Airline Managers	Wilson Airport	25	25	100
iii. Trained Firefighters	Nairobi County	2	2	100

Key: N= Total population; n=sample size

3.3.2 Sample of Airline Staff Members

In this study, there was a focus on airlines that operate within Wilson Airport. The numbers of staff members that were selected in each airline organization was 6. Proportionate quota sampling method was utilized to pick 6 staff members from each airline. Proportionate quota sampling is a sampling method that represents the characteristics of the major population by sampling a proportional total (Etikan and Bala, 2017). Ideally, in proportional quota sampling, a study seeks to represent the major characteristics of the population by sampling a proportional amount from each quota. Further, in proportionate quota sampling, the need for a specific size for the sample in selection does not stop unless the target is hit before stopping (Etikan and Bala, 2017). In this case, a minimum of 6 staff members per airline was the sample targeted from each airline with an extra 2 members from two of the airline organizations to total up to 152 respondents.

3.3.3 Sample of Key Informants and FGDS

The study Key Informants included experts with extensive knowledge on safety strategies in handling fire emergencies in airports across Kenya which includes Wilson Airport. Two senior officials from the KAA Training Academy which is a department under KAA that is responsible

for training airport staff on fire safety and rescue missions were selected (KAA, 2020). These Key Informants enabled the study gather qualitative data through in-depth interviews with them. Purposive sampling method was utilized in picking out Key Informants. The Key Informants were identified based on their experience in the aviation industry with regards to fire emergencies. 25 Airline managers were also identified from each airline through purposive sampling procedure and formed part of the FGD team together with the key informants.

3.4 Research Instruments

The study utilized the questionnaires as the main research tools, which were divided into 6 segments based on Likert scale. Questions were either open ended or closed ended to provide precise information required.

3.4.1 Questionnaire for Airline Staff Members

In this study, questionnaires were the key research tool and were selected due to the fact that they could be utilized on a larger population within a short time. Questionnaires were adopted to gather information from staff members of the 25 airline companies at Wilson Airport. The questionnaire had questions that were open-ended as well as questions that were closed-ended. Additionally, there were questions based on a Likert scale. In a Likert scale, the items were grouped based on: Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D) and Strongly Disagree (SD). A Likert scale was useful as it enabled the research examine how far the strategies under study are effective as well as the extent of their application in the airport under study. The questionnaire comprised sections that were based on the study objectives.

The questionnaires for airport staff members were organized into six main sections. Section one obtained data pertaining background information of the participants. Section two obtained data on the strategic planning measures Wilson Airport had adopted for fire emergencies. Section

three solicited data on how adequate strategic planning for fire emergencies in Wilson Airport was. Section four solicited on human resource training for fire emergencies at Wilson Airport. Section five examined the capacity of infrastructural set up for fire emergencies at Wilson Airport. Lastly, section six queried the challenges facing Wilson Airport in its response to fire emergencies.

3.4.2 Focus Group Discussions

In this study focus groups discussions (FGDs) were utilized to query information on safety handling strategies for fire emergencies at Wilson Airport. Nyumba, Wilson, Derrick and Mukherjee (2018) characterized focus groups as investigative since they employ in-depth group interviews made on a homogenous group to provide information around topics specified within the study. FGDs were important because the participants were able to communicate freely and thus supplement the data collected. In addition, the focus group discussions were necessary given that participants clarified knowledge that remained uncertain during the questionnaire survey and individual interviews.

According to Guest, Namey, McKenna, Eley and Taylor (2017), the ideal number of focus groups participants range between six to twelve (6 to12) people. Therefore out of 25 managers that were selected from airline companies, there were 2 FGDs of 12 managers and 13 managers respectively. In total there were 2 FGDs in this study.

3.4.3 Interview Guide for Key Informants

This research also adopted an interview guide to gather qualitative data from 2 senior officials at the Kenya Airports Authority Training Academy which is a department under KAA that trains airport staff on fire safety. The two were senior officials within this department since they had experience and offered insight into the fire safety handling strategies in Wilson Airport which is

among the airports the authority is mandated to provide with fire handling equipment and resources (KAA, 2020). The interview guide had a section based on the participants' background data and another section on the objectives under study. An interview guide was ideal as it provided insight on information gathered from the questionnaire survey that needs more clarity.

3.5 Validity and Reliability of Research Instruments

3.5.1 Validity

The aim of validity in a study is to ascertain its integrity (Bryman, 2012). In an attempt to confirm validity in this research; this study ensured that the data collection tools ration the data as they are intended to. While conducting the study, expert opinion on the content of the questionnaire and interview guides was sought. The purpose of testing for the instruments' validity was to ensure that their content covers all the variables under study. Further validity test confirmed if the primary information generated from responses by the participants match with reality on ground. In this research, a pilot test was undertaken to verify questionnaires and interview guides validity and thereafter any errors found were amended.

3.5.2 Reliability

Sahaya (2017), notes that reliability is the point upon which instruments can yield the same results when administered under the same circumstances to a similar population. To ensure reliability, the questionnaires and interview guides had uniform questions that were asked to all participants. Further the research instruments had standardized questions. Interpretation of the questions to different respondents was done according to their levels of understanding to avoid bias. The questionnaires and interview guides were assessed by the university supervisors to ensure the content and build-up of the instruments was verified by expert scholars so that they

can produce stable and consistent results. The quality of survey in this research was improved by ensuring the interviews are taped and recorded for clarity of the information obtained.

3.6 Data Collection Procedure

Gathering of information from respondents in research is known as data collection. The research tools were utilized in attaining data collection (Mugenda & Mugenda, 2003). The process began by obtaining all the relevant documents that was used to facilitate the process. Upon receiving these necessary documents, questionnaires were distributed to the airline staff members and interviews conducted with the airline managers and officers from City Hall's Disaster Management and Coordination department. To ensure the questionnaires would be answered in totality and retrieved from the participants, a follow up was done.

3.7 Data Analysis

Any information that is collected from respondents in a study has to be examined through what is known as data analysis. In this research quantitative and qualitative approaches to data analysis were adopted. Firstly, quantitative data collected from the questionnaires were summarized through use of descriptive statistics (Nachmias and Nachmias, 2004). The quantitative findings were thereafter presented in tables using frequencies and percentages.

Analysis of qualitative data began once interviews were conducted after which the generated information was analyzed thematically so that results could be presented logically and in a concise manner (Mohajan, 2018). The qualitative approach adopted in this study was a complex procedure that weaved themes together and identified key ideas emerging from the information obtained from the fieldwork.

All interview transcripts were thoroughly scrutinized with an aim to establish if there were unique patterns that were emerging (Mohajan, 2018). It is these emerging patterns that illuminated the objectives under study as well as the studied literature. Qualitative approach in data analysis gains its importance as the patterns emerge that highlight the objectives of the study, thematic areas of description are also developed (Mohajan, 2018). Thereafter, phrases, quotes or sentences that are central to the subject under study are examined and extracted (Mohajan, 2018). It is these phrases, sentences and quotes that were presented in narration form as per the study objectives. Themes were justified and supported by the transcribed narrations in verbatim including the laughter and pauses of the interviewees in what they said word for word. In this research, data analysis of qualitative information as well as its presentation was conducted with the aid of NVIVO software.

3.8 Ethical Considerations

Before commencing the field survey, authorization to conduct the study was pursued from the appropriate establishments. Selection of the study respondents was done with utmost care and honesty. The study also aimed to pursue the respondents' voluntary informed consent and they were allowed to withdraw their consent at will during the process. The respondents' physical and psychological safety was safeguarded to ensure that their dignity and welfare was upheld throughout the research. Clarity on matters concerning the study's purpose was indicated and respondents made to understand it was purely for academic purposes. Participants were further guaranteed of confidentiality in regard to responses from questionnaires and interviews (Flanagan, 2016). Lastly all the materials acquired from scholars and authors were appropriately acknowledged.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This section covers the findings from this research on safety strategies in handling fire emergencies in Kenya airports, a case of Wilson Airport Nairobi are presented and discussed. Generally, percentages and frequencies in figures and tables are used to present the findings.

4.2 Response Rate

Of the 152 questionnaires administered, 140 were returned making a questionnaire successful return rate of 92%. Babbie (2003) states that a return rate of 50% is adequate, 60% good and 70% very good for analysis. Therefore, 92% return rate was appropriate for data analysis.

4.3 Demographic Data

The study considered the background data of the respondents with specific reference to gender, age and education. The results are as discussed in subsequent sections 4.3.1 to 4.3.5.

4.3.1 Percentage Distribution of Respondents by Gender

In this study, 53 % of the participants were male whereas 47 % were female as shown in Table 4.1.

Table 4.1: *Percentage Distribution of Respondents by Gender*

Gender	**Frequency (n)**	**Percentage (%)**
Male	74	53
Female	66	47
Total	**140**	**100**

It is important to note that female representation in any issue such as fire emergencies at airports is important and Carter and Silva, (2010) argued that there may be gender consideration in many areas of appointments within the government, but women still have a long way to go in terms of achieving equality in participation of public service appointments. Catalyst, (2011) further observed that the international representation of men to women in leadership position is generally 20:1 especially at senior management levels.

4.3.2 Respondents Distribution by Age Bracket

In this study the respondents' age bracket ranged from: below 30 years, 31-40 years, 41-50 years and 51 years and above. The distribution based on age is shown in Table 4.2.

Table 4.2: *Respondents Distribution by Age Bracket*

Age	**Frequency (n)**	**Percentage (%)**
Below 30 years	61	22.1
31 – 40 years	65	58.6
41 – 50 years	14	6.2
Total	**140**	**100**

As shown in Table 4.2, slightly over half (58.6%) of the participants were between ages 31-40. This was followed by 22.1% and 13.1% who were aged below 30 years of age and 51 years and above respectively. Only a small percentage (6.2%) of the respondents was aged 41 – 50 years.

Age is an important factor in facilitating strategies to counter fire emergencies since it enhances performance. When a population is diverse in terms of age, there is bound to be difference in values, preferences and experiences hence making it very likely that any contribution they make will create room for them to express differing opinions concerning approaches in handling

emergencies at the airports. It is this diversity that enhances a workforce's creativity and flexibility, which will ultimately lead to better innovation and faster problem-solving techniques in handling fire emergencies.

4.3.3 Respondents Distribution by Education Level

In this study, the respondents' education level included primary, secondary, college and university levels. The findings are shown in Table 4.3:

Table 4.3: *Respondents Distribution by Education level*

Level of Education	**Frequency (n)**	**Percentage (%)**
Secondary	6	4.3
College	49	35
University	85	60.7
Total	**140**	**100**

According to Table 4.3, 60.7 % of the participants had attained university level education. Another 35 % had attained college education while 4.3 % of them had secondary education. None of them had primary level of education. Arguably, it can be deduced that a good percentage of the staff in Wilson Airport have attained basic education.

The level of education affects productivity. The importance of education and its contribution to handling fire emergencies lies in the fact that intellectual capital is a driving force towards progress in any organization. Further, Heath field (2007) established that staffs with college and university education are empowered in terms of knowledge and capabilities. Additionally, MacDougall and Hurst (2005) found that in modern society, businesses are driven by intellectual capital which is critical for them to sustain a competitive edge in the global market. Therefore,

when an organization's workforce is well-trained, they are made aware of the expectations and depth required of their responsibilities that will improve on their professionalism. This is very critical in disaster management situations such as fire emergencies since the trained personnel will have higher understanding towards hazards and predisposition towards disasters that may lead to emergencies.

In other studies, such as a study by McBey and Karakowsky (2010), it was established that the level of education is associated with work performance. Further, a study by Ariss and Timmins (2009) confirmed that the lower the education the staff has, the less likely, their performance would be better. In as much as research shows that performance exhibited by the members of an organization may vary according to the educational qualifications, Kotur (2015) and Linz (2012) found a contradicting trend within an organization opining that increasing academic qualification among the employees reduces performance. In essence, education plays a critical role in the performance of workers in handling various situations that include fire emergencies at airports.

4.3.4 Respondents Distribution by Specialization

In this study the respondents were categorized in terms of profession. Table 4.4 shows the findings.

Table 4.4: *Respondents Distribution by Specialization*

Specialization	Frequency (n)	Percentage (%)
Aeronautical	12	8.6
Air tech	11	7.9
Aviation safety	20	14.3
Aviation	8	5.7
Business management	8	5.7
Cabin crew	9	6.4
Craft engineer	8	5.7
Craft maintenance	9	6.4
Flight operation	8	5.7
Ground crew	10	7.1
MPP	10	7.1
Operation	2	1.4
Reservation	8	5.7
Safety	8	5.7
Transport	9	6.4
Total	**140**	**100**

As illustrated in Table 4.4, 14.3 % of the respondents were in aviation safety followed by 8.6 % who were in aeronautical while 7.9 % were in air tech. Areas of specialization with similar number of respondents were cabin crew, transport and craft maintenance which had 6.4 % each. Similarly aviation, business, craft engineering, flight operations, reservation and safety had 5.7% of respondents each.

The diversity of the respondents in terms of their areas of specialization is important in addressing fire safety handling strategies. A research by the Swedish Rescue Services Agency (2004) recommended national fire safety goals which shall be measurable and involve all

stakeholders. Precisely in developing a strategy for fire prevention, the research by the Swedish Rescue Services Agency (2004) states that there is need for a discussion among the key stakeholders on what should be prioritized, action plans that should be taken and the period of time it should take. All these information is based on expert opinion and available information that will assist in coming up with concrete fire handling strategies to be adopted.

4.3.5 Distribution of Respondents by Work Experience

This study had the respondents' work experience range from: below 1 year and below, 2 - 5 years, 6 - 10 years and 11 years and above. Table 4.5 presents the findings.

Table 4.5: *Distribution of Respondents by Work Experience*

Age	**Frequency (n)**	**Percentage (%)**
1 year and below	8	5.7
2 – 5 years	74	52.9
6 – 10 years	44	31.4
11 years and above	14	10
Total	**140**	**100**

As shown in Table 4.5, slightly over half (52.9%) had a work experience of between 2 – 5 years. This was followed by 31.4 % and 10 % who were had a work experience of 6 – 10 years and 11 years and above respectively. Only a small percentage (5.7 %) of the respondents had a work experience of 1 year and below.

In all professions, the workers' years of experience are relevant in determining human resource policies, remuneration, benefits packages, and appraisal. The main reason is because there is a belief that experience in employment gained over time enhances the knowledge, skills, and productivity of a worker. In the context of this study, the respondent's working experience will

be useful in determining the kind of safety strategies to be recommended for handling fire emergencies at Wilson Airport.

4.4 Strategic Planning Measures for Fire Emergencies in Airports

In this study, strategic measures existing at Wilson Airport were important in addressing the role they play in handling fire emergencies. It was the intention of this research to identify the strategic planning measures that Wilson Airport has put in place to handle fire emergencies.

4.4.1 Responsibility for Strategic Planning for Fire Safety at Wilson Airport

The respondents were asked to indicate who was responsible for strategic planning for fire safety at Wilson Airport. Table 4.6 illustrates the findings:

Table 4.6: *Responsibility for Strategic Planning for Fire Safety at Wilson Airport*

Responsibility	**Frequency (n)**	**Percentage (%)**
The Ministry of Transport	5	3.6
Airport Management	86	61.4
Departmental Heads	43	30.7
Nairobi County Council	5	3.6
Total	**140**	**100**

From Table 4.6, over half (61.4%) of the respondents indicated that the airport management was responsible for strategic planning for fire safety. 30.7% indicated departmental heads were responsible while 3.6 % stated the Ministry of Transport. Another 3.6 % indicated it was the Nairobi County Council.

From the findings, it is evident that strategic planning for fire emergencies at the Wilson Airport is generally a mandate of the airport management at the facility who have to coordinate with other stakeholders such as the Ministry of Transport and Nairobi County Council. This aligns with a study by ISDR (2003) which established that strategic planning for fire emergencies involves community outreach. Specifically, strategic planning must involve people from the community in which the airport operates in, to know what to do and how to do it, which is otherwise known as empowerment of a community in terms of fire emergency handling (ISDR, 2003). As part of disaster management, recovery plans implemented should hence involve creating consciousness among people from the community within which a fire outbreak can affect grossly.

The quantitative results were also affirmed by responses from the Focus Group Discussions where a male of 42 years of age with college level of education was captured saying;

> *"... there is need for improvement of enterprise resource planning with all stakeholders as well as community outreach"* (Participant 3, FGD 1).

The qualitative findings align with a study by Mukaria (2013) on the awareness and conformism to emergency preparedness in Wilson Airport. The study highlighted the importance of involvement of various stakeholders in emergency affairs in the airport since it found that information sharing among key stakeholders was not good at the airport and contributed to poor coordination whenever there was an emergency at Wilson Airport (Mukaria, 2013)

4.4.2 Greatest Challenge to Strategic Planning for Fire Emergencies

The study sought to establish the greatest challenge to strategic planning for fire emergencies at Wilson Airport. Table 4.7 shows the distribution as per the participants' responses:

Table 4.7: *Greatest Challenge to Strategic Planning for Fire Safety at Wilson Airport*

Challenge	Frequency (n)	Percentage (%)
High traffic rates at the airport	7	5.0
Structural design of the airport	48	34.3
Lack of a disaster management system	50	35.7
Poor coordination among departments	21	15.0
Total	**140**	**100**

As indicated in 4.7, 35.7 % indicated that lack of a disaster management system was the greatest challenge to strategic planning. 34.3 % indicated structural design of the airport could be another challenge while 15 % stated poor coordination among departments was another challenge. Only 5 % indicated that high traffic rates at the airport were the greatest challenge.

The above findings concur with a study by Obwaya which established that there was lack of proper mechanisms that integrate various stakeholders to handle emergencies at the airport.

4.4.3 Strategic Planning Measures Adopted for Fire Emergencies in Wilson Airport

The study sought to establish the strategic planning measures that are currently adopted for fire emergencies at Wilson Airport. Respondents indicated whether they agreed, strongly agreed, were undecided, disagreed or strongly disagreed with various statements regarding the strategic planning measures that Wilson Airport has put in place for fire emergencies. The distribution of responses is highlighted in Table 4.8.

Table 4.8: *Strategic Planning Measures Adopted for Fire Emergencies in Wilson Airport*

Statement	**Strongly Agree**		**Agree**		**Undecided**		**Disagree**		**Strongly Disagree**	
	F	**(%)**	**F**	**(%)**	**F**	**(%)**	**F**	**(%)**	**F**	**(%)**
Strategic planning measures for fire emergencies at Wilson Airport incorporate a disaster management system.	18	12.9	57	40.7	58	41.4	7	5.0		
Strategic planning measures at Wilson Airport involve a set of activities put in motion that aim to satisfy the immediate needs of the victims, their rehabilitation and the reconstruction of any infrastructure that may have been damaged or destroyed	21	15.0	63	45.0	42	30.0	14	10.0		
Strategic planning measures at Wilson Airport incorporate policies and objectives to guide the recovery, which have been put in place for some time, tested and proved beyond doubt	25	17.9	28	20.0	45	32.1	42	30.0		
Strategic planning measures for fire emergencies at Wilson Airport also involve coordination as an essential ingredient in a disaster preparedness plan.	48	34.3	23	16.4	53	37.9	9	6.4	7	5.0
Strategic planning measures at Wilson Airport involve community outreach whereby people from the community responding to a fire emergency know what to do and how to do it	28	20.0	46	32.9	57	40.7	9	6.4		
Strategic planning measures at Wilson Airport involve community outreach whereby people from the community responding to a fire emergency know what to do and how to do it.	16	11.4	51	36.4	10	7.1	49	35.0	14	10.0

On the issue of strategic planning measures for fire emergencies at Wilson Airport incorporate a

disaster management system, 12.7 % of the respondents strongly agreed, 40.7 agreed, 41.4 % were undecided while 5 % disagreed. This aligns with a study by Kapoor (2009) which stated that, whenever a fire breaks out, there has to be some activities set out that aim to meet the needs of the fire victims, rehabilitate them and restore any structures that have been damaged or destroyed. Specifically, Kapoor (2009) indicates that restoration involves short-term and long-term measures that are critical in returning systems to their best operational standards. Therefore, the application of disaster management systems should be systematic since haphazard response can be problematic in the event of a fire outbreak.

Further, 15 % and 45 % of the respondents strongly agreed and agreed respectively that strategic planning measures at Wilson Airport involve a set of activities put in motion that aim to satisfy the immediate needs of the victims, their rehabilitation and the reconstruction of any infrastructure that may have been damaged or destroyed. Another 30 % were undecided while 10 % disagreed. These results agree with research by Gratwa & Brolin (2002) which found that in strategic planning for fire emergencies, there has to be incorporated a response phase, rehabilitation phase as well as a reconstruction. In the response phase, steps are taken to assist and provide some essential services or goods to the victims of a fire tragedy (Garatwa & Brolin, 2002). Examples of these essential services and goods include medical care, shelter, food, repairs, evacuation and communication (Garatwa & Bollin, 2002). In the rehabilitation stage actions are taken to return everything to normality including restoration of the victims to their normal psychological and emotional state (Garatwa and Bollin, 2002). In the reconstruction phase operations, people and facilities are returned to their normality but within new priorities meant to meet its emerging environmental needs (Garatwa & Bollin, 2002).

The quantitative results were echoed by responses from the interviews with the key informants where a male trained fire fighter aged 48 years was captured saying;

> *"…the staff are informed and trained on how to handle the situation in case of fire emergencies."* (Key Informant 1)

This response from the qualitative data aligns with findings in a study by Kanyi, Kamau and Mireri (2016) undertaken in examination of appropriateness of infrastructure in the mitigation of aviation risks at Wilson Airport. It was confirmed that although there was need for improvement in terms of capacity to guarantee safety and security, Wilson Airport had the essential amenities for handling an emergency (Kanyi et. al, 2016).

With regard to the statement that strategic planning measures at Wilson Airport incorporate policies and objectives to guide the recovery, which have been put in place for some time, tested and proved beyond doubt, 17.9 % strongly agreed, 20 % agreed, 32.1 % were undecided while 30 % disagreed. This concurs with research by FEMA (2006) which established that the restoration of airport to normal operations following a fire emergency should entail institution of policies and objectives that are tested over time to guarantee their success (FEMA, 2006).

The quantitative results were mirrored in the qualitative responses from the Focus Group Discussions where a female safety manager aged 37 years and university degree holder, stated that;

> *"…there is awareness of exits points which are clearly marked out and a safe assembly point for people."* (Participant 7, FGD 2)

This does not agree with findings in a study by Kanyi et. al (2016) on how appropriate and adequate the infrastructure are in mitigating risks at Wilson Airport. The study recommended

improved infrastructural set up and employees with knowledge on their areas of work (Kanyi et. al, 2016).

Likewise, 34.3 % and 16.4 % of the respondents strongly agreed and agreed respectively that strategic planning measures for fire emergencies at Wilson Airport also involve coordination as an essential ingredient in a disaster preparedness plan. Another 37.9 % were undecided, 6.4 % disagreed while 5 % strongly disagreed. This is in line with a study by Salvano (2002) who attested to the fact that coordination must be must coordinated across all departments so that all the airport staff should are active in case a fire emergency occurs. Additionally, the airport staff should be on call 24 hours a day so that there can be no delays in response to a fire outbreak within the airport premises (Salvano, 2002).

Strategic planning measures at Wilson Airport involve community outreach whereby people from the community responding to a fire emergency know what to do and how to do it is a statement to which 20 % strongly agreed, 32.9 % strongly agreed, 40.7 % were undecided while only 6.4 % disagreed. Likewise, 11.4 % and 36.4 % of the respondents strongly agreed and agreed respectively that Strategic planning measures at Wilson Airport involve community outreach whereby people from the community responding to a fire emergency know what to do and how to do it. Another 7.1 % were undecided, 35 % disagreed while 10 % strongly disagreed. The findings align with research by ISDR (2003) that found strategic planning for fire emergencies involves community outreach. Specifically, it must involve people from the community in which the airport operates in to know what to do and how to do it, which is otherwise known as empowerment of a community to handle fire emergencies (ISDR, 2003). Such people could be the residents within the estates neighboring the airport facility.

4.4.4 Strategic Planning Measures Lacking at Wilson Airport

Respondents were asked to indicate which strategic planning measures for fire emergencies were lacking at Wilson Airport. Table 4.9 illustrates the distribution of findings.

Table 4.9: *Strategic Planning Measures Lacking at Wilson Airport*

Measures	**Frequency (n)**	**Percentage (%)**
Timely decision making	23	16.4
Better warnings	47	33.6
Relief phase	16	11.4
Airport Rescue and Fire Fighting (ARFF) coverage	17	12.1
Provision for safety equipment	30	21.4
Total	**140**	**100**

According to Table 4.9, 33.6 % of the respondents stated that better warnings as a strategic planning measure were lacking while 21.4 % stated provision of safety equipment. 16.4 % indicated timely decision making, 12.1 % noted Airport Rescue and Fire Fighting (ARFF) coverage while 11.4 % indicated the relief phase of rescue missions as strategic planning measures that were lacking at the facility. It concurs with a study by Braithwaite (2001) in Australia in which it was established that coverage at airports was not effective since there was a reduction in Airport Rescue and Fire Fighting (ARFF). Essentially, regardless of the airport size, location or any other unique features it may possess, it is important as a safety handling strategy for fire emergencies to ensure there is adequate ARFF coverage. The findings also agree with research in Kenya at Jomo Kenyatta International Airport by Obwaya (2010) where it was discovered that infrastructure was inadequate. Specifically, personnel who were trained were few

and evacuation routes were also minimal (Obwaya, 2010). In the study, Obwaya (2010) further notes that there was lack of proper mechanisms that integrate various stakeholders to handle emergencies at the airport. In the end, it was recommended a disaster management system be implemented through adequate provision of exit routes, public address systems which would be reliable in the event of a disaster (Obwaya, 2010).

4.5 Adequacy of Strategic Planning for Fire Emergencies in Airports

In establishing the role played by strategic planning for fire emergencies, there is need to address their effectiveness. It is for this reason that the study examined the adequacy of strategic planning for fire emergencies in Wilson Airport Nairobi.

4.5.1 Adequacy of Strategic Planning for Fire Emergencies at Wilson Airport

The study sought to establish how adequate strategic planning is for fire emergencies at Wilson Airport. Respondents stated whether they agreed, strongly agreed, were undecided, disagreed or strongly disagreed with various statements regarding the adequacy of strategic planning for fire emergencies in Wilson Airport. The distribution of responses is illustrated in Table 4.10.

Table 4.10: *Adequacy of Strategic Planning for Fire Emergencies at Wilson Airport*

Statement	**Strongly Agree**		**Agree**		**Undecided**		**Disagree**		**Strongly Disagree**	
	F	**(%)**	**F**	**(%)**	**F**	**(%)**	**F**	**(%)**	**F**	**(%)**
In strategic planning for fire emergencies at Wilson Airport, measures are taken to provide a broad picture of what must be achieved and in which order, including how to organize a system capable of achieving the overall goals in a fire emergency.	21	15.0	75	53.6	37	26.4	7	5.0		
When a fire emergency ensues at Wilson Airport, communication between airlines, airports, Government agencies, and other aviation stakeholders is very poor due to strategic planning.			34	24.3	36	25.7	66	47.1	4	2.9
Strategic planning for fire emergencies at Wilson Airport involves strict compliance with local fire regulations**.**	29	20.7	37	26.4	44	31.4	30	21.4		
In the strategic planning process for fire emergencies at Wilson Airport, accessibility in terms of infrastructure plays a key role.	27	19.3	77	55.0	13	9.3	23	16.4		
In strategic planning for fire emergencies at Wilson Airport, managers have to build-in the perspectives and needs of those stakeholders with whom they must co-operate and collaborate in in the event of a fire disaster.	41	29.3	79	56.4	18	12.9	2	1.4		
In strategic planning for fire emergencies at Wilson Airport, evacuation remains a critical solution to addressing fire emergencies.	29	20.7	73	52.1	27	19.3	4	2.9	7	5.0
Strategic planning for fire emergencies at Wilson Airport entails compartmentation within airports whereby high risk areas, such as tenant accommodation, storage or kitchen areas are separated from the main functional areas of the airport	36	25.7	40	28.6	27	19.3	37	26.4		
In strategic planning for fire emergencies at Wilson Airport, all the staff handling agents, tenants, control authorities, business partners, contractors and any other organizations' who visit or work in there or associated buildings, are made fully aware of the requirements and procedures of operation in case of a fire emergency.	33	23.6	31	22.1	41	29.3	35	25.0		

Findings from the study on the statement that in strategic planning for fire emergencies at Wilson Airport, measures are taken to provide a broad picture of what must be achieved and in which

order, including how to organize a system capable of achieving the overall goals in a fire emergency show that 15 % and 53.6 % agreed respectively, 26.4 % were undecided while 5 % disagreed. This aligns with findings from a study by Amboka (2015) which established that there is a guidance document that provides direction on who is to be involved in the event of a fire disaster as well as the logistics, medical care and security required.

These findings were also observed from the interview data that associated strategic planning with fire safety handling at Wilson Airport. Responses from a male trained fire fighter, aged 42 years indicated that.

> *"…There is basic knowledge on how to use and handle the different types of fire-fighting equipment which are the different types of the pressured carbon dioxide cylinders, the water pipes, the carbon dioxide snow balls, the carbon dioxide blankets, the water hydrants among others."* (Key Informant 2)

The findings from the qualitative response concur with findings in a study by Kiptoo (2010) on aerodrome emergency preparedness in Kisumu Airport. The study confirmed that personnel at the airport personnel had adequate training in rescue activities and fire containment is concerned (Kiptoo, 2010). Specifically, the firefighting and rescue support services had training in first aid, search and rescue as well as procedures for evacuation in land and water (Kiptoo, 2010).

Likewise 24.3 % agreed that when a fire emergency ensues at Wilson Airport, communication between airlines, airports, Government agencies, and other aviation stakeholders is very poor due to strategic planning while 25.7 % were undecided, 47.1 % disagreed and only 2.9 % strongly disagreed. These results agree with research by Rosenthaal (2008) on Europe's worst airports and found that in Charles de Gaulle Airport outside Paris, there was a traveler who termed the

experience within the airport like being in an Escher print. Terminals are identical and broadly spread out. Signage is poor and more often any assistance you get from airport staff is usually bad advice which is evidence of poor communication (Rosenthal, 2008).

In regard to Strategic planning for fire emergencies at Wilson Airport involves strict compliance with local fire regulations 20.7 % of the respondents strongly agreed while 26.4 % agreed. Another 31.4 % were undecided while 21.4 % disagreed. This does not agree with research by Elbanna, Andrews and Pollanen (2016) which established that strategic planning involves the active participation of managers with support from stakeholders in the implementation process on addressing fire emergencies.

Further, findings on the statement that in the strategic planning process for fire emergencies at Wilson Airport, accessibility in terms of infrastructure plays a key role, 19.3 % of the respondents strongly agreed, 55 % agreed, 9.3 % were undecided while 16.4 % disagreed. This aligns with a study by Ojo (2014) of Murtala Muhammad Airport which concluded that its international wing was not performing at its best despite the fact that it is the business hub for travelers in West Africa. Specifically, poor infrastructural planning as exemplified in the Murtala Muhammad Airport has led losses economically and such poor infrastructure makes the airport vulnerable to fire outbreaks (Ojo, 2014). In his study Ojo (2014), recommends strategic planning that will reduce the hold-ups that are consistent in the airport.

The opinions captured in the quantitative data were also validated by responses captured in the interviews. Respondents in the interviews revealed that they were informed prior to any emergency on how to escape. This was captured from the Focus Group Discussions where a male Security Manager, aged 45 years stated that:

"...there is an awareness of exits points which are clearly marked out and a safe assembly point for people." (Participant 7, FGD 2)

The qualitative data aligns with findings in a study by Kanyi et. al (2016) that assessed how appropriate and adequate the physical infrastructure was in alleviating risks at Wilson Airport. From the study it was confirmed that Wilson Airport may require improvement in its capacity to guarantee safety at the airport but had essential infrastructure to handle emergencies (Kanyi et. al, 2016).

Results on the statement that in strategic planning for fire emergencies at Wilson Airport, managers have to build-in the perspectives and needs of those stakeholders with whom they must co-operate and collaborate in in the event of a fire disaster, 29.3 % strongly agreed and 56.4 % agreed. 12.9 % were undecided while 1.4 % disagreed. This agrees with a study by Elbanna, Andrews and Pollanen (2016) which found that strategic planning involved the active participation of managers with support from stakeholders in the implementation process on addressing fire emergencies.

These results were also supported by findings from the Focus Group Discussions where a female Quality Manager, aged 39 years and a holder of a university degree was captured saying that;

"... there is need for improvement of enterprise resource planning with all stakeholders as well as community outreach" (Participant 3, FGD 1).

The findings in the qualitative data are attested by findings in a study by Mukaria (2013) on awareness and conformity to emergency preparedness standards at Wilson Airport. The study highlights the importance of enterprise resource planning as it found that notes that the main causes for accidents at Wilson Airport are faults that may be human, mechanical or those

associated with nature such as weather (Mukaria, 2013). Such faults are a result of lack of poor planning, lack of human resource training and poor infrastructural set up.

Results on the statement that in strategic planning for fire emergencies at Wilson Airport, evacuation remains a critical solution to addressing fire emergencies, 20.7 % of the respondents strongly agreed and 52.1 % agreed. 19.3 % were undecided while 2.9 % and 5 % disagreed and strongly disagreed respectively. The findings are substantiated in a research by BRE (2019) in which it was stated that airports must have evacuation teams who have a duty to ensure that all the staff in an airport understands their roles and responsibilities during an evacuation. Essentially, in fire emergencies, buildings around the airport have an increased capacity and require coo-operation of all the staff for proper evacuation.

Findings on the statement that strategic planning for fire emergencies at Wilson Airport entails compartmentalization within airports whereby high risk areas, such as tenant accommodation, storage or kitchen areas are separated from the main functional areas of the airport 25.7 % of the respondents strongly agreed, 28.6 % agreed, 19.3 % were undecided while 26.4 % disagreed. This concurs with findings from research by BRE (2019) that had among many recommendations stated that there should be classification of various areas. Examples of areas such as high risk in terms of fire emergencies should be separated from other areas within the airport through compartments that have special fire resistance walls (BRE, 2019).

Likewise, on the statement that in strategic planning for fire emergencies at Wilson Airport, all the staff handling agents, tenants, control authorities, business partners, contractors and any other organizations' who visit or work in there or associated buildings, are made fully aware of the requirements and procedures of operation in case of a fire emergency, 23.6 % and 22.1 % of the

respondents strongly agreed and agreed respectively. 29.3 % were undecided while 25 % disagreed. These findings agree with a study by Bryson, Crosby and Bryson (2009) which indicated that in an airport for instance, strategic planning involves consultation and collaboration with the various stakeholders involved to come up with a fire response mechanism that is ideal for airports.

The quantitative results were reflected in the qualitative responses from the interviews where a male trained fire fighter aged 48 years stated;

> *"…the staff are informed and trained on how to handle the situation in case of fire emergencies."* (Key Informant 1)

The findings in the qualitative data align with study findings by Kiptoo (2010) in Kisumu Airport, Kenya. The study established the personnel at the airport had adequate training in initiating rescue activities and fire containment is concerned (Kiptoo, 2010).

4.5.2 Effectiveness of Strategic Planning for Fire Emergencies at Wilson Airport

Respondents were asked to rate the effectiveness of strategic planning for fire emergencies at Wilson Airport. Table 4.11 presents the distribution of responses.

Table 4.11*: Effectiveness of Strategic Planning for Fire Emergencies*

Strategic Planning Ratings	Frequency (n)	Percentage (%)
Excellent	2	1.4
Good	19	13.6
Average	119	85
Poor	-	-
Total	**140**	**100**

According to Table 4.7, majority (85%) of the respondents rate the effectiveness of strategic planning at Wilson Airport to be average. Another 13.6 % indicated it was good while only 1.4 % stated that it was excellent. This does not agree with research by Kanyi, Kamau and Mireri (2016) in which it was established that although Wilson Airport may have the required infrastructure and facilities, there is need to improve on the fire handling strategies to guarantee that the airport is free from fire disasters (Kanyi et. al, 2016).

The opinions captured in the quantitative results are evident in the qualitative survey from the Focus Group Discussions since participants noted that the current state of strategic planning was effective although there is need for improvement as was captured when a male high school graduate and a flight operations staff aged 28 years indicated:

> *"...strategic planning is at 80% on the equipment though more need to be done with the trainings and the drills."* (Participant 5, FGD 1)

The qualitative data agrees with findings by Ojo (2014) concerning perceptions and quality of services at Murtala Muhammed International Airport (MMIA) in Lagos, Nigeria. In the research, while rating the Murtala Muhammad Airport, it was concluded that its international wing was

not operating at its best notwithstanding its significance as the business hub for travelers in West Africa (Ojo, 2014).

4.5.3 Greatest Influence on Strategic Planning for Fire Emergencies at Wilson Airport

The study sought to find out what has the greatest effect on strategic planning for fire emergencies at Wilson Airport. Table 4.12 illustrates the findings.

Table 4.12: *Greatest Influence on Strategic Planning for Fire Emergencies*

Influence	**Frequency (n)**	**Percentage (%)**
Policies	53	37.9
Communication	21	15.0
Collaboration	46	32.9
Safety and environmental standards	20	14.3
Total	**140**	**100**

From Table 4.8, 32.9 % stated that collaboration had the greatest influence on strategic planning for fire emergencies at Wilson Airport while 37.9 % of the respondents indicated that policies had the greatest influence. 15 % stated the greatest challenge to be communication while 14.3 % indicated safety and environmental standards. The findings concur with research by Bryson, Crosby and Bryson (2009) in which it was revealed that in an airport, strategic planning involves consultation and collaboration with the various stakeholders involved to come up with a fire response mechanism that is ideal for airports. The findings also align with research by Carrilo that found that policies and procedures that address the causes of fire disasters as well as mitigating its effect are very important. Carrilo (2010) further indicates that these policies and

procedures should continuously be re-evaluated to improve on response plans during fire emergencies.

4.6 Human Resource Training for Fire Emergencies in Airports

The form of human resource training that takes place in an organization is critical for handling fir emergencies. In this study therefore, there was an aim to assess the form of human resource training that informs the fire emergencies in Wilson Airport Nairobi.

4.6.1 Human Resource Training for Fire Emergencies at Wilson Airport

The study sought to establish the human resource training for fire emergencies that has been adopted at Wilson Airport. Respondents indicated whether they agreed, strongly agreed, were undecided, disagreed or strongly disagreed with various statements regarding human resource training for fire emergencies at Wilson Airport. Table 4.13 highlights the findings.

Table 4.13: *Human Resource Training for Fire Emergencies Adopted at Wilson Airport*

Statement	**Strongly Agree**		**Agree**		**Undecided**		**Disagree**		**Strongly Disagree**	
	F	**(%)**	**F**	**(%)**	**F**	**(%)**	**F**	**(%)**	**F**	**(%)**
Human resource training for fire emergencies at Wilson Airport entails staff participating in fire drill constantly to gain skills and to understand	11	7.9	106	75.7	2	1.4	14	10.0	7	5.0
In Wilson Airport, human resource training for fire emergencies involves education campaigns, training of response teams and rehearsals of emergency response scenarios.	16	11.4	74	52.9	20	14.3	30	21.4		
In Wilson Airport, human resource training for fire emergencies incorporates a disaster preparedness plan that is developed and completed for all staff to rehearse its major elements.	6	4.3	69	49.3	30	21.4	35	25.0		
In Wilson Airport, there are firefighting staffs that are properly trained to perform their duties in an efficient manner and participate in live fire drills commensurate with the types of aircraft and type of firefighting equipment	9	6.4	78	55.7	46	32.9			7	5.0
In Wilson Airport, there are inadequate refresher trainings on simple first aid administration as part of human resource training for fire emergencies**.**	7	5.0	44	31.4	29	20.7	60	42.9		
As part of human resource training for fire emergencies at Wilson Airport, there is guidance on either training frequency or competency standards of staff.	8	5.7	71	50.7	45	32.1	16	11.4		

Findings from the study on the issue of human resource training for fire emergencies at Wilson Airport entails staff participating in fire drill constantly to gain skills and to understand show that 7.9 % of the respondents strongly agreed and 75.7 % agreed. 1.4 % were undecided while only 10 % disagreed and 5 % strongly disagreed. Likewise, on the statement that in Wilson Airport, human resource training for fire emergencies involves education campaigns, training of response teams and rehearsals of emergency response scenarios, 11.4 % of the respondents strongly agreed while 52.9 % agreed. 14.3 % were undecided and 21.4 % disagreed. This is in line with a study by Ayonga (2016) which revealed that airport staff should be consistently drilled on how to handle fire emergencies specifically what to expect in order to understand the dynamics and how its disastrous effects can be countered. For this reason, training of airport personnel on precautions and measures to prevent or deal with fire emergencies is very important.

This was supported by responses from the interviews as a male trained fire fighter aged 48 years stated:

> *"…there are irregular drills on fire emergencies."* (Key Informant 1)

These findings in the qualitative data align with research by Obwaya (2010) on preparedness for disaster at JKIA, Nairobi. Specifically, the study highlighted how current fire handling practices are irregular since it was established that JKIA lacked adequate fire and emergency escape routes as well as a few staff trained in firefighting thus creating the need for more fire drills to be conducted (Obwaya, 2010).

In regard to the statement that In Wilson Airport, human resource training for fire emergencies incorporates a disaster preparedness plan that is developed and completed for all staff to rehearse its major elements, 4.3 % of the respondents strongly agreed while 49.3 % agreed. 21.4 % were

undecided while 25 % disagreed. In similar trend, 6.4 % and 55.7 % of the respondents strongly agreed and agreed respectively that in Wilson Airport, there are firefighting staffs that are properly trained to perform their duties in an efficient manner and participate in live fire drills commensurate with the types of aircraft and type of firefighting equipment. Another 32.9 % were undecided while 5 % strongly disagreed. This corroborates with finding in a study by Amboka (2015) in which it was discovered that the aim of training of human resources is to have staff who are alert and well prepared to work with other stakeholders in ensuring the airport is safe from the disastrous effects associated with fire emergencies. Once a disaster preparedness plan is complete, it is important for the workforce to practice what it entails (Amboka, 2015). In Wilson Airport, there are inadequate refresher trainings on simple first aid administration as part of human resource training for fire emergencies is a statement to which 5 % of the respondents strongly agreed while 31.4 % agreed. 20.7 % were undecided while 42.9 % strongly disagreed. This does not concur with findings in a study by Kiptoo (2010) in Kisumu Airport Kenya where it was established that there is inadequate human resource training since staff are only trained on first aid and no refresher courses are conducted. Kiptoo (2010) attests to the fact that personnel at Kisumu Airport had adequate training on first aid, search and rescue as well as evacuation procedures in land as well as water. Interestingly, the study further revealed that staff turnover rates were high due to frequent transferring of workers, their retirement and departures hence the need to conduct repetitive trainings (Kiptoo, 2010).

In regard to the statement that as part of human resource training for fire emergencies at Wilson Airport, there is guidance on either training frequency or competency standards of staff, results show that 5.7 % of the respondents strongly agreed, 50.7 % agreed, 32.1 % were undecided while 11.4 % disagreed. The results concur with findings in research by Air services (2012) in

Australia where it was established that human resource training undertaken at Sydney Airport in November 2012 involved a group of 19 trainee fire fighters put through a sequence of situations to improve and refine their skills in the professional group of aviation firefighting and rescue processes. The group used hands-on training aids accessible at Air services Sydney fire station as well as a model of an airplane fuselage and smoke house. The training would contain the making of huge quantities of fire and smoke as the trainees polish up their firefighting skills (Air services, 2012).

Findings from the quantitative data are also substantiated from the interview responses where a a male trained fire fighter, aged 42 years indicated that:

> *"Once in a while the craft supplier and the different air fuel suppliers invite expatriates to offer intense training to the members of the safety departments."* (Key Informant 2)

4.6.2 Human Resource Training Aspects that Staff at Wilson Airport Lack

The participants in this research stated some of the areas of fire prevention and containment that were lacking among the staff at Wilson Airport. Table 4.14 illustrates the distribution of findings.

Table 4.14: *Human Resource Training Aspects that Staff at Wilson Airport Lack*

Lacking Areas	**Frequency (n)**	**Percentage (%)**
Evacuation procedures	26	18.6
Identifying fire hazards in the workplace	57	40.7
Fire safety legislation	18	12.9
Means of raising alarm	13	9.3
Usage of fire extinguishers	4	2.9
Total	**140**	**100**

Results from Table 4.14 show that 40.7% of the respondents indicated that human resources lacked training on identifying fire hazards in the workplace, 18.6 % stated evacuation procedures, 12.9 % fire safety legislation while 9.3 % indicated means of raising alarm. Only 2.9 % stated that the usage of fire extinguishers was what the human resource training at Wilson Airport lacked. It agrees with a study by Kanyi, Kamau and Mireri (2016) which established that although Wilson Airport may have the required infrastructure and facilities, there is need to improve on the fire handling strategies to guarantee that the airport is free from fire disasters (Kanyi et. al, 2016). The study recommended improved infrastructural set up and employees with knowledge on their areas of work (Kanyi et. al, 2016). Among the three factors that affect fire safety at Wilson Airport that clearly emerges from this study is the need for human resource training to handle fire emergencies.

4.6.3 Stakeholder Involvement in Human Resource Training

It was the aim of this research to examine among the Airports' various stakeholders, who specifically was not involved in human resource training. Table 4.15 presents the findings.

Table 4.15: *Stakeholder Involvement in Human Resource Training*

Stakeholder	**Frequency (n)**	**Percentage (%)**
Airport Management	9	6.4
Local Community	107	76.4
Aircraft Staff	17.1	24
Total	**140**	**100**

As shown in Table 4.15, majority (76.4 %) indicated that the local community was not involved in human resource training. 24 % indicated the aircraft staff was not involved while 6.4 % stated

that the airport management was not involved. This does not concur with findings in a study by Menya (2016) which stated that as part of human resource training, specialist services are essential in terms of human resources capacity in particular. Menya (2016) points out that a fire engineer who can be responsible for coordinating the fire response plans along with the fire response teams can form part of the safety strategies for handling fire emergencies in airports (Menya, 2016). The findings also agree with research by Kanyi, Kamau and Mireri (2016) which established that although Wilson Airport may have the required infrastructure and facilities, there is need to improve on the fire handling strategies to guarantee that the airport is free from fire disasters (Kanyi et. al, 2016). The study recommended improved infrastructural set up and employees with knowledge on their areas of work (Kanyi et. al, 2016). Among the three factors that affect fire safety at Wilson Airport that clearly emerge from this study is the need for human resource training for staff to handle fire emergencies.

The findings exemplify the fact that some departments are not involved in trainings and as observed here are also supported by qualitative data as expressed by a a male trained fire fighter, aged 42 years in the interview who stated that:

> *"Once in a while the craft supplier and the different air fuel suppliers invite expatriates to offer intense training to the members of the safety departments."* (Key Informant 2)

The qualitative response agrees with study findings in research by Amboka (2015) on the issues that affect disaster preparedness in Moi International Airport, Mombasa, Kenya. In the study, the importance of intense training offered was highlighted (Amboka, 2015). Specifically, the study established that the aim of awareness and education was to promote an alert and reliable labor force that is capable of supporting and co-operating with other stakeholders in fire emergency rescue activities (Amboka, 2015).

4.7 Capacity of Infrastructural Set-up for Fire Emergencies in Airports

The type of infrastructure available is critical in handling fire emergencies. This study hence sought to appraise the capacity of the infrastructural set up in addressing fire emergencies at Wilson Airport Nairobi.

4.7.1 Importance of Various Infrastructural Set-up Aspects in Handling Fire Emergencies

In this study, the importance of various aspects of the infrastructural set-up at Wilson Airport in handling fire emergencies was assessed. Participants rated the importance of three factors: firefighting equipment, communication and radar equipment and fire departments on a Likert scale. Table 4.16 illustrates the findings as per the Likert scale ratings from 1 (least important) to 7 (most important).

Table 4.16: *Importance of Various Factors in Addressing Culture*

	1		2		3		4		5		6		7	
Variable	**(F)**	**(%)**	**(F)**	**(%)**	**(F)**	**(%)**	**(F)**	**(%)**	**(F)**	**(%)**	**(F)**	**(%)**	**(F)**	**(%)**
Firefighting Equipment					2	1.4	2	1.4	44	31.4	33	23.6	59	42.1
Communication and Radar Equipment							4	2.9	34	24.3	63	45.0	39	27.9
Fire Departments							7	5.0	60	42.9	33	23.6	40	28.6

Table 4.16 shows that many (42.1%) of the respondents rated firefighting equipment to be every important. Similarly, communication and radar equipment was also indicated to be important by many (45.0 %) of the respondents. Another 42.1 % of the participants in this study, rated fire departments as averagely important while none (0%) rated any of the infrastructural set-up aspects as least important. The findings align with findings in a study by in Kenya at Jomo Kenyatta International Airport by Obwaya (2010) in which it was discovered that infrastructure

was inadequate. Specifically, personnel who were trained were few and evacuation routes were also minimal (Obwaya, 2010). In the study, Obwaya (2010) further notes that there was lack of proper mechanisms that integrate various stakeholders to handle emergencies at the airport. In the end, it was recommended a disaster management system be implemented through adequate provision of exit routes, public address systems which would be reliable in the event of a disaster (Obwaya, 2010).

The findings were echoed in the qualitative survey where one female flight crew aged 29 years and a college graduate while in the Focus Group Discussions noted that:

> *"……. strategic planning is at 80% on the equipment though more need to be done with the trainings and the drills."* (Participant 5, FGD 1)

These qualitative findings have been supported by a study by Kanyi et. al (2016) conducted a study on how appropriateness and adequate existing infrastructure at Wilson Airport is in mitigation of risks. The study found that Wilson Airport may have the infrastructure and amenities in place for fire disasters but requires to improve its capacity to handle the fire emergencies (Kanyi et. al, 2016).

4.7.2 Capacity of Infrastructural Set-up for Fire Emergencies at Wilson Airport

The study sought to assess the capacity of infrastructural set up in addressing fire emergencies in Wilson Airport Nairobi. Respondents indicated whether they agreed, strongly agreed, were undecided, disagreed or strongly disagreed with various statements regarding capacity of infrastructural set up in addressing fire emergencies in Wilson Airport Nairobi.

Table 4.17: *Capacity of Infrastructural Set-up for Fire Emergencies at Wilson Airport*

Statement	**Strongly Agree**		**Agree**		**Undecided**		**Disagree**		**Strongly Disagree**	
	F	**(%)**	**F**	**(%)**	**F**	**(%)**	**F**	**(%)**	**F**	**(%)**
In Wilson Airport, there are departments and agencies that will have a role in a disaster's four phases of emergency management	25	17.9	43	30.7	65	46.4	7	5.0		
In Wilson Airport, the infrastructural set up for fire emergencies incorporates the development of airfields and airports in Kenya that is level and free of artificial obstructions in the vicinity.	2	1.4	43	30.7	23	16.4	72	51.4		
In Wilson Airport, infrastructural set up for fire emergencies involves funding of firefighting equipment as well as communications and radar equipment.	31	22.1	51	36.4	44	31.4	7	5.0	7	5.0
Wilson Airport has complex structures to support aviation activities, services, and other needs such as firefighting agencies as part of its infrastructural set up for fire emergencies.	10	7.1	61	43.6	46	32.9	23	16.4		
As part of the infrastructural set up for fire emergencies at Wilson Airport, there are visual interruptions that can cause a common standard 'EXIT' or 'Running Man' sign that can be easily spotted among the visual mess.	20	14.3	62	44.3	30	21.4	28	20.0		
In Wilson Airport, the infrastructural set up for fire emergencies faces challenges from unreliable handling equipment due to poor maintenance or obsolescence.			46	32.9	32	22.9	60	42.9	2	1.4

17.9 % of the respondents strongly agreed that in Wilson Airport, there are departments and agencies that will have a role in a disaster's four phases of emergency management. Another 30.7 % agreed while 46.4 % were undecided. 5 % of the respondents disagreed. This concurs with research by McEntire and Dawson (2007), in which it was established that a proper infrastructure provides an environment where all the members of staff have responsibilities across all the disaster management phases in a fire emergency. The study by McEntire and Dawson (2007) concludes that infrastructural set-up at the airports should incorporate organizations from the public, NGOs and private sectors.

Findings from the quantitative data on the existence of special departments to deal with emergencies were also substantiated from the interview responses where a male trained fire fighter, aged 42 years indicated that:

> *"Once in a while the craft supplier and the different air fuel suppliers invite expatriates to offer intense training to the members of the safety departments."* (Key Informant 2)

These qualitative responses concur with findings in a study by Menya (2016) on fire disaster mitigation and preparedness in Nairobi. The study by Menya (2016) mentions specialist services as essential in terms of human resources capacity in particular a fire engineer who can corporate alongside management teams and utilize existing systems to in implementation of fire safety handling strategies for airports.

Further, in regard to the statement that in Wilson Airport, the infrastructural set up for fire emergencies incorporates the development of airfields and airports in Kenya that is level and free of artificial obstructions in the vicinity, 1.4 % of the respondents strongly agreed while 30.7 % agreed. 16.4 % were undecided while 51.4 % disagreed. This is not in line with research in

Kenya by Oladele (2005) which states that regulations demand airports to be developed on flat terrains that are free from any form of obstruction.

22.1 % of the respondents strongly agreed that in Wilson Airport, infrastructural set up for fire emergencies involves funding of firefighting equipment as well as communications and radar equipment. Another 36.4 % agreed while 31.4 % were undecided. However 5 % disagreed and another 5 % strongly disagreed. This agrees with research by Chinedu (2018) in Nigeria addressing the Airport infrastructure deficit. In the research, findings showed there was inadequate funding for equipment that includes navigation aids, lighting for the airfields as well as communication equipment. Additionally, meteorological equipment was inadequate which are vital for reporting on weather conditions for safer flights (Chinedu, 2018). Essentially, to counter disasters within airports as Chinedu (2018) attests requires proper funding.

Further, 7.1% of the respondents strongly agreed that Wilson Airport has complex structures to support aviation activities, services, and other needs such as firefighting agencies as part of its infrastructural set up for fire emergencies. 43.6 % agreed while 32.9 % were undecided while 16.4 % disagreed. These findings do not align with research by Kanyi et. al (2016) who in their study revealed institutional weakness and inadequate management whenever disasters occur at Wilson Airport. This was evident through the dilapidated fire engines as attested by findings in the study that only a single fire engine was operational (Kanyi et. al, 2016). As an indicator of inefficiency in firefighting at Wilson Airport, the study also noted how fire fighters used buckets to put off fire after the fire engines had failed (Kanyi et. al, 2016). Conclusively, Wilson airport does not have the required infrastructure as well as human resource capacity to handle a fire emergency should one occur.

14.3 % and 44.3 % of the respondents strongly agreed and agreed respectively that as part of the infrastructural set up for fire emergencies at Wilson Airport, there are visual interruptions that can cause a common standard 'EXIT' or 'Running Man' sign that can be easily spotted among the visual mess while. 21.4 % were undecided and 20 % disagreed. Concurs with research by Sidik and Ahmad (2008), where it was found that the development of the cutting edge air terminal has entangled the issue of traveler evacuation during crisis occasions. Specifically, when strolling down a concourse in a cutting edge air terminal, travelers will pass booths, retail signage, customer-facing facades, and other visual interruptions that can cause a common standard 'EXIT' or 'Running Man' sign to be hard to discover among the visual mess.

The quantitative data results were reflected in the qualitative survey where male craft engineer, aged 31 years and a college graduate while in the Focus Group Discussions was captured indicating that:

> *"....there is an awareness of exits points which are clearly marked out and a safe assembly point for people."* (Participant 7, FGD 2)

The qualitative responses agree with research by Rosenthal on congestion and other terminal illnesses in airports across Europe. The importance of signage and exit ways is indicated with specific reference to Charles de Gaulle Airport in France in which it is noted that terminals are identical and broadly spread out. Signage is poor and more often any assistance you get from airport staff is usually bad advice. The research refers to one passenger Nada Kranjc of Ptuj, Slovenia who noted how difficult it was to find things in the airport if you do not know it (Rosenthal, 2008)

On the statement regarding In Wilson Airport, the infrastructural set up for fire emergencies faces challenges from unreliable handling equipment due to poor maintenance or obsolescence, 32.9 % agreed, 22.9 % were undecided, 42.9 % disagreed while 1.4 % strongly disagreed. The results corroborate with findings in research by Kanyi et. al (2016) that revealed institutional weakness and inadequate management whenever disasters occur at Wilson Airport. This was evident through the dilapidated fire engines as attested by findings in the study that only a single fire engine was operational (Kanyi et. al, 2016). As an indicator of inefficiency in firefighting at Wilson Airport, the study also noted how fire fighters used buckets to put off fire after the fire engines had failed (Kanyi et. al, 2016). Conclusively, Wilson airport does not have the required infrastructure as well as human resource capacity to handle a fire emergency should one occur.

4.7.3 Challenges Affecting Infrastructural Set-up in Wilson Airport

In this study, the greatest challenges to the capacity of infrastructural set-up for fire emergencies in Wilson Airport were examined. Table 4.18 indicates the findings.

Table 4.18: *Challenges Affecting Infrastructural Set-up in Wilson Airport*

Challenges	**Frequency (n)**	**Percentage (%)**
Poor interactions between managers and disaster management committees	87	62.1
Lack of a common communication infrastructure	43	30.7
Poor security and operational facilities	10	7.1
Total	**140**	**100**

Results from Table 4.18 highlight that 62.1 % of the participants stated poor interactions between managers and disaster management committees was the greatest challenge to the infrastructural

set-up at Wilson Airport while 30.7 % indicated lack of a common communication infrastructure. 7.1 % said poor security and operational facilities were the greatest challenge. The results concur with research by McEntire and Dawson (2007) which established communication to be central in handling disasters. McEntire and Dawson (2007) identified three most important communication aspects. First is that pre-disaster ties which are vital in the communication procedure during a disaster. Second, is that coordinating entities or stakeholders must establish a common platform to communicate that requires proper and adequate infrastructure (McEntire and Dawson, 2007). Without proper technological infrastructure, communication would be affected and fire rescue operations rendered unsuccessful. Finally, is that the stakeholders should have the goodwill to coordinate which would otherwise hinder the success of their pre-disaster ties (McEntire and Dawson, 2007).

This observation was also captured in the Focus Group Discussions where a male Operations Manager aged 46 years was captured saying:

> *"... there is need for improvement of enterprise resource planning with all stakeholders as well as community outreach"* (Participant 3, FGD 1).

The qualitative data aligns with findings in a study by Omondi and Kimutai (2018) on the engagement of stakeholders and project implementation at JKIA, Nairobi, Kenya. The study notes the importance of various stakeholders by stating that there have been misunderstandings between participants and players key to implementing projects at JKIA which makes planning a challenge (Omondi and Kimutai, 2018).

4.8 Challenges Facing Airports in Response to Fire Emergencies

Strategies put in place to handle fire emergencies must be assessed holistically including the challenges encountered in utilizing them for fire response. It was therefore the intention of this

research to examine challenges facing Wilson Airport in its appropriate response to fire emergencies.

4.8.1 Challenges Associated with Fire Response in Wilson Airport

The study sought to find out what can greatly reduce the challenges associated with fire response emergencies at Wilson Airport. Table 4.19 illustrates the findings.

Table 4.19: *Challenges Associated with Fire Response at Wilson Airport*

Challenges	**Frequency (n)**	**Percentage (%)**
Improving on resource allocation to handle fire emergencies	37	26.4
Improving the infrastructural set up	29	20.7
Improving safety and environmental standards	27	19.3
Improving on collaboration between airport departments	33	23.6
Total	**140**	**100**

Results from Table 4.19 indicate that 26.4 % of the participants said improving on resource allocation to handle fire emergencies can greatly reduce the challenges associated with fire emergencies while 23.6 % indicated improving on collaboration between airport departments. 20.7 % said improving the infrastructural set up while 19.3 % stated improving safety and environmental standards. These findings concur with research by Njuguna (2013) on airports in Africa. Among the challenges highlighted include: low safety and environmental standards; worn-out aircraft fleet; authorities who are not self-sufficient; inadequate infrastructure and inadequate training of staff; lack of collaboration between airline carriers and open skies agreements

4.8.2 Challenges Facing Wilson Airport in Response to Fire Emergencies

The study sought to identify the challenges facing Wilson Airport in its appropriate response to fire emergencies. Respondents indicated whether they agreed, strongly agreed, were undecided, disagreed or strongly disagreed with various statements regarding the challenges facing Wilson Airport in its appropriate response to fire emergencies.

Table 4.20:

Challenges Associated with Fire Response at Wilson Airport

Statement	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	F	(%)	F	(%)	F	(%)	F	(%)	F	(%)
A major challenge facing Wilson Airport during fire emergencies is communication, collaboration and coordination of activities.	42	30.0	80	57.1	11	7.9	7	5.0		
In Wilson Airport, when a fire outbreak ensues, communication between the various departments, organizations, Government agencies, and other aviation stakeholders is very poor.	2	1.4	13	9.3	50	35.7	68	48.6	7	5.0
Wilson Airport does not meet safety regulations as stipulated by ICAO (International Civil Aviation Organization) standards and recommended practices.	2	1.4	29	20.7	34	24.3	73	52.1	2	1.4
Wilson Airport faces the challenge of inadequate rescue capacities in the event of emergencies such as fire disasters.	14	10.0	40	28.6	4	2.9	80	57.1	2	1.4
The number of passengers travelling in and out of Wilson Airport is big thus posing a great challenge since the cost to victims and survivors and their families cannot be estimated in the event of a fire outbreak.	13	9.3	98	70.0			22	15.7	7	5.0
Misunderstandings between participants and players key to implementing projects at Wilson Airport makes planning a challenge for fire emergencies response.			38	27.1	81	57.9	21	15.0		
In Wilson Airport response to fire emergencies faces a challenge of inefficiency, irregularities and unethical practices in operations.			13	9.3	67	47.9	53	37.9	7	5.0
Lack of training in the firefighting, inspectorate and traffic control departments poses a great challenge to fire emergencies response in Wilson Airport.	21	15.0	51	36.4	38	27.1	30	21.4		

30 % of the respondents strongly agreed that a major challenge facing Wilson Airport during fire emergencies is communication, collaboration and coordination of activities. Another 57.1 % agreed while 7.9 % were undecided while 5 % of the respondents disagreed. Thes agrees with research by Obwaya (2010) in which it was established that airports in Kenya lack capacity as a result of few staff members and equipment hence affecting communication and coordination in emergency cases. The findings further concur with research by Njuguna (2013) in which it was indicated that among the challenges facing airports in Africa towards disaster handling is inadequate infrastructure and inadequate training of staff as well as lack of collaboration between airline carriers (Njuguna, 2013).

Further, in regard to the statement that in Wilson Airport, when a fire outbreak ensues, communication between the various departments, organizations, Government agencies, and other aviation stakeholders is very poor, 1.4 % of the respondents strongly agreed while 9.3 % agreed. 35.7 % were undecided, 48.6 % disagreed while only 5 % strongly disagreed. The results concur with a study by Kanyi et. al (2016) who in their study revealed that although Wilson Airport may have the required infrastructure and facilities, there is need to improve on the fire handling strategies to guarantee that the airport is free from fire disasters (Kanyi et. al, 2016). The study recommended improved infrastructural set up and employees with knowledge on their areas of work. Conclusively, Wilson airport responds to fire disasters but lack the adequate infrastructure to handle a fire emergency should one occur.

1.4 % strongly agreed that Wilson Airport does not meet safety regulations as stipulated by ICAO (International Civil Aviation Organization) standards and recommended practices. Another 20.7 % agreed while 24.3 % were undecided. Only 52.1 % disagreed while 1.4 % strongly disagreed. This aligns with fings in research by UNESCO (2009) where it was indicated

that most airports within Africa do not meet safety regulations as stipulated by ICAO standards (UNESCO, 2009). Specifically, most of these airports have dilapidated airstrips, taxi and parking spaces, passenger terminals, freight terminals and inadequate cargo handling equipment which can pose a great risk to airports as they are ill-equipped to handle emergencies such as fire outbreaks.

Further, 10 % of the respondents strongly agreed that Wilson Airport faces the challenge of inadequate rescue capacities in the event of emergencies such as fire disasters. 28.6 % agreed while 2.9 % were undecided. 57.1 % disagreed while only 1.4 % strongly disagreed. These findings corroborate with a study by Obwaya (2010) in which it was stated that airports in Kenya generally lack capacity to handle emergencies as a result of few staff members and equipment. As a challenge, it places lives, properties, staff and fire response teams at risk should a fire outbreak occur.

These findings were also observed in the qualitative survey data from the Focus Group Discussions where a female operations officer aged 27 years and a university graduate wass captured saying that:

> *"Aspects of continuous training and regular fire emergencies drills are a challenge."*
> (Participant 9, FGD 2)

The qualitative findings concur with a study by Obwaya (2010) disaster preparedness at JKIA in Nairobi, Kenya. The study highlights a report by Kenya Airport Authority (KAA) that indicates there are existing challenges associated with inefficiency, irregularities and unethical practices in operations in Kenyan airports (Obwaya,2010).

9.3 % and 70 % of the respondents strongly agreed and agreed respectively that the number of passengers travelling in and out of Wilson Airport is big thus posing a great challenge since the cost to victims and survivors and their families cannot be estimated in the event of a fire outbreak 15.7 % disagreed and 5 % strongly disagreed. This concurs with findings in a study by Ayres (2009) which established with over 350,000,000 individuals and aircrew operating in airports annually, the damage of a fire emergency can be worse than it was anticipated.

On the statement regarding misunderstandings between participants and players key to implementing projects at Wilson Airport makes planning a challenge for fire emergencies response, 27.1% agreed, 57.9 % were undecided while 15 % strongly disagreed. The results corroborate with findings in a study by Omondi and Kimutai (2018) where it was established that there have been misunderstandings between participants and players who are vital to implementing projects at JKIA which makes planning a challenge. It also aligns with research findings by Mokaya and Nyaga (2009) who found out that the capacity to implement projects was inadequate at JKIA due to poor culture, lacking human resources and unclear clear policies, all which are critical factors when implementing safety programs that are meant to deal with disaster outbreaks such as fire emergencies in airports.

The findings were echoed in the responses from the Focus Group Discussions where one male participant aged 34 years and a college graduate stated that:

> *"... there is need for improvement of enterprise resource planning with all stakeholders as well as community outreach"* (Participant 3, FGD 1).

The qualitative data aligns with a study by Mukaria (2013) on knowledge and conformism to emergency preparedness standards at Wilson Airport. From the study, it was established that

flow of information between stakeholders was very poor thus contributing to coordination problems in the event of a disaster at the airport thereby showing how important it is to involve all stakeholders in regard to fire emergencies at the airport.

In regard to the statement that in Wilson Airport response to fire emergencies faces a challenge of inefficiency, irregularities and unethical practices in operations, 9.3 % agreed, 47.1 % were undecided, 37.9 % disagreed while 5 % strongly disagreed. The findings concur with conclusions from a study by Obwaya (2010) in which it was revealed that inefficiency, irregularities and unethical practices were a challenge across airports in Kenya in handling emergencies. Specifically, the study reflected on a report that was released by Kenya Airport Authority (KAA) on a plane crash which occurred in Busia in 2003 which indicated that the crash occurred due to challenges that included unethical operational practices, incompetence and anomalies. The challenge was witnessed from other airports as highlighted by the report in terms of human resource capacity to handle emergency situations. Specifically, the report stated that adequate security should be deployed at Kenyan airports (Obwaya, 2010).

Further, 15 % and 36.4 % of the respondents strongly agreed and agreed respectively that lack of training in the firefighting, inspectorate and traffic control departments poses a great challenge to fire emergencies response in Wilson Airport. 27.1 % were undecided while 21.4% disagreed. The findings concur with results from a study by in Kisumu Airport Kenya by Kiptoo (2010), where it was revealed that there was inadequate human resource training since staff was only trained on first aid and no refresher courses were conducted. However, the regulatory agencies noted that personnel have adequate training on fire containment (Kiptoo, 2010). Specifically, Kiptoo (2010) indicated that personnel had training on first aid, search and rescue, procedures for evacuation in land as well as water. The study also affirmed that there was high turnover of staff

due to retirements, transfers and departures hence the need to conduct repetitive trainings across departments (Kiptoo, 2010).

The quantitative data results on the importance of training towards handling fire disasters were echoed in the Focus Group Discussions where a female participant and flight crew member aged 27years said that:

"...strategic planning is at 80% on the equipment though more need to be done with the trainings and the drills." (Participant 5, FGD 1)

The qualitative findings concur with a study by Kanyi, Kamau and Mireri (2016) Wilson Airports' infrastructure and its appropriateness and adequacy in mitigating risks. The study established that although Wilson Airport may have the required infrastructure and facilities, there is need to improve on its capacity to handle disasters at the airport facility (Kanyi et. al, 2016).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter is summary of the findings, conclusions and recommendations as well as suggestions for further studies in related areas

5.2 Summary of the study

The study's main purpose was to assess safety strategies in handling fire emergencies in Wilson Airport Nairobi, Kenya. The study collected both qualitative and quantitative data. Descriptive statistics that included means, frequencies and standard deviation was used to analyze quantitative data that had been coded into version 21 of SPSS software to compute frequencies and %. On the other hand, qualitative data was analyzed thematically. Major findings from the research were generated and presented using means and frequencies that have been presented and discussed in chapter four.

In response to demographic characteristics, the study findings indicated that slightly over half (53%) of the respondents were male while 47% were female. In terms of age 58.6% of the respondents were aged between 31-40 years of age. This was followed by 22.1% and 13.1% who were aged below 30 years of age and 51 years and above respectively while only a small percentage (6.2%) of the respondents was aged 41 – 50 years. With regard to education level 60.7 % of the respondents had university level of education. Another 35 % of them indicated that they had attained college education level while 4.3 % of them had secondary education. In reference to their areas of specialization, 14.3 % of the respondents were in aviation safety followed by 8.6 % who were in aeronautical while 7.9 % were in air tech. Some areas of specialization had similar number of respondents that included: cabin crew, transport and craft

maintenance which had 6.4 % each. Similarly aviation, business, craft engineering, flight operations, reservation and safety had 5.7% of respondents each.

5.2.1 Findings on Strategic Planning Measures for Fire Emergencies at Wilson Airport

Over half (61.4%) of the respondents indicated that the airport management was responsible for strategic planning for fire safety. 30.7% indicated departmental heads were responsible while 3.6 % stated the Ministry of Transport. 35.7 % of the respondents indicated that lack of a disaster management system was the greatest challenge to strategic planning. 34.3 % indicated structural design of the airport could be another challenge. On the issue of strategic planning measures for fire emergencies at Wilson Airport incorporate a disaster management system majority of the respondents generally agreed as indicated by 12.7 % of the respondents who strongly agreed and 40.7 who agreed. Similarly, 60 % of the respondents agreed that strategic planning measures at Wilson Airport involve a set of activities put in motion that aim to satisfy the immediate needs of the victims, their rehabilitation and the reconstruction of any infrastructure that may have.

Less than half (37.9 %) of the respondents agreed that strategic planning measures at Wilson Airport incorporate policies and objectives to guide the recovery, which have been put in place for some time, tested and proved beyond doubt. Additionally, 34.3 % and 16.4 % of the respondents strongly agreed and agreed respectively that strategic planning measures for fire emergencies at Wilson Airport also involve coordination as an essential ingredient in a disaster preparedness plan. Strategic planning measures at Wilson Airport involve community outreach whereby people from the community responding to a fire emergency know what to do and how to do it is a statement to which over half of the respondents (52.9 %) agreed while 40.7 % were undecided. 47.8 % of the respondents agreed that Strategic planning measures at Wilson Airport involve community outreach whereby people from the community responding to a fire

emergency know what to do and how to do it. In regard to strategic planning measures that were lacking, 33.6 % of the respondents stated that better warnings as a strategic planning measure were lacking while 21.4 % stated provision of safety equipment.

5.2.2 Findings on Adequacy of Strategic Planning for Fire Emergencies at Wilson Airport

15 % and 53.6 % agreed respectively that in strategic planning for fire emergencies at Wilson Airport, measures are taken to provide a broad picture of what must be achieved and in which order, including how to organize a system capable of achieving the overall goals in a fire emergency. 24.3 % agreed that when a fire emergency ensues at Wilson Airport, communication between airlines, airports, Government agencies, and other aviation stakeholders is very poor due to strategic planning while 47.1 % disagreed. 20.7 % of the respondents strongly agreed while 26.4 % agreed that strategic planning for fire emergencies at Wilson Airport involves strict compliance with local fire regulations. Majority (74.3 %) of the respondents generally agreed that in the strategic planning process for fire emergencies at Wilson Airport, accessibility in terms of infrastructure plays a key role. Similarly, a majority (85.7 %) agreed that in strategic planning for fire emergencies at Wilson Airport, managers have to build-in the perspectives and needs of those stakeholders with whom they must co-operate and collaborate in in the event of a fire disaster. Likewise a majority (72.8 %) of respondents agreed that in strategic planning for fire emergencies at Wilson Airport, evacuation remains a critical solution to addressing fire emergencies.

25.7 % of the respondents strongly agreed and 28.6 % agreed respectively that strategic planning for fire emergencies at Wilson Airport entails compartmentation within airports whereby high risk areas, such as tenant accommodation, storage or kitchen areas are separated from the main functional areas of the airport. On the statement that in strategic planning for fire emergencies at

Wilson Airport, all the staff handling agents, tenants, control authorities, business partners, contractors and any other organizations' who visit or work in there or associated buildings, are made fully aware of the requirements and procedures of operation in case of a fire emergency, 23.6 % and 22.1 % of the respondents strongly agreed and agreed respectively. 85 % of the respondents rate the effectiveness of strategic planning at Wilson Airport to be average. Another 13.6 % indicated it was good while only 1.4 % stated that it was excellent. 32.9 % stated that collaboration had the greatest influence on strategic planning for fire emergencies at Wilson Airport while 37.9 % of the respondents indicated that policies had the greatest influence.

5.2.3 Findings on Human Resource Training for Fire Emergencies at Wilson Airport

Generally, 83.6 % of the respondents agreed that human resource training for fire emergencies at Wilson Airport entails staff participating in fire drill constantly to gain skills and to understand. Likewise, 11.4 % of the respondents strongly agreed while 52.9 % agreed that in Wilson Airport, human resource training for fire emergencies involves education campaigns, training of response teams and rehearsals of emergency response scenarios. Additionally, 53.6 % of respondents agreed that in Wilson Airport, human resource training for fire emergencies incorporates a disaster preparedness plan that is developed and completed for all staff to rehearse its major elements. In similar trend, 6.4 % and 55.7 % of the respondents strongly agreed and agreed respectively that in Wilson Airport, there are firefighting staffs that are properly trained to perform their duties in an efficient manner and participate in live fire drills commensurate with the types of aircraft and type of firefighting equipment. Interestingly, 42.9 % disagreed while 31.4 % agreed that in Wilson Airport, there are inadequate refresher trainings on simple first aid administration as part of human resource training for fire emergencies is a statement. In regard to the statement that as part of human resource training for fire emergencies at Wilson Airport,

there is guidance on either training frequency or competency standards of staff, results show that 56.4 % generally agreed. 40.7% of the respondents indicated that human resources lacked training on identifying fire hazards in the workplace while 18.6 % stated evacuation procedures. Majority (76.4 %) of the respondents stated that the local community was not involved in human resource training. Another 24 % indicated the aircraft staff was not involved.

5.2.4 Findings on Infrastructural Set-up for Fire Emergencies at Wilson Airport

42.1% of the respondents rated firefighting equipment to be every important. Similarly, communication and radar equipment was also indicated to be important by many (45 %) of the respondents. Another 42.1 % of the participants in this study, rated fire departments as averagely important while none (0%) rated any of the infrastructural set-up aspects as least important.48.6 % of the respondents agreed that in Wilson Airport, there are departments and agencies that will have a role in a disaster's four phases of emergency management. 51.4 % disagreed while 30.7 % agreed that in Wilson Airport, the infrastructural set up for fire emergencies incorporates the development of airfields and airports in Kenya that is level and free of artificial obstructions in the vicinity. 36.4 % agreed while 22.1 % of the respondents strongly agreed that in Wilson Airport, infrastructural set up for fire emergencies involves funding of firefighting equipment as well as communications and radar equipment. Further, 50.7 % of the respondents agreed that Wilson Airport has complex structures to support aviation activities, services, and other needs such as firefighting agencies as part of its infrastructural set up for fire emergencies. 58.6 % of the respondents generally agreed that as part of the infrastructural set up for fire emergencies at Wilson Airport, there are visual interruptions that can cause a common standard 'EXIT' or 'Running Man' sign that can be easily spotted among the visual mess while. 21.4 % were undecided and 20 % disagreed. 32.9 % agreed that in Wilson Airport, the

infrastructural set up for fire emergencies faces challenges from unreliable handling equipment due to poor maintenance or obsolescence. 62.1 % of the respondents stated that poor interactions between managers and disaster management committees was the greatest challenge to the infrastructural set-up at Wilson Airport while 30.7 % indicated lack of a common communication infrastructure.

5.2.5 Findings on Challenges Facing Wilson Airport in Response to Fire Emergencies

26.4 % of the respondents stated that improving on resource allocation to handle fire emergencies can greatly reduce the challenges associated with fire emergencies while 23.6 % indicated improving on collaboration between airport departments. 30 % and 57.1 % of the respondents strongly agreed and agreed respectively that a major challenge facing Wilson Airport during fire emergencies is communication, collaboration and coordination of activities. However, 48.6 % of the respondents disagreed that in Wilson Airport, when a fire outbreak ensues, communication between the various departments, organizations, Government agencies, and other aviation stakeholders is very poor. Likewise, 52.1 % of the respondents disagreed that Wilson Airport does not meet safety regulations as stipulated by ICAO (International Civil Aviation Organization) standards and recommended practices. 57.1 % disagreed while 28.6 % agreed that Wilson Airport faces the challenge of inadequate rescue capacities in the event of emergencies such as fire disasters. 9.3 % and 70 % of the respondents strongly agreed and agreed respectively that the number of passengers travelling in and out of Wilson Airport is big thus posing a great challenge since the cost to victims and survivors and their families cannot be estimated in the event of a fire outbreak

57.9 % were undecided on the statement that misunderstandings between participants and players key to implementing projects at Wilson Airport makes planning a challenge for fire

emergencies response while 27.1% agreed. Similarly 47.1 % were undecided on the statement that in Wilson Airport response to fire emergencies faces a challenge of inefficiency, irregularities and unethical practices in operations while 37.9 % disagreed. 15 % and 36.4 % of the respondents strongly agreed and agreed respectively that lack of training in the firefighting, inspectorate and traffic control departments poses a great challenge to fire emergencies response in Wilson Airport.

5.3 Conclusions of the Study

The study was able to draw the following conclusions as per the study objectives.

5.3.1 Conclusions on strategic planning measures adopted at Wilson Airport.

In regard to this objective, findings confirm that strategic planning is primarily a responsibility of the Airport management for successful implementation of fire emergency response. Further findings confirm that although, there exists a disaster management system for handling fire emergencies at Wilson Airport, it remains the greatest challenge in strategic planning at the facility.

5.3.2 Conclusion on the strategic planning measures adopted at Wilson Airport

In reference to the second objective, the study established that among the strategic planning measures adopted at Wilson Airport, coordination between departments and staff plays a key role in fire safety handling. The other important aspect of strategic planning that has been put in place is community outreach whereby people from within the community that the Airport is located have been trained on how to approach and handle a fire emergency situation. However, there are some strategic planning measures that are lacking from the facility which include: need for better warnings as well as inadequate fire safety equipment. Findings from the adequacy of strategic planning measures adopted at Wilson Airport indicate that the strategic measures are adequate

since they are clear on what is to be achieved and the order in which it is to be achieved including the appropriate system to adopt to achieve in the event of a fire outbreak. This fact is reinforced by results which show that communication between staff and key stakeholders such as airlines or Government organizations is not poor due to strategic planning as attested by many of the respondents.

5.3.3 Conclusions on the human resource training for fire emergencies.

Regarding the third objective, the study established activities such as: fire drills for the staff to constantly gain skills, the training of response teams as well as emergency response rehearsals. Additionally human resource training at Wilson Airport encompasses guiding staff on how frequent training should be conducted and appraisals of staff competency in handling fire emergencies. The results further show that in Wilson Airport, there are firefighting staff with proper training on how to undertake their responsibilities and utilize equipment in the event of a fire outbreak. There is also a disaster preparedness plan in the human resource training program at the facility which has been developed and completed for the entire staff at the Airport to rehearse its major elements. Interestingly, there is a feeling that refresher training may not be that adequate to meet the capacity to handle a fire emergency at the Airport although they are conducted regularly. Another aspect of human resource training that lacks at the facility is training for staff on identification of fire hazards at the workplace as well as evacuation procedures. The local community does not engage in human resource training at the Airport from the study findings.

5.3.4 Conclusions on the infrastructural set up for fire emergencies

In regard to the objective four, the study established that firefighting equipment, communication and radar equipment as well as firefighting departments are very important as part of the

infrastructural set-up for fire emergencies at Wilson Airport. However, at Wilson Airport, part of the infrastructural set-up for fire emergencies has not guaranteed that the departments set up can handle the emergency management's four phases i.e. mitigation, preparedness, response and recovery. The findings have also established that the airport and its airfields have not been developed on flat land that is free from obstructions, for easier accessibility whenever there is a disaster such as a fire emergency. It can be confirmed that at the facility, part of the infrastructural set-up involves financing the purchase of firefighting equipment as well as communications and radar equipment. Signage around the facility is also properly set-up as a common standard 'EXIT' or 'Running Man' sign that can be easily spotted among the visual mess. The study can also confirm that the infrastructural set-up at Wilson Airport faces challenges from unreliable handling equipment due to poor maintenance or obsolescence. Other challenges hindering the set-up of a proper infrastructure for fire emergencies include: poor interactions between managers and disaster management committees as well as lack of a common communication infrastructure.

5.3.5 Conclusions on challenges facing Wilson Airport in fire emergencies

In regard to challenges, the study findings show that the number of passengers travelling in and out of Wilson Airport has increased thus posing a great challenge since the cost of damage cannot be estimated in the event of a fire outbreak remains the biggest challenge to fire safety handling at the facility followed by resource allocation. The study further confirms that although communication between the various departments, organizations, Government agencies, and other aviation stakeholders is not poor, communication, collaboration and coordination of activities between departments in relation to fire emergencies and fire safety handling remains a great challenge to fire safety handling at Wilson Airport. The study can also attest that it would be a

greater challenge in handling fire emergencies should there be lack of training in the firefighting, inspectorate and traffic control departments poses a great challenge to fire emergencies response in Wilson Airport. Interestingly, there are no challenges associated with regulations since the facility meets the safety regulations as stipulated by ICAO standards. There are also no challenges associated with rescue capacities as it can be confirmed that there are adequate rescue capacities in the event of emergencies such as fire disasters.

5.4 Recommendations of the Study

Recommendations in this study are stated as per the key findings with regard to assessment of safety strategies in handling fire emergencies in Wilson Airport Nairobi, Kenya.

5.4.1 Recommendations for Strategic Planning

In relation to the strategic planning measures adopted at Wilson Airport, the study recommends the need to improve on the policies and objectives meant to guide the fire safety handling at the facility in terms of testing them and proving them beyond doubt. In adopting this measure, it is vital for the Airport Management as the main stakeholders responsible for fire safety at the facility, to cooperate with other stakeholders such as the Ministry of Transport, the Nairobi County Government and other departments within the Airport to develop sound policies on fire safety handling at the facility. The policies should reflect on the lacking strategic planning measures which entail the installation of more fire safety equipment and improved warning systems.

5.4.2 Recommendations on Adequacy of Strategic Planning

The study recommends the need to improve on the effectiveness of the strategic planning measures. This will entail collaboration between departments as well as improved communication which have been highlighted as great influences in strategic planning. Airline

Managers have to take in the perspectives of all the stakeholders who contribute in one way or the other towards handling a fire emergency in their strategic planning measures. Finally, more training for the staff and regular drills need to be conducted to improve on the adequacy of the strategic planning measures.

5.4.3 Recommendations on Human Resource Training

In reference to human resource training for fire emergencies at Wilson Airport, the study recommends more training to be conducted for the staff. Further, trainings on evacuation procedures are recommended. The local community which comprises of people who are affected by the activities of the Airport such as the neighboring estates, organizations as well as the Ministry of Transport, the Nairobi County Government must all be involved in training for fire safety handling at Wilson Airport. Training needs to be conducted regularly as refresher trainings so that human resource training for fire safety handling at Wilson Airport can be able to perform in a manner that meets the set targets in the event of a fire disaster.

5.4.4 Recommendations on Capacity of Infrastructural Set-up

In relation to the infrastructural set-up for fire emergencies at Wilson Airport, the study recommends that communication and radar equipment, fire departments and firefighting equipment are essential in fire safety handling at the Airport. It is important for the Airport management to ensure that these facilities are availed to improve on the infrastructural set-up. Additionally, the Airport itself should be on a flat terrain free from obstructions. This will involve collaboration with other stakeholders such as organizations responsible for environmental and safety standards to enforce regulations that will keep unwanted constructions or any other form of obstructions at the required distance from the facility. Lastly, the study

recommends that all equipment that is vital in fire safety handling be regularly checked and maintained to ensure that the infrastructural set-up at the facility can handle a fire outbreak.

5.4.5 Recommendations on Challenges

In regard to challenges facing Wilson Airport in its response to fire emergencies, the study recommends that the Airport Management and other stakeholders work towards ensuring that there is resource allocation towards fire safety handling at the facility. Additionally, there is need to improve on the capability of the Airport to handle an increasing passenger traffic in and out of the Airport. This can be achieved through increasing the evacuation routes, improved signage across the Airport so that it can be able to safely handle a fire emergency with its increased traffic. Lastly, key in all aspects of fire safety in this study is consistent training conducted on staff across all departments at the Airport, failure to which shall pose a great challenge in fire safety handling at Wilson Airport.

5.5 Suggestions for further studies

From the results of this research, it is suggested that the following be carried out in order to compliment the findings of this study:

I. A comparable study be undertaken in other airports to allow compare the results.
II. Future studies can focus on policies that can be formulated to make it easier for management to handle fire emergencies in airport facilities.
III. A study is necessary to establish suitable frameworks that are able to address the emerging challenges that are associated with fire safety handling at airports across Kenya.
IV. Future studies should consider how communities within airports could harness these strategies such as strategic planning, human resource training, and infrastructural set-up among others to handle fire disasters.

V. There is need to study other aspects of fire safety handling strategies other than strategic planning, human resource training and infrastructural set-up which can ensure airports can handle fire emergencies in Kenya.

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APPENDICES

APPENDIX 1: LETTER OF INTRODUCTION

Fredrick Nambuya,

Dear Respondent,

I am a student at University of Nairobi. I am conducting a study on **An Assessment of Safety Strategies in Handling Fire Emergencies in Kenya Airports: A Case Study of Wilson Airport Nairobi.** You have been selected to take part in this study. I would be grateful if you would assist me by responding to all items in this questionnaire. Your name does not need to appear anywhere in the questionnaire. The information will be kept confidential and will be used for academic research purpose only. Your co-operation will be greatly appreciated.

Yours faithfully,

Fredrick Nambuya

APPENDIX 2: INFORMED CONSENT FORM

Informed Consent Form

Please read this consent form carefully. Ask as many questions as you like before you decide whether you want to participate in this research study. You are free to ask questions at any time before, during, or after your participation in this research.

Project Title: An Assessment of Safety Strategies in Handling Fire Emergencies in Kenya Airports: A Case Study of Wilson Airport Nairobi

Principal Researcher: Fredrick Mwanguya Nambuya

Telephone: +254726321104

E-mail: fredrick.nambuya1@gmail.com

Organization: University of Nairobi

Location of Study: Nairobi County

Purpose of this Research Study: You are being asked to participate in a research study involving 152 airline staff members, 25 airline managers and 14 trained firefighters. This research is designed to be conducted as part of my Master's Degree program in University of Nairobi. I am the principal researcher and my research is in the area of Sociology and Social Work on an assessment of safety strategies in handling fire emergencies in Kenya Airports in a case of Wilson Airport Nairobi.

Procedures: You will be asked to sign a form of consent to freely participate in this study. Your participation is by giving information and answering some questions asked in the questionnaires. This process will be guided by the principal investigator or the research assistant. The process will take about 30 to 40 minutes.

Possible Risks: This is an academic research with possible risks like the research may unearth strong emotions, meaning the researcher will employ a counselor to work out the possible emotional issues that may arise in the process of research.

Possible Benefits: The researchers anticipate that by participating in this research you will gain more insights on an assessment of safety strategies in handling fire emergencies in Kenya Airports in a case of Wilson Airport Nairobi.

Financial Considerations: You will not incur any costs as a result of your participation in this research nor will you receive any financial compensation for your participation. However, in case you spent money for transport it will be refunded.

Confidentiality: Your identity in this study will be treated as confidential. Results of the study, including all collected data, may be published in my dissertation and in possible future journal articles and professional presentations, but names or any identifiable references to participants will not be included. However, any records or data obtained as a result of participation in this study may be inspected by the persons conducting this study. Review Board members provided, legally obligated to protect any

identifiable data from public disclosure, except where disclosure is otherwise required by law or a court of competent jurisdiction. These records will be kept private in so far as permitted by law. One of the steps taken to protect confidentiality is such as using number codes or pseudonyms for identifying data or subjects. All study data will be retained for a minimum of three years or as required by the University Research Ethics Board, and then destroyed.

Termination of Study: Please know that you are free to choose whether to participate in this study or not. You may also choose to withdraw from the study or to decline to answer any questions at any time. You will not be penalized or lose any benefits to which you are otherwise entitled if you choose not to participate or choose to withdraw. In the event you decide to discontinue your participation in the study, please notify the principal researcher of your decision so that your participation can be terminated in an orderly fashion. Your participation in the study may be terminated by the investigator without prior notice to, or consent in the event that you get an illness and unable to participate, or other reason(s). All data collected on, about, or by you will be destroyed and not used in the data analysis or writing of the findings if you choose to withdraw.

Resources: Please know that any questions you may have about this study will be answered by the Principal Investigator or the Research Assistant. In case of any research-related emergency, call the principal investigator: Fredrick Nambuya (0726321104).

Participant: I have read and I understand this consent form, and I volunteer to participate in this research study. I understand that I will receive a copy of this report if I ask. I voluntarily choose to participate and, I understand that my consent does not take away any legal rights in the case of negligence or other legal fault of anyone who is involved in this study. I further understand that nothing in this consent form is intended to replace any applicable national, government, or local laws.

Signatures :

Participant Pseudo-name : _____

Participant Signature: _____

Date: _____

Principal Researcher's/Assistant's Name: _____

Principal Researcher's /Assistant's Signature: _____

Date: _____

Client anonymous code: 

APPENDIX 3: QUESTIONNAIRE FOR AIRPORT STAFF MEMBERS

QUESTIONNAIRE

Dear Student,

I am a Masters student from the University of Nairobi in the Department of Sociology and Social work doing a research on ***"An Assessment of Safety Strategies in Handling Fire Emergencies in Kenya Airports: A Case Study of Wilson Airport Nairobi"*** and you are among the designated participants.

Your responses will contribute greatly to this research. It would be appreciated in kind if you would take your time to fill in the questionnaire. There is a guarantee that data you provide shall be private and only utilized for research purposes.

Thank you for your cooperation.

Section I: Background Information

1. Gender. Please tick (√) in the appropriate box.

   a) Male [ ]

   b) Female[ ]

2. Age bracket. Please tick (√) in the appropriate box.

a) Below 30 yrs	[ ]	c) 41-50 years	[ ]
b) 31-40 years	[ ]	d) 51 years and above	[ ]

3. Education Level. Please tick (√) in the appropriate box.

a) University	[ ]	c) Secondary	[ ]
b) College	[ ]	d) Primary	[ ]

4. Specialization (specify) _____

5. Designation _____

6. Department_____

7. Working experience. Please tick (√) in the appropriate box.

a) 1 year and below	[ ]	c) 6-10 years	[ ]
b) 2-5 years	[ ]	d) 11 years and above	[ ]

Section II: Strategic Planning Measures for Fire Emergencies in Airports

8. Who is responsible for strategic planning for fire safety at Wilson Airport? Please tick (√) in the appropriate box.

(a) The Ministry of Transport [ ]

(b) Airport Management [ ]

(c) Departmental Heads [ ]

(d) Nairobi County Council [ ]

(e) Any Other (Specify)……

9. Which of the following is the greatest challenge to strategic planning for fire emergencies at Wilson Airport? Please tick (√) in the appropriate box.

(a) High traffic rates at the airports [ ]

(b) Structural design of the airport [ ]

(c) Lack of a disaster management system [ ]

(d) Poor coordination among departments [ ]

(e) Any Other (Specify)……

10. The following are statements regarding strategic planning measures that Wilson Airport has put in place to handle fire emergencies. Indicate whether you agree, strongly agree, undecided, disagree or strongly disagree with the various statements. Please tick (√) in the appropriate box.

(***Key**: SA: Strongly Agree; A: Agree; UD: Undecided; D: Disagree, SD Strongly Disagree*)

NO.	Factors	SA	A	UD	D	SD
a)	Strategic planning measures for fire emergencies at Wilson Airport incorporate a disaster management system.					
b)	Strategic planning measures at Wilson Airport involve a set of activities put in motion that aim to satisfy the immediate needs of the victims, their rehabilitation and the reconstruction of any infrastructure that may have been damaged or destroyed.					
c)	Strategic planning measures at Wilson Airport incorporate policies and objectives to guide the recovery, which have been put in place for some time, tested and proved beyond doubt					
d)	Strategic planning measures for fire emergencies at Wilson Airport also involve coordination as an essential ingredient in a disaster preparedness plan.					
e)	Strategic planning measures at Wilson Airport include resource allocation that add value to the professional training for those people involved in the fire emergency response plan.					
f)	Strategic planning measures at Wilson Airport involve community outreach whereby people from the community responding to a fire emergency know what to do and how to do it.					

11. Which of the following strategic planning measures for fire emergencies lack at Wilson Airport? Please tick (√) in the appropriate box.

(a) Timely decision making [ ]

(b) Better warnings [ ]

(c) Relief phase [ ]

(d) Airport Rescue and Fire Fighting (ARFF) coverage [ ]

(e) Provision for safety equipment [ ]

(f) Any Other (Specify)……

Section III: Adequacy of Strategic Planning for Fire Emergencies in Airports

14. Which of the following strategic planning for fire emergencies aspects needs to be improved at Wilson Airport? Please tick (√) in the appropriate box.

    (a) Preparatory activities [ ]

    (b) Response processes [ ]

    (c) Lines of authority [ ]

    (d) Policy implementation [ ]

    (e) Oversight and coordination [ ]

    (f) Resource allocation [ ]

    (g) Any Other (Specify)……

15. The following are statements regarding the adequacy of strategic planning for fire emergencies at Wilson Airport. Indicate whether you agree, strongly agree, undecided, disagree or strongly disagree with the various statements. Please tick (√) in the appropriate box.

    (***Key**: SA: Strongly Agree; A: Agree; UD: Undecided; D: Disagree, SD Strongly Disagree*)

NO.	Factors	SA	A	UD	D	SD
a)	In strategic planning for fire emergencies at Wilson Airport, measures are taken to provide a broad picture of what must be achieved and in which order, including how to organize a system capable of achieving the overall goals in a fire emergency.					
b)	When a fire emergency ensues at Wilson Airport, communication between airlines, airports, Government agencies, and other aviation stakeholders is very poor due to strategic planning.					
c)	Strategic planning for fire emergencies at Wilson Airport involves strict compliance with local fire regulations.					
d)	In the strategic planning process for fire emergencies at Wilson Airport, accessibility in terms of infrastructure plays a key role.					
e)	In strategic planning for fire emergencies at Wilson Airport, managers have to build-in the perspectives and needs of those stakeholders with whom they must co-operate and collaborate in in the event of a fire disaster.					
f)	In strategic planning for fire emergencies at Wilson Airport, evacuation remains a critical solution to addressing fire emergencies.					

g)	Strategic planning for fire emergencies at Wilson Airport entails compartmentation within airports whereby high risk areas, such as tenant accommodation, storage or kitchen areas are separated from the main functional areas of the airport using compartmentation with specified fire resistance.					
h)	In strategic planning for fire emergencies at Wilson Airport, all the staff handling agents, tenants, control authorities, business partners, contractors and any other organizations' who visit or work in there or associated buildings, are made fully aware of the requirements and procedures of operation in case of a fire emergency.					

16. How would you rate the effectiveness of strategic planning for fire emergencies at Wilson Airport? Please tick (√) in the appropriate box.

a) Excellent	[ ]	c) Average	[ ]
b) Good	[ ]	d) Poor	[ ]

17. In which of the following areas of strategic planning do you think there is the greatest effect in handling fire emergencies at Wilson Airport? Please tick (√) in the appropriate box.

(a) Policies [ ]

(b) Communication [ ]

(c) Collaboration [ ]

(d) Policies [ ]

(e) Safety and environmental standards [ ]

(f) Airport physical layout [ ]

(g) Any Other (Specify)……

Section IV: Human Resource Training for Fire Emergencies in Airports

18. The following are statements regarding human resource training for fire emergencies at Wilson Airport. Indicate whether you agree, strongly agree, undecided, disagree or strongly disagree with the various statements. Please tick (√) in the appropriate box.

(***Key***: *SA: Strongly Agree; A: Agree; UD: Undecided; D: Disagree, SD Strongly Disagree*)

NO.	Factors	SA	A	UD	D	SD
a)	Human resource training for fire emergencies at Wilson Airport entails staff participating in fire drill constantly to gain skills and to understand the dynamics of fire calamities, what to expect and how to counter fire emergencies efficiently.					
b)	In Wilson Airport, human resource training for fire emergencies involves education campaigns, training of response teams and rehearsals of emergency response scenarios.					
c)	In Wilson Airport, human resource training for fire emergencies incorporates a disaster preparedness plan that is developed and completed for all staff to rehearse its major elements.					
d)	In Wilson Airport, there are firefighting staffs that are properly trained to perform their duties in an efficient manner and participate in live fire drills commensurate with the types of aircraft and type of firefighting equipment in use at the airport, as part of human resource training for fire emergencies.					
e)	In Wilson Airport, there are inadequate refresher trainings on simple first aid administration as part of human resource training for fire emergencies.					
f)	As part of human resource training for fire emergencies at Wilson Airport, there is guidance on either training frequency or competency standards of staff.					

19. Which of the following areas of fire prevention and containment do the staff at Wilson Airport lack? Please tick (√) in the appropriate box.

(a) Evacuation procedures [ ]

(b) Identifying fire hazards in the workplace [ ]

(c) Fire safety legislation [ ]

(d) Means of raising alarm [ ]

(e) Usage of fire extinguishers [ ]

(f) Any other (specify)…….

20. Who among the following stakeholders of Wilson Airport is not involved in human resource training for fire emergencies? Please tick (√) in the appropriate box.

(a) Airport Management [ ]

(b) Local community [ ]

(c) Aircraft staff [ ]

(d) Any other (specify)…….

Section V: Capacity of Infrastructural Set up for Fire Emergencies in Airports

22. Please rate the following as to how important the aspects of infrastructural set up are to handling fire emergencies at Wilson Airport? (Please **CIRCLE** the appropriate number)

	Least important → Most important						
Firefighting equipment	1	2	3	4	5	6	7
Communication and Radar Equipment	1	2	3	4	5	6	7
Fire departments	1	2	3	4	5	6	7

23. The following are statements regarding the capacity of infrastructural set up for fire emergencies at Wilson Airport. Indicate whether you agree, strongly agree, undecided, disagree or strongly disagree with the various statements. Please tick (√) in the appropriate box.

(***Key**: SA: Strongly Agree; A: Agree; UD: Undecided; D: Disagree, SD Strongly Disagree*)

NO.	Factors	SA	A	UD	D	SD
a)	In Wilson Airport, there are departments and agencies that will have a role in a disaster's four phases of emergency management as part of infrastructural set up for fire emergencies.					
b)	In Wilson Airport, the infrastructural set up for fire emergencies incorporates the development of airfields and airports in Kenya that is level and free of artificial obstructions in the vicinity.					
c)	In Wilson Airport, infrastructural set up for fire emergencies involves funding of firefighting equipment as well as communications and radar equipment.					
d)	Wilson Airport has complex structures to support aviation activities, services, and other needs such as firefighting agencies as part of its infrastructural set up for fire emergencies.					

e)	As part of the infrastructural set up for fire emergencies at Wilson Airport, there are visual interruptions that can cause a common standard 'EXIT' or 'Running Man' sign that can be easily spotted among the visual mess.					
f)	In Wilson Airport, the infrastructural set up for fire emergencies faces challenges from unreliable handling equipment due to poor maintenance or obsolescence					

24. Which of the following is the greatest challenge to the capacity of infrastructural set up at Wilson Airport? Please tick (√) in the appropriate box.

(a) Poor interactions between managers and disaster management committees [ ]

(b) Lack of a common communication infrastructure [ ]

(c) Poor security and operational facilities [ ]

(d) Any Other (Specify)……

Section VI: Challenges Facing Airports in Response to Fire Emergencies

26. Indicate among the following actions, the one which can greatly reduce the challenges associated with response to fire emergencies be reduced in Wilson Airport? Please tick (√) in the appropriate box.

(a) Improving on resource allocation to handle fire emergencies [ ]

(b) Improving the infrastructural set up [ ]

(c) Improving safety and environmental standards [ ]

(d) Improving on collaboration between airport departments [ ]

(e) Any Other (Specify)……

27. The following are statements regarding challenges facing Wilson Airport in response to fire emergencies. Indicate whether you agree, strongly agree, undecided, disagree or strongly disagree with the various statements. Please tick (√) in the appropriate box.

(***Key**: SA: Strongly Agree; A: Agree; UD: Undecided; D: Disagree, SD Strongly Disagree*)

NO.	Factors	SA	A	UD	D	SD
a)	A major challenge facing Wilson Airport during fire emergencies is communication, collaboration, and coordination of activities.					
b)	In Wilson Airport, when a fire outbreak ensues, communication between the various departments, organizations, Government agencies, and other aviation stakeholders is very poor.					
c)	Wilson Airport does not meet safety regulations as stipulated by ICAO (International Civil Aviation Organization) standards and recommended practices.					
d)	Wilson Airport faces the challenge of inadequate rescue capacities in the event of emergencies such as fire disasters.					
e)	The number of passengers travelling in and out of Wilson Airport is big thus posing a great challenge since the cost to victims and survivors and their families cannot be estimated in the event of a fire outbreak.					
f)	Misunderstandings between participants and players key to implementing projects at Wilson Airport makes planning a challenge for fire emergencies response.					
g)	In Wilson Airport response to fire emergencies faces a challenge of inefficiency, irregularities and unethical practices in operations.					
h)	Lack of training in the firefighting, inspectorate and traffic control departments poses a great challenge to fire emergencies response in Wilson Airport.					

28. How would you rate the level of response to fire emergencies at Wilson Airport? Please tick (√) in the appropriate box.

a) Low	[ ]	c) Average	[ ]
b) High	[ ]	d) Very High	[ ]

Thank you!!!

APPENDIX 4: INTERVIEW GUIDE FOR KEY INFORMANTS

Interview Guide

I am Fredrick Mwanguya Nambuya from the University of Nairobi, Kenya. I am doing a research on: ***"An Assessment of Safety Strategies in Handling Fire Emergencies in Kenya Airports: A Case Study of Wilson Airport Nairobi"***. I request you to assist me with information to do the research. Please allow me to use a recorder so that I can get the information accurately. I assure you of confidentiality.

1. What strategic planning measures does Wilson Airport have for fire emergencies?
2. How adequate are the strategic planning measures for fire emergencies at the Wilson Airport?
3. What is the form of human resource training that informs fire emergencies in Wilson Airport Nairobi, Kenya?
4. What is the capacity of the infrastructural set up at Wilson Airport for addressing fire emergencies?
5. What specific challenges does Wilson Airport have for appropriate response to fire emergencies?

Thank you!!!

APPENDIX 5: INTERVIEW GUIDE FOR FOCUS GROUP DISCUSSIONS

Interview Guide

I am Fredrick Mwanguya Nambuya from the University of Nairobi, Kenya. I am doing a research on: ***"An Assessment of Safety Strategies in Handling Fire Emergencies in Kenya Airports: A Case Study of Wilson Airport Nairobi"***. I request you to assist me with information to do the research. Please allow me to use a recorder so that I can get the information accurately. I assure you of confidentiality.

Please note that all participants are referred to as participants (P1Wilson, P2Wilson, etc.) so as to conceal identity and maintain confidentiality. Note: P = participant, 1 = number of participant, Wilson = name of organization

Date and Time	
Venue	
Names of Interviewer(s)	
FGD ID	

Part 1: Details of the Participants

	Name	**Designation**	**Gender**	**Age bracket**
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

9.				
10.				
11.				
12.				
13.				

Part II. Safety Strategies in Handling Fire Emergencies in Kenya Airports: A Case Study of Wilson Airport Nairobi

1. What strategic planning measures does Wilson Airport have for fire emergencies?
2. How adequate are the strategic planning measures for fire emergencies at the Wilson Airport?
3. What is the form of human resource training that informs fire emergencies in Wilson Airport Nairobi, Kenya?
4. What is the capacity of the infrastructural set up at Wilson Airport for addressing fire emergencies?
5. What specific challenges does Wilson Airport have for appropriate response to fire emergencies?

Thank you!!!

APPENDIX 6: WORK PLAN

Time / Activity	JUL 2020				AUG 2020				SEPT 2020				OCT 2020				NOV 2020				DEC 2020			
Research proposal																								
Proposal Defence																								
Data Collection																								
Data Analysis																								
Chapter 5 writing																								
Thesis Defence																								
Submission of Error-free Copies																								
Graduation																								

APPENDIX 7: RESEARCH BUDGET

ITEM	QUANTITY	UNIT COST Ksh	TOTAL Ksh
Stationary		*6,000	6,000
Transport	2 people, five days	2x 1000x 5 = 10,000	10,000
Training /lunch			5,000
Printing & Photocopy			20, 000
Air Time	3 people	3x 2000	6,000
Contingencies	10% of 37,500	3,750	3,750
GRAND TOTAL			**50,750**

Source of funds: Personal contribution

APPENDIX 8: KREJCIE AND MORGAN TABLE

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970

APPENDIX 9: LIST OF LOCAL AIRLINES IN KENYA

1. African Express Airways – Jomo Kenyatta International Airport
2. Aberdair Aviation – Wilson Airport
3. Aero-Pioneer Group – Wilson Airport
4. Acariza Aviation – Wilson Airport
5. AD Aviation Aircharters – Wilson Airport
6. Aeronav Air Services – Wilson Airport
7. AeroSpace Consortium – Jomo Kenyatta International Airport
8. Air Direct-Connect – Jomo Kenyatta International Airport
9. Avro Express – Wilson Airport
10. 748 Air Services – Jomo Kenyatta International Airport
11. Airkenya Express – Wilson Airport
12. ALS – Aircraft Leasing Services – Wilson Airport
13. Astral Aviation – Jomo Kenyatta International Airport
14. Blue Bird Aviation (Kenya) – Wilson Airport
15. Fly540 – Jomo Kenyatta International Airport
16. Fly-SAX – Jomo Kenyatta International Airport
17. Freedom Airline Express
18. Global Airlift – Wilson Airport
19. Great Airways – Jomo Kenyatta International Airport
20. Jambojet – Jomo Kenyatta International Airport
21. Jetways Airlines – Wilson Airport
22. Jubba Airways (Kenya) – Jomo Kenyatta International Airport
23. KASAS – Wilson Airport
24. Kenya Airways – Jomo Kenyatta International Airport
25. Silverstone Air – Wilson Airport
26. Tubania Aviation Group – Wilson Airport
27. LadyLori – Wilson Airport
28. Knight Aviation – Wilson Airport
29. Mombasa Air Safari – Mombasa Moi International Airport
30. Pan African Airways – Jomo Kenyatta International Airport
31. Phoenix Aviation (Kenya) – Wilson Airport
32. Queensway Air Services – Wilson Airport
33. Reliance Air Charters – Wilson Airport
34. Ribway Cargo Airlines – Jomo Kenyatta International Airport
35. Safari Express Cargo- Jomo Kenyatta International Airport
36. Safarilink Aviation – Wilson Airport
37. Safe Air (Kenya) – Wilson Airport
38. Skytrail Air Safaris – Bamburi (BMQ)
39. Skyward International Aviation – Wilson Airport

40. Solenta Aviation Kenya – Jomo Kenyatta International Airport
41. Tamarind Air – Jomo Kenyatta International Airport
42. Transworld Safaris – Wilson Airport
43. Trident Aviation – Wilson Airport

Fredrick Nambuya
P.O Box 68453-0622
Nairobi, Kenya
24th Sept, 2020

TO:

The Chairman department of sociology and Social Work
P.O Box 30197-00100
Nairobi, Kenya

Through,
Prof. Gidraph Wairire
P.O Box 30197-00100
Nairobi, Kenya.

Strongly Supported
Supervisor
24/9/2020

Dear Sir/Madam

REF: REQUESTING FOR PERMISSION TO DO FIELD WORK FOR MY M.A RESEARCH PROJECT

I the above named Master of Arts Student, Reg. number C50/69135/2011, do hereby request your approval to proceed with field work after successful completion of my research proposal.

A copy of my research proposal is herein attached for your perusal and approval.

Best regards
Fredrick Nambuya

Supervisor's Name: Prof. Gidraph Wairire Sign 24/9/2020