

**EFFECTS OF THE ADOPTION OF INTERNATIONAL CIVIL AVIATION
ORGANIZATION SECURITY PREVENTIVE MEASURES: A CASE STUDY OF
JUBA INTERNATIONAL AIRPORT**

SOLOMON DENG KUTRENG AGOK

**A Thesis Submitted to the Graduate School in Partial Fulfillment of the Requirements
for the Master of Arts Degree in Security Management of Egerton University**

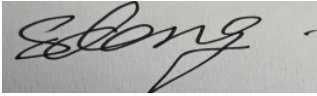
EGERTON UNIVERSITY

OCTOBER, 2025

DECLARATION AND RECOMMENDATION

Declaration

This thesis is my original work and to the best of my knowledge has not been presented for examination of any Degree in any institution or university.

Signature: 

22th October, 2025

Solomon Deng Kutreng Agok

Ame21/9017/17

Recommendation

This thesis has been submitted for examination with our recommendation as university supervisors.

Signature: 

23rd October, 2025

Prof. Hadija Murenga, PhD

Department of Peace, Security and Social Studies

Egerton University

Signature: 

23rd October, 2025

Dr. Samuel Auya, PhD

Department of Peace, Security and Social Studies

Egerton University

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DEDICATION

This thesis is dedicated to very special people to my heart who in their own way supported me morally, and financially to pursue academics at different levels. They include my late Father Kutreng (Abanydit) de Agok Mabior and my late Mother, Adau Gak de Majok, my loving wife Aja Manoa Majok, our two daughters; Aboki and Nyandeng, my son David Koreng, my Late brother Garang Kutreng, my elder brother Chol Kutreng, both of who supported my primary school, Late Uncle Agok Ageer Arok, who initially supported my undergraduate studies and the late Uncle Geu (Mangai) Ayuel Warabek for his passionate for education.

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ABSTRACT

International Civil Aviation Organization (ICAO) came up with standard of security requirements and best practices for maintaining safety and security of international air travel across the globe. The importance of such standards led to the use of the ICAO standards at actual airport like the Juba International Airport (JIA) in its efforts to enhance its security systems. However, their application may vary in terms of effectiveness of their implementation, and the scarcity of resources as well as the need to train, which could hinder their optimal adherence. This study has analysed the effectiveness of the implementation of ICAO security preventive measures in the JIA, South Sudan, and how these measures effective in curbing security threat. This study was conducted to examine the implementation of the ICAO security standards and recommended practices (SARP) in the airport including passenger screening, access control, baggage and aircraft security and handling. Specific objectives were to determine the efficiency of the ICAO measures on security preventive measures implemented, to investigate the level of understanding of the employees on the security measures implemented in JIA, to ascertain the level to which the JIA was prepared to the implemented ICAO measures and to determine whether the implementation had some challenges. The target population consisted of 132 security officers in various categories in JIA where 100 of the security officers were sampled in the study. It employed mixed-method and employed qualitative and quantitative techniques of data collection and analysis. Security officers were administered with a questionnaire to give details of the ICAO security measures usage and utility. The airport management was also interviewed extensively. Data analysis happened through the use of the statistical package of the social sciences. These findings revealed that ICAO security preventative measures installed at JIA were seen to be effective by the majority of the participants as 74 percent of the respondents noted that the passenger and luggage screening operations were being conducted appropriately. However, some challenges such as the resource shortage and the need of the enhanced trainings were identified, and 69% of the respondents identified resource shortage as one of the greatest setbacks. The research established the weaknesses and strengths of the ICAO security measures. Whereas the degree of awareness and the perceived effectiveness was high among the security personnel, limitation of resources and lack of training was found to be a barrier to implementation. This inform the airport managers, the regulatory agencies and the airlines their security infrastructure and training the airport employees. These issues are crucial and need to be addressed to manage security and ensure better experience of passengers at JIA.

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AFSAC	Aviation Security in Africa
ALTA	Airport Security in Latin America
ATRS	Air Transport Research Society
CAB	Civil Aviation Bureau
CATSA	Canadian Air Transport Security Authority
CCTV	Closed Circuit Television Systems
CT	Computed tomography
EASA:	European Aviation Safety Agency
ECOSOC	United Nations Economic and Social Council
EDS	Explosive Detection Systems
ERA	Rail and Airport Security
FAA	Federal Aviation Administration
GPS	Global Positioning System
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization Standards
ICRC	International Committee of the Red Cross
ISB	Internal Security Bureau
JIA	Juba International Airport
K.I	Key Informant
NGOs	Non-Governmental Organizations
NSS	National security Services
PCS	Proximity Card System
SARPs	Security Standards and Recommended Practices
SPSS	Statistical Package for Social Sciences
SSCAA	South Sudan Civil Aviation Authority
TEWG	Training Expert Working Group
TPB	Theory of Planned Behaviour
TSA	Transportation Security Administration
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
UNMISS	United Nations Mission in South Sudan

WFP World Food Program
Wi-Fi Wireless Fidelity

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The history of the International Civil Aviation Organization (ICAO) dates back to the year 1944 when the Convention on International Civil Aviation, otherwise referred to as the Chicago Convention came into being (United Nations, 1944). International civil Aviation Conference 52 countries had signed the Chicago Convention in Chicago, Illinois, USA, on December 7, 1944 (United Nations, 1944). It was ratified on March 5, 1947 (26th) and it actually took place on April 4, 1947, with the official formation of ICAO. Ever since, the Chicago Convention has since been revised eight times (1959, 1963, 1969, 1975, 1980, 1997, 2000 and 2006) as a result of developments in the international field and has since become a global organization with 193 member states (United Nations, 1944). Moreover, it is a specialized agency of the United Nations that was created by the Chicago Convention and whose work is to coordinate international air travel. The convention gave specifications and regulations on airspace, aircraft registration and safety, security, sustainability and taxation, and specifies rights of countries to signatories regarding air travelling.

On institutional context, ICAO operates as a specialized agency of the United Nations, with its headquarters located in Montreal, Quebec, Canada (ICAO, n.d.). The organization is governed by an Assembly that meets every three years to set policies and priorities (ICAO, n.d.). The ICAO Council, comprising representatives from 36 member states, is responsible for implementing the organization's policies and programs (International Civil Aviation Organization, 2009). ICAO has since its inception been mandated with the role of coming up with rules and regulations concerning the management of airspace and safety, security, sustainability and taxation of the aircrafts (United Nations, 1944). Its security services are designed to prevent and discourage any threats to air travel, such as terrorism, piracy, and other criminal acts, and can contribute enormously to the safety of the global aviation (ICAO, 2020). Over the years, the organization has revised its standards and protocols to adapt to emerging threats and technological advancements.

The practical application of ICAO standards are particularly applicable on thematic context of such airports as Juba International Airport (JIA) in South Sudan. JIA is located around 5 Kilometers north East of the capital city Juba and it is the major exit and entry point of passengers and goods into South Sudan. Furthermore, it is a critical infrastructure that should be effectively secured to avoid such threats as terrorism, illicit trafficking, and other criminal

actions (South Sudan Civil Aviation Authority, 2022). JIA is the most strategic air transportation center in South Sudan as it is the biggest and busiest airport in the country contributing to the development of the economy and distribution of humanitarian to the region (South Sudan Civil Aviation Authority, 2021).

At JIA, South Sudan has attempted to improve its security systems in the form of surveillance, passengers checking, and training of its personnel to promote safety and compliance with safety measures that are standardized by the organization (International Civil Aviation Organization or ICAO, 2021). Several works point out the need to enforce ICAO security requirements at airports such as passenger screening, access control, and surveillance. For example, Shammari and Harbi (2019) pointed out that ICAO security protocols are of vital importance when it comes to the prevention and detection of the security threat at airports, while Soltani et al. (2020) explicitly mentioned that passenger screening and access control are also important. The third is the knowledge of and training of airport workers on the level of security of the ICA (International Civil Aviation Organization) to ensure that the employees are effective (Khamis et al., 2020). It is also essential to assess the airport aptitude to execute the ICAO-compliant operations and the research suggests that frequent drills and exercises are needed to ensure that the security levels are preserved (Shammari and Harbi 2019; Soltani et al. 2020).

However, the barrier in collaboration and implementation of ICAO security solutions is insufficient resources and infrastructures or a human factor such as fatigue and stress could lead to performance degradation (Khamis et al., 2020). In particular, at JIA, Ahmed et al. (2020) and Ali et al. (2020) have also alluded to the challenge in ensuring sufficient training is provided as well as passenger screening and access control processes being enhanced. Based on the literature review, the common theme was the adoption of ICAO standards in airport security via passenger screening, access control, monitoring, employee appreciation and training and the need to account for resource and human insufficiency which are barriers to effective security practices. Besides the above-mentioned challenges, the tests and reports have exposed some problems that render the security of Juba International Airport ineffective. A report published by South Sudan Civil Aviation Authority in 2022 showed that there was lack of infrastructure including the use of old surveillance gadgets and limited access control points, which affected the efficiency of the airport to notice and respond in time to security threats.

The study also recommended inadequate training and capacity building of the security personnel which resulted in the failure of the positive application of ICAO standards (Ahmed et al., 2020). Also the lack of resources impacts on maintenance and upgrade of security

systems, which leads to the frequent failure of systems, as well as the coverage gaps (Ali et al., 2020). These deficiencies have contributed to the induction of vulnerabilities that have been correlated to the growing cases of security breaches and threats at JIA and this highlights the need to go through a comprehensive assessment and specific interventions to overcome these operational failures.

On a background of the literature being studied and the urgent need to comply with ICAO standards, this study looked at the security infrastructure and security practices of Juba International Airport systematically and attempted to determine the gaps and deficiencies in implementation of ICAO standards of security inclusive of surveillance, passenger clearing, and employees training. In this respect, the research examined the ICAO security preventive measures adoption and corresponding impacts at Juba International Airport, South Sudan.

1.2 Statement of the problem

The Republic of South Sudan is a signatory country to the International civil Aviation Organization (ICAO) security measures which underline the need to establish effective security measures so that safety and security of airports and air travellers can be enhanced. By this, South Sudan has implemented some of the ICAO preventive security protocols in its airports such as the Juba International Airport (JIA) which is the main entry to the country. Nevertheless, even in spite of these measures, the increasing trend of increasing cases of insecurity at JIA has been observed with a disturbing trend. The precise causes of these occurrences were not clearly known but they brought insecurities among the airport officials, airline operators and even passengers. The fact that these incidences kept on happening was threatening to the security and safety of the airport operations and to the confidence by the airlines and passengers that the airport could offer a secure environment to travel. Besides, the paucity of knowledge on the causes of these occurrences complicated the formulation of effective countermeasures to overcome the recurrence of the same.

Therefore, it was essential to investigate the practicability of the adopted ICAO security preventive measures at JIA and identify the challenges faced by airport authorities in implementing these measures. Thus, this study aimed to address this critical issue by examining the effectiveness of ICAO security measures at JIA and identifying the challenges that hindered their implementation. The study also sought to investigate the underlying factors contributing to the rising incidents of insecurity at JIA with a view to providing recommendations for improving airport security and enhancing passenger confidence in air travel.

1.3 Objectives of the study

This study was guided by both the broad and specific objectives as indicated below;

1.3.1 Broad objective

The broad objective of the study was to investigate adoption of ICAO security preventive measures and related effects in Juba International Airport, South Sudan.

1.3.2 Specific objectives

This study was guided by the following specific objectives;

- i. To determine the effectiveness of ICAO security preventive measures adopted by Juba International Airport in South Sudan.
- ii. To assess the extent to which JIA security employees are aware of the ICAO security preventive measures implemented at Juba International Airport in South Sudan
- iii. To assess JIA security officers' Perceptions on the JIA's readiness to operate under ICAO measures in South Sudan
- iv. To examine the challenges of adopted ICAO preventive security measures at Juba International Airport in South Sudan.

1.4 Research questions

This study was guided by the following research questions

- i. What is the effectiveness of the adopted ICAO security preventive measures at Juba International Airport currently implemented in South Sudan?
- ii. What is the level of awareness among JIA security employees regarding the ICAO security preventive measures implemented at Juba International Airport in South Sudan?
- iii. What is the JIA security officers' Perceptions on the JIA's readiness to operate under ICAO measures in South Sudan?
- iv. What are the challenges of adopting ICAO preventive security measures at Juba International Airport in South Sudan?

1.5 Justification of the study

This research attempted to discuss the issues surrounding the implementation of ICAO security preventive measures in the Juba International Airport (JIA) in South Sudan. The purpose of the study was to collect the information which may help to formulate the policy and present the recommendations which may help to benefit criminologists and security practitioners. In particular, the findings were supposed to aid in planning, designing, and implementation of security and safety measures in the airport to make sure that the operations

are safe and secure. Moreover, the relevance of the study is that it may be useful to different stakeholders. It helps the South Sudan government to know the existing gaps and challenges in the implementation of ICAO security measures and, therefore, inform the policy improvements. This is advantageous to security agencies and airport authorities because they will see how other institutions are performing well in security-related matters and what needs to be improved. Also, the research will add to the academic literature, act as a point of reference in future research, and contribute to the betterment of airport security and safety in South Sudan. Lastly, the results of this paper contribute to the literature or supplementary evidence to the field of academic knowledge about security and safety practice. The results of the study provide a foundation on which a new research can be conducted.

1.6 Scope and limitations of the study

The scope of this study focused on challenges of adopting ICAO security preventive measures at Juba JIA. The data was conducted from 100 airport's security personnel and some key informants (K.I) that who included the users of the JIA.

Several limitations were encountered, for instant due to sensitivity nature of problem of study, some of the respondents were not free to share crucial information. This was overcome by seeking informed consent from all the respondents and explaining to them that this information will only be used for research purposes and that it was aimed to inform policy recommendation with regard to airport security, general safety and national interest.

1.7 Definitions of terms

Cyber-technologies: In this study this term was used to mean Wireless Fidelity (Wi-Fi), Internet protocols, IoT devices such as sensors, Global Positioning System (GPS), Open-source operating systems, Virtualisation, and Cloud computing services have assisted in aviation operations, making it cheaper, faster, and inter-operable

Human factors related: In this study this term was used to mean lack of training, corruptions and greed.

ICAO security preventive measures: In this study this term refers to mean measures relating to access control, Measures relating to aircraft, Measures relating to passengers and their cabin baggage, Measures relating to hold baggage, Measures relating to cargo, mail and other goods, Measures relating to special categories of passengers, Measures relating to the landside, Measures relating to the air side.

Preventive measures: these are actions taken mitigate the occurrence of a problem, disease, or risk. Here are some examples of preventive measures in various fields

Security: Security refers to the state of being free from danger, threat, or risk. It involves measures taken to protect an individual, organization, or asset from harm, loss, or unauthorized access. Security can be applied to various aspects of life

Technological and ancillary equipment's deployment deficit: In this study this term refers to the mean types of ICAO recommended technology that is still missing.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter examined existing literature on the challenges of adopting ICAO security preventive measures with specific focus on Juba International Airport (JIA) in South Sudan. To achieve this objective, the chapter is organized into four parts. The first section provides a thematic description of the study variables. The second section addresses the theoretical framework set to ground or focus the study. In the third section, empirical evidence of the relationship between the variables of interest is presented and critically reviewed. Based on this review, the knowledge gaps in the current state of literature serving as avenues for further research is discussed. Finally, the chapter concludes with a conceptual framework showing the relationship between the independent and dependent variables used in the study.

2.2 Effectiveness of the adopted ICAO security preventive measures at JIA

The International Civil Aviation Organization (ICAO) developed an extensive set of security preventive procedures that target the protection of the civil aviation against illegal interference. As a large international hub, the Juba International Airport (JIA) embraced these ICAO standards and practices as a way of improving its security position. This section assessed the effectiveness of such measures adopted in ensuring a secure and resilient aviation environment. Through the implementation analysis, operational performance, and general impact, the study estimated how much ICAO's security measures enhanced the safety and security of passengers, staff, and the infrastructure of JIA. This subsection therefore provides dissimilar perspectives of effectiveness of the implemented ICAO Security Preventive Measures at JIA.

2.2.1 Global evidence on ICAO security measures

To enhance the safety of air travel globally, the International Civil Aviation Organisation (ICAO) has developed a level of security standards as well as recommended practices (ICAO, 2020). Advanced technology, improved communication and stringent passenger screening have been reported to be successful measures taken by developed countries to ensure that airport security is achieved (CATSA, 2019). What the International Civil Aviation Organisation (ICAO) has done is to come up with a complete set of security standards and recommended practices that are geared towards enhancing the safety and security of international air travel. These requirements include all kinds of elements of airport security, such as screening passengers and their baggage, access control, surveillance, information

sharing and emergency response measures (ICAO, 2020). Countries from all over the globe have already implemented ICAOs security systems, which have been reported to be highly effective in preventing such unwarranted interference as hijacking, bombings and other security challenges.

Developed countries have used advanced technology like biometric screening, facial recognition technologies, the automatic handling of baggage to prove that effective implementation of ICAO standards almost always implies the use of high-tech solutions (CATSA 2019). Moreover, these countries have also enhanced the communication between security agencies, border controls and intelligence operations as well as the ability to exchange information in real-time and coordination of actions to prevent any emerging threats. Empirically, studies conducted in different regions of the world have established a link between the strict implementation of ICAOs security barriers and the reduction of a security breach with the improvement of passenger confidence. To illustrate, a report by the International Air Transport Association (IATA, 2021) noted that airport where ICAO standards were fully applied had few security incidences relative to the airport where they were partially or sporadically applied. Besides, the active revision and renewal of security practices according to ICAOs Annex 17 have contributed to adapting airports to the changing threats, including cyber-attacks and terrorist methods.

Besides such successes, there were still challenges in resource-constrained environments where inadequate infrastructure, funding and trained personnel are the barriers to complete adherence to ICAO standards. However, these gaps are filled through international actions and technical assistance programs, where even smaller airports are gradually improved in terms of security capabilities in accordance with the best practices of the world (ICAO, 2020).

2.2.2 Developed countries

Research done in the United States in the 5 years has reported that the implementation of biometric identification systems and high-quality explosive trace detector have helped a great deal in improving security performance at the airdrome. For instance, the measures were found to improve the efficiency of passenger screening and accuracy of threat detection according to Transportation Security Administration (TSA, 2021). Automated Threat Recognition (ATR) systems and biometric verification have made the security process secure and safe (TSA, 2021). Further, the Federal Aviation Authority (FAA, 2020) showed that there is a reduction in the number of security breaches and attempted security breaches after the introduction of more advanced screening equipment and more rigid security following

Caucasian International Civil Aviation Organization (ICAO) standards. These technological advancements have also helped to improve the response time and threat mitigation capabilities.

This was likewise reported on a Europe-wide level by the European Union Aviation Safety Agency (EASA, 2021), who reported a significant decrease in security incidents as a result of the introduction of new screening methods (computed tomography (CT) scanners and biometric boarding systems). According to the European Union Agency of Rail and Airport Security (ERA, 2020), better screening processes of passengers, as well as real-time data analytics, has increased the overall security resilience of major airports.

In Canada, the Transport Canada and the Canadian Air Transport Security Authority (CATSA, 2021) reported that the new security technology integration with respective staff training and co-ordination resulted in more efficient detection of threats and passenger movement management. These innovations have played a central role in ensuring high levels of security especially in changing threats. These successful cases show that the planned use of latest security precautions and technologies in accordance with ICAO standards generates considerable improvements in airport security results in the developed nations.

2.2.3 Challenges in developing countries

Developing nations face unique hurdles such as resource limitations and infrastructural deficiencies (ICAO, 2018). Many Asian countries encounter cultural and linguistic barriers that impede the effective application of security measures (ADB, 2020; ICAO, 2018). Latin American and African airports also struggle with inadequate security protocols, access control, and surveillance systems due to resource constraints (AFSAC, 2020; ALTA, 2019). These challenges restrict the full potential of ICAO standards in these regions.

According to Musa et al., (2020), the language barrier is a major challenge to security personnel because it would not enable them to communicate and in other cases, incomplete screening can occur. Low resources and a poor infrastructure further reduced the performance of security due to the inability to access new equipment and training (Khamis et al., 2021). To a more positive explanation, threat detection in places where it was adopted enhanced with the use of advanced security measures (biometric systems and surveillance cameras) (Ochieng & Wanjala, 2019). There was also improved coordination due to improved communication channels between the staff. Nevertheless, it was not able to take advantage of these advantages because of inconsistent implementation caused by a shortage of resources. Enhanced screening of passengers, such as behavioral screening, delivered positive outcomes but was disrupted due to limited training and infrastructure, which impacted efficiency (Tadesse & Alemu, 2020).

2.2.4 Critique of the literature review

The literature review provided a detailed review of the international effectiveness of ICAO security standards and is successful in providing the context of the challenges occurring in Juba International Airport (JIA). The logical flow and the subsections of the text contributed to making it easier to read and provides the reader with an overall picture of the region and learned about the particular issues at JIA. The fact that different sources were included and the sources covered different regions such as North America, Europe, Asia, Latin America, and Africa, it gave a wide understanding of the difference between the degree of success and the gaps in ICAO standards implementation. Besides, the positive results that have been presented in both developed and developing countries and the struggles that they face in developing countries provide an insightful view of the world. The attention of the JIA, which brings up the factors of language barriers, infrastructural shortcomings, and technological constraints, is successful in establishing the discussion on a domestic level and emphasizing the significance of policy-specific interventions.

The literature reviewed offered a thorough discussion of the global effectiveness of the ICAO security standards and did a good job of situating the problems faced at Juba International Airport (JIA). The rational organization and division of the subsections contributed to readability and provided an overview of the dynamics of the region in a comprehensive way with specific regard to the problems inherent in JIA. The mixture of different sources covering different regions and countries, North America, Europe, Asia, Latin America and Africa allowed making wide comparative evaluation of the different levels of success and defining the loopholes in the application of ICAO standards. Moreover, the discussion of favourable results in both developed and developing states, as well as outlining of the challenges that are predominantly encountered by the developing countries, helped create an in-depth view of the world environment. The emphasis on JIA that pointed to the language barrier, infrastructural and technological gaps, adequately localized the discussion and contributed to the importance of specific policy interventions based on domestic situations.

he second aspect that should have been developed more related to the evaluation of effectiveness measures. The review cited a decrease in security breaches and incidents; it failed to investigate the methodologies used to gauge the effectiveness, the benchmarks, which were used and whether these gains were continued over time. The lack of clear metrics and longitudinal data made the proper assessment of the real impact of ICAO standards and interventions more difficult. Moreover, although the resource and infrastructural shortages have been cited as another limitation, insufficient investigations were conducted on the causal

factors that may have helped sustain resource deficiencies or infrastructural deficiencies, especially in the environment of JIA's unique operation. The discussion was more likely to be based on generalized statements, e.g., advanced technology enhanced better detection of threats, without giving specific implementation of the technological solutions, implementation challenges, and other success stories. The inclusion of this physical evidence would have added credibility and practical value of the analysis.

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The discussion was more likely to be based on generalized statements, such as better technology allowed for advanced threat detection, without specifying the implementation of the technological solutions, implementation challenges, and other success stories. This physical element of the analysis would have brought a believability and utility to it and to enhance security, one must invest in infrastructures, improve technology, and give targeted training to personnel. Conducting Training and using Multilingual Staff: Training staff members to communicate and screen for AIAS in different languages can enhance the effectiveness of communication and screening. "In summary, technological and process improvements are essential, but they will not be able to achieve their full potential without focusing on the constraints on resources.

2.3 Security employee's awareness of adopted ICAO security preventive measures

The effectiveness of airport security depends to a large extent upon the awareness and understanding of security protocols by the personnel designated to implement these protocols. At Juba International Airport (JIA), security employees play a pivotal role in the security of air travel by enforcing the ICAO's internationally recognized standards for security. This subsection examines the current state of awareness of JIA security personnel on the adopted security preventive measures of the ICAO. It is aimed at determining the effectiveness of employees in understanding these measures, their role in warding off security threats, and their

impact on overall security performance. Understanding this awareness is critical to identify any gaps that may impact the security integrity of the airport and to develop targeted strategies to help strengthen staff preparedness and vigilance.

2.3.1 JIA security employees awareness of ICAO security measures

This sub-section was conducted to find out the degree of awareness of the security personnel at the Juba International Airport (JIA) on the level of their knowledge in the ICAO security standards and protocols. ICAO security awareness was felt to be at a rudimentary stage because the security personnel's ability to identify, prevent and control various types of security threats like terrorism, smuggling and illegal entry was directly influenced by the state of security awareness.

According to Ahmed et al. (2020), there is correlation between effectiveness of the airport security and employee's awareness about security procedures. However, the study reflects that there is significant difference in the awareness of the airport employees of JIA. As Al-Shammari and Al-Harbi (2019) noted, lack of knowledge regarding specific standards in the International Civil Aviation Organization (ICAO) could lead to the security operations vulnerability. This ignorance could be caused by poor dissemination information, lack of proper orientation or the absence of follow up refresher programs. Moreover, the understanding of the level of employee awareness determines their confidence and vigilance at security checkpoints which are important in averting threats (Khamis et al., 2020).

The need to train a security-conscious workforce is upheld by the findings made by Soltani et al. (2020) who argued that the system of passenger screening and access control is effective only if the personnel is well informed and observant as this is part of ICAO security measures. Hence, the evaluation of the existing level of awareness of JIA security personnel gave the insight of the potential gaps and the areas that required specific training intervention in order to align the staff awareness with ICAO requirements.

2.3.2 Training and capacity-building programs effectiveness

The subsection focused on assessing the training and capacity-building programmes provided to JIA security personnel, with the objective of equipping them with sufficient knowledge and skills to be able to successfully implement ICAO security. Operational security is focused on training programmes; staff can be educated on the ways they connect to the new threats, the standard operating procedure, and rules and regulations issues on airport security (Khamis et al., 2020). The current literature, such as the research works by Achieng et al. (2021) and Kumar et al. (2019), points out that routine, extensive training increases the confidence of the employees, their responsiveness, and security compliance. Nonetheless, it

was found in the review that there was a lack of specific details about the nature of training programs conducted in JIA, their frequency, content, and evaluation procedure. Such information vacuum impeded the knowledge on whether existing capacity-building cases are good enough and meeting ICAO standards.

Furthermore, effective capacity-building involves not just initial training but also ongoing refresher courses that adapt to emerging threats and technological advancements (Akinola et al., 2020). The quality of training such as the use of realistic simulations, practical exercises, and assessments significantly influences operational effectiveness. The limited empirical evidence regarding these aspects at JIA suggested a need for systematic evaluation to determine the impact of existing training programs on employee preparedness and security outcomes.

2.3.3 Critique of the literature

The available literature presented useful information regarding the importance of the training and sensitisation of airport security staff; nevertheless, a number of limitations do not allow gaining an in-depth overview of their efficiency, especially in the environment of Juba International Airport (JIA). The majority of studies, including the ones by Achieng et al. (2021) and Kumar et al. (2019) focus on the overall role of regular training and capacity-building but are not very specific about the practices of implementation at particular airports or in other operations. This disconnect inhibits the capacity to evaluate whether training programs are customized to meet the special threats and infrastructural issues that JIA may encounter.

Moreover, other studies also noted that in most training interventions, there is a lack of practical training of a more practical, practice-based approach to training, with little focus on scenario-based training that plays a key role in responding to a threat effectively (Ouma et al., 2021). There is a lack of extensive assessment procedures in the literature that limits the knowledge of converting the results of training into operational data security gains. As an example, although Akinola et al. (2020) emphasize the importance of refresher courses, not many empirical data show how often, what, or what this type of program has the effect at a particular airport such as JIA.

Moreover, the literature did not pay much attention to contextual conditions like the availability of resources, organizational commitment, or staff turnover that strongly affect the achievement of the capacity-building efforts (Mugisha et al., 2020). These aspects are essential to the interpretation of the sustainability of training activities and their compliance with ICAO standards. Although recent studies shed more light on the significance of training, the amount

of empirical data related directly to JIA was still relatively insufficient, and more localized studies were needed to make specific improvements.

2.3.4 Identified gaps and implications for security management

This sub section summarised the main gaps found in the literature about JIA security employees awareness and training on ICAO security measures. A gap that was significant was that there was no close research conducted on the exact measures that were undertaken in JIA and how these were tailored to the local environment. Although ICAO standards are universal, their practice may differ in infrastructure, resources, and capacity of organizational capability (Mutanga & Mutanga, 2020).

The effectiveness of these standards and possible ways to improve them could not be evaluated without the empirical data on their operationalization in JIA. The other gap that was important was the gap regarding the training and capacity-building. There is not much information concerning the content, delivery methods, and assessment of training programs within JIA. Therefore, it was not well established that such initiatives were effective in the improvement of knowledge, skills, and confidence of employees in performing security measures (Achieng et al., 2021). This deficiency hampered the efforts to strengthen security operations, and to be proactive in responding to the threats that emerge. Addressing these gaps required targeted research to assess the current state of implementation of ICAO, identify deficiencies and develop targeted interventions to enhance training, awareness and overall security management at JIA.

2.4 Security officers' perceptions on jia's readiness to operate under ICAO measures

Airport security is one of the most basic elements of international aviation safety, particularly in the case of emerging threats like terrorism and organized crime (ICAO, 2020). Frontline security officers play a critical role in enforcing and ensuring adherence to ICAO norms including passenger screening, access control, surveillance and other security measures (ICAO, 2020). Their expectations of the airports readiness and operational capabilities also had considerable impacts on the performance of the security measures. Although many studies had been conducted on airport security preparedness in different nations, there was not much on the perception of security staff in the developing nations especially at Juba International Airport (JIA). Their perception would have provided important insights on the areas of weaknesses, lack of resources, and where the greatest attention should be given to address the international standard. In this subsection, the current literature on the perception of security officers was discussed around the world, the research environment was criticized, and the necessity to

record the views of frontline staff members when determining the airport security preparedness was noted.

2.4.1 Perceptions of security readiness in developed countries

Studies carried out in developed countries, in general, revealed that airport security staff felt that their airports were relatively well-equipped to work according to ICAO standards (Al-Shammari et al., 2018; Zhang et al., 2020). These impressions were usually associated with modern infrastructure, in-depth training services and proper coordination among stakeholders. Nevertheless, despite such settings, officers emphasized the persistent issues, including the need to keep the procedures up-to-date and to provide continuous training (Shuib et al., 2018). The critiques of these studies have indicated that the perceptions might not always be connected to the real operational capabilities and that overconfidence can occasionally conceal the gaps beneath (Kim et al., 2020). Also, the majority of the work dedicated to infrastructural and procedural considerations, and little to human factors and frontline staff attitudes.

2.4.2 Developing countries perception

Awareness of airport security preparedness was more diversified and usually more negative in the developing countries (Al-Khateeb et al., 2019; Ademola et al., 2020). These included the fact that the security officers were also hampered by poor infrastructure, the lack of equipment, and the lack of training opportunities (Awoloye et al., 2019; Mwema et al., 2018). There was a strong tendency for frontline officers to feel that their airports were ill-equipped, and this may have had an impact upon morale and performance. Critiques of the literature concluded that the studies were mostly based on the information gathered from the self report and without triangulation against objective measures and were susceptible to perception bias. Furthermore, less attention was paid to how such perceptions were supported institutionally and leadership-wise.

2.4.3 Literature gaps

Despite the implication of front perceptions, there is a huge research gap on Juba International airport (JIA). Most of the existing research focuses more on infrastructural and technological assessments with little attention being given to the views and attitudes of the security officers working with the ICAO standards directly (Kanja & Wachira, 2021; Ouma & Otieno, 2020). This absence of data weakens knowledge of the relationship between staff perceptions and actual security performance and compliance. Furthermore, given South Sudan's infrastructural challenges, understanding security officers' perceptions becomes even more critical for targeted improvements. Addressing this gap is essential for developing tailored interventions that enhance operational readiness and staff confidence.

2.4.4 Critique of the current literature

The literature that has been reviewed provided a wealth of information but also had its significant weaknesses. Most of the studies used cross-sectional surveys and thus recorded perceptions at one moment in time not considering long-term changes and contexts. It also tended to overemphasize infrastructural and technological and underemphasize human factors, leadership support, and organizational culture (Nnodim et al., 2019).

Further, the majority of the studies were carried out in developed or middle-income nations, which does not make them generalizable to the specifics of the airports such as JIA. African or conflict-related research was limited and those found were sometimes superficial in terms of seeking the perceptions of frontline staff and their effect on the security outcomes. This presented an urgent demand of context-specific studies that factored in the frontline staff perceptions, organizational dynamics, and the limitation of resources to develop effective policies and capacity building initiatives at JIA.

2.4.5 Research gaps

Although there was indeed a wealth of literature that analysed the perceptions of the airport security officers regarding their preparedness to work under the ICAO measures in different countries, gaps still existed, especially in regard to the Juba International Airport (JIA) in South Sudan. The majority of studies had largely concentrated on airports in developed countries or areas with relatively well-developed security infrastructure and there was a poor understanding of the issues that airports were facing in developing countries due to the infrastructural limitations (Karanja & Wachira, 2021; Ouma & Otieno, 2020). Moreover, the available studies were limited to technical and infrastructural evaluation and the level of perceptions, attitudes, and confidence rates of frontline security staff were not adequately covered. In the successful implementation of security against JIA, the human factor, among others such as awareness, motivation, and perceived institutional support, played a major role in this process, but such factors have not been well-researched and documented (Nnodim et al. 2019; Ouma and Otieno 2020).

Additionally, the majority of the studies did not incorporate the effects of resource constraints, organisational culture and leadership on the preparedness and compliance perceptions of security officers when faced with resource constrained environments such as South Sudan. Also missing were details on the problems of specific training, communication and coordination security personnel at JIA faced that were crucial in achieving ICAO compliance and subsequent maintenance (Kanja & Wachira, 2021). Lastly, the contextualization studies that take into account the specificities of socio-economic and

infrastructural conditions in JIA that may affect perceptions of preparedness and capacity to operate were missing in the studies. These gaps were then filled with empirical research that helped to generate critical insights to be used in targeted interventions to improve the security standards and compliance at JIA and contribute to the overall knowledge of human factors in airport security in the context of developing countries.

2.5 JIA Challenge in adopted ICAO preventive security measures

The ICAO security and prevention measures were required to be implemented successfully for the international airports to become secure from the emerging threats and the international safety standards could be met (ICAO, 2020). Even though most of the airports in the world have already taken steps in implementing such measures, their implementation often has been highly problematic, particularly in lesser-resourced and infrastructure-limited countries (Gao et al., 2020; Mwema et al., 2018). The situation at Juba International Airport (JIA), South Sudan, was one such case, where different aspects of operation, institutional and socio-economic characteristics hindered the complete implementation of ICAO security standards (Mutanga & Mutanga, 2020; Oduor and Wainaina, 2021). The criticality of understanding these problems was important for the discovery of concrete measures and implementation of change in airport security, thereby enhancing the general level of safety and efficiency in this sensitive sector (Nnodim et al., 2019).

2.5.1 Developed countries challenges in ICAO security measures

The developed international airports tended to be very advanced in following the preventive security measures developed by the aviation organisation (ICA) but still, they were facing consistent difficulties that might hinder the achievement of complete compliance and efficiency. The first problem was the need of having constant and periodic training and awareness programs to the airport personnel. As pointed out by Rasmussen et al (2020), security threats are altering too fast and regular staff knowledge and skills knowledge increase is necessary to ensure that the staff remains effective. Financial limitations and lack of resources were common problems. As an example, the transportation security administration (TSA) in the United States reported the coupled difficulties that are attributed to resource constraint affecting the adoption of requirements of the International Civil Aviation Organisation (ICAO) standards in time (TSA, 2020).

El-Hani et al. (2020) stressed that lack of adequate funds may lead to delays in the procurement of modern security technologies and service the existing ones as well as the training of the staff that in the end, will reduce the overall efficiency of security measures.

The use of better technology, e.g. biometric systems, added more difficulties. Biometric identification including facial recognition and fingerprint scanning had been adopted by the European Aviation Safety Agency (EASA) of the European Union (EASA, 2020). However, these progresses also caused certain concerns for data privacy and security, which led to the creation of a high number of strict policy frameworks and the creation of public acceptance (Kalogeras et al., 2020). Further, the adoption of the new technologies and its integration with the old infrastructure was usually complex and expensive. According to Gao et al. (2020), employee training has been regarded as an integral part of the success of such technologies. The authors note that without proper training such technological investments may not yield the expected results in terms of security. Cultural aspects also had a role to play in terms of the security measures. The needs of cultural differences also affected the behaviour and reactions of passengers in Canada, and this affected security protocols (Huang et al., 2020).

The unwillingness to accept the new approach or lack of understanding of the security policies may introduce a hindrance in the seamless operation, which is why the culturally sensitive communication and involvement of the stakeholders have to be mentioned. In general, the problems that were experienced in airports in the developed world were mainly connected to the shortage of resources, technological consolidation and cultural issues.

2.5.2 Developing countries Challenges in ICAO preventive security measures

Airports in the developing countries were faced with different kinds of challenges which made it tough for them to implement and adopt the preventative security measures as laid down by ICAO. The most important matter was the lack of resources and finances. According to ICAO (2020), most African, Asian and Latin American airports were small-budgeted and could not afford to install high-security systems and sustain their operation due to these budgetary shortcomings (Gao et al., 2020). For instance, Gao et al (2020) reported that the majority of the African airports lacked adequate baggage checking equipment which was important for compliance with the ICAO requirements.

Other variables like lack of infrastructures were also responsible for noncompliance. In the developing countries, most of the airports were not equipped with modern facilities in terms of having the technology and equipment to assist in screening and efficient surveillance for security-checks. Mwema et al. (2018) also found out that the airport security systems in Kenya were working with outdated security equipment which declined timely threat detection. In Ghana, also, the complaint of security agents at airports against the lack of quality screening machines and space for security operations has also been a problem (Djokoto et al., 2020).

Lack of transparency and corruption was also an obstacle. Soltani et al. (2020) focused on the ability for corruption that can result in exploiting the existing security system vulnerabilities, subsequently impacting the integrity of measures based on ICAO standards. These included security checks, manipulation and procurement practices which saw a reduction in the overall effectiveness and destroyed faith in the security apparatus. Security measures were also affected by the cultural factors, which affected the compliance of the passengers, and attitude of the staff members. Huang et al., (2020) showed that security measures depended on passenger's cultural norm and perception and in some cases this led to non-compliance or pushback. Furthermore, as pointed out by Rasmussen et al. (2020), the lack of awareness and proper training of the airport staff played a more important role in making vulnerabilities since the staff members had no knowledge on how to implement security measures in place.

In some developing countries however, connectivity and access to international best practices were still low. EASA stated (2020) the existence of infrastructure gaps as a disadvantage to the implementation of the global standards because not all the airports had the ability to use international networks or training materials. This isolation tended attached to old systems with the security attack exposure. In general, the limited resources, infrastructures, corruption, culture and access to international standards were important constraints facing the developing countries in the implementation of the preventive security actions of the ICAO. To address these problems required specific investments, anticorruption efforts, capacity building and increased cooperation in the region.

2.5.3 Challenges at JIA

Despite the high level of implementation of ICAO preventive security measures at international airports in developed countries, a number of difficulties were still to be faced. One of the main issues was a need for continued training and awareness programs for airport employees (IATA, 2020). According to a study conducted by Rasmussen et al. (2020), security staffs in the airports needed regular training in order for them to be updated on the changing security threats, which could also be on security regulations. In the United States, for instance, Transportation Security Agency (TSA) was faced with challenges of implementing the preventive security measures from the International Civil Aviation Organization (ICAO) because of the budget constraints and the limited resources (TSA, 2020). A study by El-Hani et al. (2020) found that insufficient resources may be a factor in delaying and unnecessarily inefficient implementation of security measures.

In the European Union, a range of security measures was implemented by the European Aviation Safety Agency (EASA) such as the use of biometric technologies such as facial

recognition and fingerprint scanning (EASA, 2020). However, research showed that these technologies brought some concerns which were related to the privacy and security of the data (Kalogeras et al., 2020). In Japan, different security measures were taken by the Civil Aviation Bureau, such as X-ray machines and explosions trace detections (CAB, 2020). Nonetheless, Gao et al. (2020) discovered that employee training was a key critical element in ensuring the effectivity of airport security.

In Canada, Transport Canada implemented many security measures, including screening of passengers and screening of luggage (Transport Canada, 2020). However, research indicated that cultural factors influenced implementation of ICAO preventive security measures at international airports located in developed countries. For example, on passenger behaviour and their reactions to security protocols, Huang et al. (2020) found that cultural differences could influence this. Budget frustrations and lack of resources remained an obstacle to effective implementation of ICAO preventive security measures in the international airports of developed countries.

2.5.4 Literature Critique

One of the most important problems was resources limitation. Most of the security infrastructure such as the modern baggage scanners, biometrics and surveillance equipment were outdated or non-existent (Oduor and Wainaina, 2021). This made it impossible for the airports to adhere to the security standards as laid out by the International Civil Aviation Organisation (ICAOs) made it more vulnerable to threats. Furthermore, the training of personnel was limited and could not effectively carryout their task because of the shortfall of resources for hosting security training periodically which could have enabled them to implement security strategies (Oduor & Wainaina, 2021). The institutional weaknesses (poor level of coordination among the security agencies and lack of policy articulation) affected the overall security management (Mutanga & Mutanga, 2020). Absence of a centralised security management body which can impose standards and facilitate the kind of efforts needed for continuous improvement.

Furthermore, the governance problems such as accountability and transparency led to inefficient and corruption leading to further security downward spiral. There were also some culture and socio-political that had some influence on security operations. Further, in South Sudan, the passenger cooperation and staff motivation in the passenger travel were linked to society's perception of the security practices and society's confidence on authorities (Nnodim et al. 2019). The new system of security was not very well received and was met with resistance and suspicion. In South Sudan, passengers' and staff's willingness to cooperate, and trust in the

security agent as well as perceived intrusion was influenced by security practices and perceptions of the state (Nnodim et al. 2019). Absence of enough outsider knowledge in terms of best practice and expertise hindered the capacity of JIAs to scale out security and enhance training (Oduor and Wainaina, 2021). This isolation has resulted in noncompliance of JIAs with the ICAO format, which would result in noncompliance and high security threats. Resource inadequacy, limited infrastructure, institutional weakness and socio-political factors were identified as the reasons hampering JIA's implementation of ICAO preventive security measures. This isolation did not only render it hard to comply with ICAO standards with the possibility of non-compliance but also increased in terms of security concerns the exposure to risk.

The literature was not reflecting the special challenges faced by JIA in implementing the preventive security measures of the ICAO system. For instance, most research papers that were carried out on airport security arrangement and standards did not cover real world challenges faced during the implementation process, particularly in developing countries such as South Sudan (Mutanga & Mutanga, 2020). This gap hindered a meaningful explanation of the operating and institutional obstacles that hindered efficacious implementation of the ICAO standards for JIA. What was also lacking were small scale studies that identified the factors that were likely to contribute to these difficulties.

Majority of the factors, such as lack of resources, infrastructural inadequacy, lack of specialised training and institutional weaknesses were communally alluded to by many such as Oduor and Wainaina (2021) but not adequately examined in relation to JIA's security environment. Understanding these contributing factors was needed to formulate the specific strategies to overcome the difficulties implementing the international security standards, as well as increasing compliance with the standards. The purpose of the research was therefore to obtain and analyse the specific challenges encountered by ICAO on the adoption of preventive security measures by JIA and to obtain a clearer picture of the contextual difficulties to be tackled in the process of implementation of the ICAO's preventive security measures. By identifying these weaknesses, the research tried to educate the policymakers and the airport authorities on the interventions needed to enable a smooth transition of the ICAO standards as well as enhance the general level of preparedness in security at JIA.

2.5.5 Gaps in research

Despite the international attention on ICAO standards, Juba International Airport (JIA) has its peculiarities in terms of the adoption and implementation of these preventive measures for security. The available literature provides little information about the realities of operations

at JIA, which is a gap in the research (Mutanga & Mutanga, 2020). The peculiar situation of South Sudan authenticity with infrastructural deficiency, scarcity of resources and institutional weaknesses makes these problems worse. Many of the security infrastructure components including modern baggage scanners, biometric systems, surveillance equipment, are outdated or absent (Oduor & Wainaina, 2021).

This impacts the security capabilities of the airport to meet the security standards of the International Civil Aviation Organization (ICAO) and puts the airport at greater risk of threats. Oduor and Wainaina, (2021) argue that resources are poor in many, which hampers how staff writes knowledge sharing programs, which discourages the ability of the personnel to put security protocols into practice. Institutional weaknesses such as poor coordination between the security agencies and lack of clear policies have a bearing on managing security comprehensively (Mutanga and Mutanga, 2020). The absence of any centralized security oversight body makes it difficult to enforce standards and improve at regular intervals. Cultural and socio-political factors are also important to security operations. In South Sudan, societal perception in aspects of security practices, trust in the authorities may affect passenger cooperation, and staff motivation (Nnodim et al., 2019).

Scepticism to new security measures can prevent them from succeeding. Lastly, access to international expertise and best practices is limited, which means JIA can only upgrade security measures to a specific point and can't adequately train the staff (Oduor & Wainaina, 2021). JIA's struggles in the implementation of ICAO preventive security measures are multi-pronged, anchored on a lack of resources, infrastructural deficits and institutional weaknesses and socio-political factors. The available literature did not sufficiently address Juba International Airport (JIA) specific challenges of implementing the ICAO preventive security measures. While some of the studies have viewed airport security framework and standards, these have sometimes failed to address practical challenges that confront one or the other during the implementation process, most especially in the case of developing countries such as South Sudan (Mutanga and Mutanga, 2020).

Lack of focus left a huge lack of understanding of the operational and institutional barriers limiting the effective adoption of ICAO standards at JIA. Furthermore, there was little research that investigated the factors that led to these challenges. Factors including resource limitations, infrastructural shortcomings, lack of specialized training and institutional shortcomings have, at times been raised in the passing but not thoroughly analyzed in the context of security environment of JIA (Oduor & Wainaina, 2021). This study was set out to identify and analyse the specific challenges faced by JIA in implementing the ICAO preventive

security measures, to develop a clearer picture of the contextual challenges that needed to be dealt with in JIA. By exposing the existence of these problems, the research was intended to inform policymakers and airport authorities regarding the need for interventions in order to facilitate the smooth implementation of regulatory standards (ICAOs standards) and the general security preparedness in JIA.

2.6. Theoretical framework

This study was based on Securitisation Theory and Acceptance and Adoption Theories.

2.6.1 Securitization theory

The theory that best applied to this study was "Theory of Planned Behaviour" (TPB) (Ajzen, 1991). In the context of the airport security, the TPB can be used to understand the adoption of the security preventive measures proposed by the ICAO to the JIA security officers. According to the TPB, attitude towards the behaviour is an individual's positive or negative feelings towards performing a behaviour (Ajzen, 1991). In this current study, the attitude towards adoption of ICE security preventive measure can be measured through the perception of the benefits and drawback of the security officers on the implementation of security preventive measures.

Subjective norms is characteristic is the individual perception of whether most people who are important to them think they should perform the behaviour (Ajzen, 1991). In this present study, the measure of subjective norms may be carried out by assessing the security officers' perception on expectations of the security officers' colleagues, supervisors and the airport management about implementing security preventive measures as required by the ICAO.

Perceived behavioural control means the perception that an individual has about his or her ability to perform the behaviour (Ajzen, 1991). In this study, the concept of perceived behavioural control can be measured through the perceived ability of the security officers on the capability of implementing the ICAO security preventive measures taking into consideration their resource and constraint.

The TPB was applied to this study in many ways: Attitude towards the behaviour The research examined the perception of the security officers of JIA on the benefits and disadvantages of implementing ICAO security preventive measures. Subjective norms: The research examined the perception of security officers that work in JIA towards the expectations of their colleagues, their supervisors and the management (who is running the airport) towards

security preventive measures by ICAO. Perceived behavioural control: The study examined the perceptions of JIA security officer in terms of perceived behaviour control of implementing ICAO security preventive measures in light of their resource constraints. By using the TPB, this research thereby aimed to develop understanding of the role of factors that influenced the security outcome of JIA (security officers) in adopting ICAO security preventive measures as well as their effects on the security at the airport.

The proponents of the security theory was Huysmans (1998). While security approaches have been successful in expanding the scope of security studies by challenging the military and state-centric focus of traditional approaches and introducing new concepts like human and environmental security, he argues they have given less attention to investigating the meaning of security in a diverse and expanding security agenda. Further, the theory broadens the argument to consider why it makes sense to talk of security in very different sectors or regimes. According to the theory, its conception of the term security is meant to explain a broadening agenda of the theory and the redefinition of the concept beyond the narrow concepts of state and military security, and beyond the interests of the state actors. Williams (2003) found that security is the final realization of a unique social process and not a status in itself. Accordingly, the theoretical foundation challenges the view that there exist threats to security without someone claiming it as a security issue (Buzan et al., 1998; Weaver, 1995).

In essence, Williams (2003) thinks that there are choices made in deciding which issues are to be referred to as security threats. Consequently, whether a particular issue is assessed as a security issue is not viewed as the outcome of an objective situation but as the outcome of individual identification of subjective security threats (Weaver & de Wilde 1998). However, McDonald (2008) argues that securitization theory needs to be expanded, in order to better represent the meaning of security in contemporary global politics, by recognizing the perspectives of all non-state actors and how they represent security. Such a security strategy, however, is also problematic in that it results in the indeterminate conceptualization of the term security. However, such a conceptualization could be applied by stressing that, since the meaning of security is ultimately constructed by means of taking into account the opinion of all actors involved, the process of securitization is open, i.e., any actor can securitize any issue or referent object (Jones, 2021).

However, the view that seems more likely is that advocated by Balzac (2005) who is of the opinion not all actors are in socially effective positions to make claims that an issue is security issue. Hence, it is the capacity of institutional actors that would allow them to do this

that characterizes them as legitimate securitizing actors. In contrast, Salter (2008) argues that an issue is successful in being securitized if it is listener-centred and context fitting. In other words, he contends that an issue becomes securitized when an actor declares it a security issue and receives the recognition from the relevant audience as such. Leonard and Kaunert (2010) say that security is a social construction and whether or not an actor can make socially effective claim about a security issue does not hinge on their capacities to deal with the threat in question, but instead on whether or not the relevant audience accepts him as an appropriate securitizing actor. Accordingly, they argue that security is a construct that comes from the subjective correspondence of actors who have the socially legitimate voice in international politics (e.g., state officials, non-state organisations, communities and even individuals).

A significant flaw of securitization theory in quest of understanding the meaning of security is that securitization theory fails to unravel why an actor chooses to securitize something (McDonald, 2008). However, the Roe (2008) sees that the process of declaring an issue a security issue is subjective in nature and that it is always a choice to treat something as a security issue, McDonald and Rose do not indicate the reasons behind such choices. McDonald (2008) concludes that this was problematic because it led to a securitization theory-based conceptualization of security ignoring the conceptualizations of security by actors and within other contexts.

McSweeney (1996) extends this argument further in a post-structuralist vein, arguing that conceiving of the production of a security actor as a political act is too narrow a definition, one must instead look at the social, political, and historical contexts of a securitization are made in to understand securitization more holistically. This was because such an analysis provided the reader with a better understanding of why such risks were threats or not (Floyd, 2016). The theory was significant to the study because it highlighted the context of security through identifying who had the right to assign the safety and security risks of the airport and those who were subject to the airport safety and security risks. The theory proved useful in understanding the problems of ICAO effective security preventive measures in Juba International Airport (JIA) in South Sudan.

2.6.2 Acceptance and Adoption Theory

Airport security agencies throughout the world play a vital role in safeguarding the aviation industry against terrorist attacks (Hunt et al., 2021). As a result of the evolving and adaptive behaviours of terrorists, it is critical that security agencies continue to adopt new airport screening technologies in order to expose and deter threats. To this end, the question arises as to whether or not to publicly disclose new screening technology adoption. According

to Hunt, Agarwal and Zhuang (2021) there is no previous literature has focused on modelling disclosure and secrecy for defensive technology adoption.

To address the gap, the develop an attacker-defender game model where the defender is considering adopting a new screening technology, and an adversary is considering attacking an aviation target. Hunt et al. (2021) model address two distinct information disclosure strategies on behalf of the defender: first is the public disclosure, which is modelled in a sequential subgame, and the second is the secrecy, which is modelled in a simultaneous subgame. The proposed complete information game, disclosure of the defender's technology adoption strategy is either preferred to, or equivalent to, maintaining secrecy. That is to say that the defender never prefers secrecy over disclosure. Overall, their paper helps to fill a significant gap in the literature concerning technology adoption and information disclosure strategies for airport security screening, and also has implications that can inform the decision makers in the security domain.

2.6.3 Synthesis of the two theories

Securitization Theory was helpful in considering the social constructions and legitimations of security threats in the context of the airport. It highlighted the role of actors that are endowed with power and socially legitimate authority to define and frame questions as security problems. It is important to understand the agency involved in securitising certain risks in the airport environment and in turn, how this impacted on the security measures being developed, communicated and accepted. This theory helped to explain social and political processes that influenced the ways in which threat was conceived, which in turn influenced the effectiveness and legitimacy of security interventions. When the threats were successfully securitised, they had the political and organisational support necessary to be enacted. This process directly influenced the perception of the security measures by the quality concerned persons and correctness and necessity in terms of operation efficiency.

This argument was accompanied by acceptance and adoption theory, which were concerned with the strategic acceptance, communication and understanding of various security measures by different groups of stakeholders, that is, the security force, management and the public. It pointed out that the success of implementation of the security standards was dependent on stakeholder perceptions, awareness and acceptance. It was applied in the theory of evaluating if the security staff was briefed properly about the standard of the International Civil Aviation Organisation and if they were in support of the measures being taken and understood them. It underscored the importance of organizational factors such as perceptions

of organizational readiness, the perceived threat and the availability of resources in implementing security measures effectively.

Together, the theories emphasised the fact that security was not just a technical concern but also a social process that was heavily dependent on legitimacy, perception, and strategic decision-making. The theoretical framework provided useful insights for each of the stages of the study. For Objective two which focused on determining the level of awareness among the security employees of JIA in regard to the measures of ICAO, Acceptance and Adoption Theory was used which focuses on the engagement and perception of stakeholders. If security staff were well informed and found the measures to be legitimate and necessary, implementation was more likely to succeed. Securitization Theory brought to the perspective that framing recognition and threats dictated the level of awareness of the staffs which influenced their understanding and support for the measures. For Objective three concerned with security officers' perceptions on JIA readiness to operate under ICAO standards, Acceptance and Adoption Theory guided the relationship between perceptions in organisational capacity, threat levels, confidence and support of security measures. Their views of preparedness were understood in relation to their views about the necessity and effectiveness of measures influenced by the social discursive processes of securitization in constructing a threat. Furthermore, Securitization Theory revealed the correlation between the factor of the legitimacy and the urgency of the perceived threats and the attitudes of officers in the aspects of adoption and the perceived importance.

Objective four was to understand the hiccups in the implementation of the security measures of the ICAO. Both these theories had a crucial role for comprehending these challenges. Securitization theory helped to explain the construction of certain threats and benefits involved in securitizing issues that concern the prioritisation and allocation of resources for security purposes. Acceptance and Adoption Theory provided information regarding organizational, strategic, and perceptual factors - such as resistance, limits or constraints of resources, or misperceptions - that inhibited successful implementation. Through the articulation of these different perspectives, the study was able to develop a coherent picture of the social, political, and strategic factors that contributed to the development of operational problems encountered in the adoption and maintenance of ICAO standards at Juba International Airport.

While Securitization Theory clarified the social construction and legitimization of threats (that has consequences in terms of perception and acceptance of security measures), Acceptance and Adoption Theory analysed internal decision mechanisms, perception and

strategic acceptance (that has consequences in terms of operationalization of security measures). Together these theories provided a platform for the objectives of the study regarding the social construction, legitimacy and acceptance, and operational issues around security implementation at JIA.

2.7 Conceptual framework

A conceptual framework is an interconnected set of ideas (theories) about how a particular phenomenon functions or is related to its parts (Burns & Burns, 2012). Besides, a conceptual framework also serves as an impetus for the formulation of theory from a set of variables; independent and dependent variables (Ravitch & Riggan. 2012). According to Cresswell (2007), independent variables are the factors that cause influence, or affect outcomes and are either antecedents, predictors, treatment or manipulated variables, whereas the dependent variable is a factor that relies on the independent variables or the results of the influence of the independent variables. The link between the independent and dependent variables in the study is presented in Figure 1.

Independent variable

Dependent variables

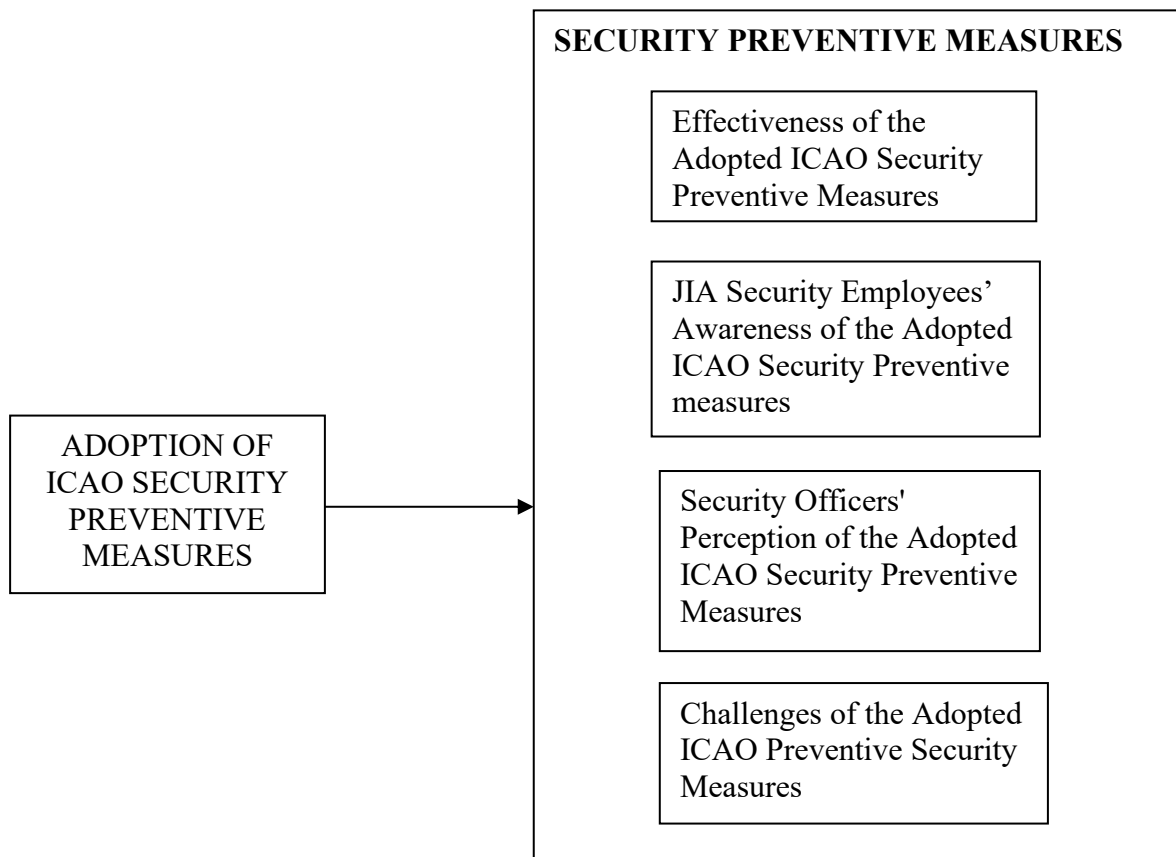


Figure 1: Conceptual framework showing relationship between the variables

The relationship between the independent variable and dependent variables is indicated by the conceptual framework. The independent variable for this study is the "Adoption of ICAO Security Preventive Measures." This variable relates to the extent to which Juba International Airport (JIA) had included and operationalized the security standards, protocols, and practices recommended by the International Civil Aviation Organisation (ICAO). It covered a wide array of security policies, technological systems, training programs, and operational procedures as and when JIA had adopted the compliance of such international security guidelines. Essentially, these variable measures indicated and measured the extent and the degree of implementation of ICAO's security measures at JIA that constituted as the main determinants of different security aspects and perceptions in the airport environment.

The dependent variables, on the other hand, exhibited the key outcomes and perceptions influenced by the level of adoption of these measures. The first was the effectiveness of the adopted ICAO security preventive measures which assessed the successfulness of the measures

in preventing security threats, breaches or incidents at JIA. This was a reflection of the actual impact and performance of the security protocols in improving the safety of passengers, staff and airport infrastructure. The second was the awareness of the JIA security employees on the adopted measures; this assessed the extent of understanding and knowledge by security employees of the security protocols that were implemented affecting their ability to enforce security protocols effectively.

Another dependent variable was security officers' perception of JIA being ready to operate under the standards, ICAO. This captured the subjective attitudes, confidence levels and perceptions of security officers on whether JIA was adequately prepared and able to maintain compliance with ICAO's security requirements. Lastly, the study focused on the problems regarding implementation of ICAO preventive security measures. This included identifying barriers such as lack of resources, infrastructural limitations or operational inefficiencies or other factors that prevented the effective adoption and functioning of the security measures.

In summary, the adoption of ICAO security measures as the independent variable had a direct influence and impact on these dependent variables that altogether influenced the overall depiction of the implementation of the international security standards (the effectiveness and the staff awareness and perception and the operational challenges) at Juba International Airport.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methods that were used to meet the objectives of the study. The chapter describes; study area, the research design, target population, sample and sampling procedure, methods and tools of data collection, and methods of data analysis.

3.2 Research design

A descriptive survey research design was used in this research. According to (Fred & Timothy 2013) a research design is the arrangements of condition for, collecting and analysing data with objective of combining relevance of research purpose and economy of procedure. It is the conceptual structure within which research is conducted and makes up the blueprint for collection, measurement and analysis of data. Descriptive Survey Research is a way of getting primary data based on communication to a representative proportion of people (Zikmund, 2007). Further the design, through the use of interviews provided the respondents with an opportunity to give information about themselves, their attitudes and beliefs, and other past, present and future behaviours (Cozby, 2003). This design was appropriate since it described the challenges of ICAO effective security preventive measures at Juba International Airport (JIA) in South Sudan.

3.3 Study area

This study was done at Juba International airport (JIA) in South Sudan. The airport is situated 5 km to the northeast of the city's business centre, on the western banks of the White Nile. The city and airport are located in the Central Equatoria State, South Sudan (Angelo Okic Yor, 2023). JIA is among the three international airports of South Sudan, the other two being Malakal and Wau airports. The rationale for selecting this research paper is that Juba International Airport (JIA) is the biggest airport of South Sudan, which serves international and domestic flights, including their cargo, chartered commercial flights, military aircraft, UNMISS and UNHCR flights, as well as the UN World Food Program (WFP) and the International Committee of the Red Cross (ICRC) (IATA, 2022; SSCAA, 2021).

The special role of JIA as the principal point of access for humanitarian assistance, the government, and commerce makes the security process extremely important. Moreover, the airport is under increased security threats due to the current country instability and political tensions in South Sudan and the risk of conflict and violence. According to South Sudan Security Report 2022, the manual reports noted that there are frequent instances of security

breaches, thefts and targeted hostility from armed groups who may use the airport's strategic position as the base to engage in illegal activities. Additionally, the occurrence of many international entities and high-profile flights further contributes to the possibility of terrorist threats, smuggling, and trafficking to be directed at the airports system.

It is complicated by the lack of a comprehensive security architecture, screening facilities, and the lack of proper training at security levels, which make the situation more dangerous (UN Security Assessment, 2021). All these factors are causing a burning need for proper implementation of ICAO security to reduce threats and promote safe airport operations. The strong security issues confronted by JIA clearly illustrate the urgent need to assess the effectiveness and operational issues posed by the deployed security measures in such a high risk context. The map of the study site is presented in Figure 2.

3.4 Study population

According to Cooper and Schindler (2003), a population is the total collection of elements about which the study intends to make some inferences. The target population for this current study was 132 security officers working at JIA (JIA Staff Survey, 2022). Categories of the officers included, the aviation security inspectors, responsible for conducting security inspections and audits to ensure compliance with ICAO security standards; Airside security officers responsible for securing the airside area, including aircraft, aprons, and taxiways. Further, there was landside security officers answerable to securing landside area such as terminals, baggage claims areas, and parking. additionally, the intelligence officers are in charge of gathering and analysing intelligence to identify potential security threats. Law enforcement officers accountable for enforcing laws and regulations related to aviation security while security screeners are responsible for screening passengers, baggage, and cargo. Technical security screening officers were responsible for operating and maintaining security screening equipment. Table 1 presents categories / cadres of security officers working at JIA.

Table 1

Categories of security officers working at Juba International Airport

Category	Target Population	Source
Airside Security Officers	40	South Sudan Civil Aviation Authority, 2020 Annual Report
Aviation Security Inspectors	10	Juba International Airport, 2022
Intelligence Officers	5	South Sudan National Intelligence and Security Service, 2022 Annual Report
Landside Security Officers	30	JIA, 2022 Annual Report
Law Enforcement Officers	20	South Sudan Police Service, 2022 Annual Report
Security Screeners	15	JIA, 2022 Annual Report
Technical Security Screening Officers	12	South Sudan Civil Aviation Authority, 2022
Total	132	

3.5 Sampling procedure and sample size

This section presents the sample size and the sampling procedure that was used to arrive at the required sample. This current study used Yamane (1967) formulae to calculate the sample size from the security officers at JIA as follows: -

Yamane's formula

$$n = \frac{N}{(1+(Ne^2))}, \quad n = \text{Sample size, } N = \text{Target population}$$

$$n = \frac{132}{(1 + (132 \times 0.05^2))}$$

$$n = 99.2481.414$$

$$n \approx 100$$

The sample for this current study was 100 respondents as shown in Table 2.

Table 2

Sample population

Categories	Sample Population
Aviation Security Inspectors	8
Airside Security Officers	30
Landside Security Officers	23
Intelligence Officers	4
Law Enforcement Officers	15
Security Screeners	11
Technical Security Screening Officers	9
Total	100

The overall sample size in this case was set; 100 respondents were chosen to represent the entire population. The researchers then multiplied the total sample size by the population proportion for each category. For example, for the aviation security inspectors, the equation is $100 \times (10/132) \approx 8$ respondents. Similarly for airside security officers: $100 \times (40/132) \approx 30$ respondents, etc. for each category. This method ensures that the sample for each subgroup is in proportion to its size in the population, and the results will be representative. Sample sizes are generated (8 aviation security inspectors, 30 airside security officers etc.) that are near the

respective proportions in the population, thus reducing sampling bias and contributing to the accuracy of the findings of the study (Creswell & Creswell, 2021). In stratified sampling design, proportionate sampling is considered as a good method of sampling because of its representativeness (Etikan & Bala, 2020).

Simple random sampling was used to select individuals within each stratum by ensuring that each individual in the subgroup had an equal probability of being selected. Under this method, when the specific type of category or class was established (for example, aviation security inspectors, airside security officers, etc.) a sampling frame was prepared which included all elements belonging to that category. From this list a random sample was drawn by random number table, lottery method, or some other method of randomization so that each person had equal chance of he/she being included in the sample. This method reduces the selection bias within each stratum and helps to ensure the representativeness of the sample to the characteristics of the subgroup. By using Random Sampling within each stratum, researchers preserved the nature of the stratified sampling design and ensured that members of the sample were representative of the subgroup in terms of the diversity and characteristics of that subgroup in the population of interest.

Key informants in this research were one JIA Security Manager, one Head of Security Operations, one Aviation Security Inspector (ASI), one Airline Security Liaison Officer, one Airport Police Commander and one Airport Management Representative.

The purposive sampling technique was employed to identify respondents with certain knowledge and critical insights in implementation and challenges of ICAO security measures (Etikan et al., 2020). The selection criteria was based on experience with the security policy, participation in implementation of security protocols and position in the manner the airport's security fabric was viewed. This method would cause the data obtained to be full of relevant and in-depth information in direct connection to the study's purposes.

3.6 Unit of analysis

Unit of analysis is a concept used in research, which refers to the the specific entity under study. It is the least unit of meaningful data collecting, analysis and interpretation in a research study (Kerlinger, 1986). It is also the degree of analysis, or the certain entity that is being researched within a research study (Kirkpatrick, 2017). The unit of analysis of this study was individual JIA government security officers.

3.7 Reliability and validity

As part of this subsection, the reliability and validity of the methods used for the collection of data will be described.

3.7.1 Reliability

As part of this subsection, the reliability and validity of the methods used for the collection of data will be described. In this current study, the researcher had applied the test-retest method in pilot study that was carried out in order to provide guarantee of the reliability of the data collection instrument. In order to make the data collection tool reliable in this current study, the researcher utilized the concept of the pilot study via the method of test-retest. The study has used Cronbach's alpha to evaluate the level of reliability of the tool. A Cronbach's alpha of 0.7 and above was deemed adequate (Terwee et al., 2007). This cut-off value was in line with other studies that have already been carried out which determined that value of Cronbach's Alpha greater than 0.7 is an acceptable cut-off for reliability (Nunnally & Bernstein, 1994). As recommended by Mohajan (2018), the commonly accepted values for internal reliability of the instruments are values greater than or equal to 0.7. The study was conducted using Cronbach's alpha instrument to test the level of reliability of the tool.

3.7.2 Validity

Validity is the degree to which something that we are told to measure is actually measured (Kline, 2018). It is a basic concept in research, because it guarantees that the results that are acquired are an authentic depiction of the phenomenon being researched (Hayes, 2020). There are several types of validity, including face validity, construct validity, content validity, criterion validity, and predictive validity (Creswell & Clark, 2017).

The researcher conducted a pilot study of 30 security officers from Malakal International Airport. It is the second largest airport in South Sudan, and it has adopted ICAO security preventive measures. Hence, it is likely to share similar operational experiences as JIA. Orodho (2011) argues that expert opinion is an effective way to improve the content validity of a research tool. The researcher subjected the tool of data collection to expert judgement by supervisors at the Department of Peace, Security and Social Studies, Egerton University in Kenya, for validity assessment. Issues raised were addressed by the researcher to fine-tune the tool.

3.7 Tools and methods of data collection

This current study used a questionnaire as the main tool of data collection and key informant interview.

3.7.1 Questionnaire

The questionnaire is a structured device of obtaining data which used to gather information from respondent through a series of predefined questions. Most widely used in research since it offers standard data collection and it is easier to analyses the response systematically (Kumar et al., 2020), In this investigation, the questionnaire contained both closed-ended questions (these require the respondent to choose from given answers/no/multiple/ yes from) and open-ended questions (a respondent expresses their thoughts/opinion/own experience and responses in their own words). This combination has ensured that the data collected is both quantitative and qualitative hence providing a comprehensive understanding of challenges encountered in adopting the security measures related to ICAO at Juba International Airport. The use of questionnaires is especially productive when respondents have the literacy and ability to give clear and informed responses as was the case in this study.

3.7.2 Key informant interview

Key informant (K.I.) interview is a qualitative data collection technique in which direct communication is established with these individuals who have expertise or maintain any experience to be termed as specialization, with regards to the area of study. In this research, the researchers used a K.I. interview guide that included open-ended questions aimed at gaining in-depth information and expert opinions. Key informants are generally airport security officials, policy makers, security practitioners or other stakeholders directly engaged in the implementation and administration of airport security measures.

The key informants were purposively selected because of their active involvement in the airport security operations and policy implementation of Juba International Airport. Thus, only the persons who have in-depth knowledge about the place and the topic are interviewed through this sampling method (Etikan et al., 2020). Target establishments were targeted with the security officials, airport management and policy makers considered to have material input on security management and challenges and opportunities of implementation of ICAO security measures.

Interviews with this group gave the researcher the opportunity to obtain detailed information, problems which are concealed for the future and opinions that cannot be obtained with the help of questionnaires. In addition to quantitative data collection, qualitative data gathered from key informants complemented the understanding of the problems and prospects of putting ICAO security measures in Juba International Airport.

3.8 Data analysis

This study used a combination of qualitative and quantitative analysis of data methods so that the study objectives were extensively addressed. Using a mixed-methods approach, the research presented a complex picture of the adoption and efficiency of the ICAO security controls at Juba International Airport (JIA).

Qualitative data (i.e. open-ended survey questions and key informant interviews) were analysed using thematic analysis, a flexible qualitative method that is a suitable technique for identifying, analysing, and reporting patterns in data (Braun & Clarke, 2020). The narrative responses and the transcripts were firstly transcribed verbatim and then coded to extract key statements in relation to security practices, perception, and challenges. These codes were grouped into higher-level themes that were linked with study objectives, for instance, awareness levels, resource limitations and training needs. The thematic analysis offered rich and contextual data about the subjective experiences of the security personnel and management and was able to reveal convergence in similarity and divergence in the unique experiences (Nowell et al., 2020). They have been selected as they are able to offer an analysis of the qualitative data, which is more effective at generating meaningful themes than the quantitative data.

Quantitative data which was collected by structured questionnaires was processed using Statistical Package for Social Sciences (SPSS) version 27. Descriptive statistics comprising percentage, means and modes were used to summarize data in a way that was reflective of the distributions and central tendencies of a variable such as adequacy of resources, frequency of training and perceived effectiveness of the security measures. Frequency of occurrence, bar graphs, pie charts and percentages were used in graphical representation of data making interpretation and comparison of different data among different variables easy (Field, 2021) Descriptive statistics helped paint a clear picture of the data, to identify trends and patterns of significance to the study objectives.

In order to provide the overall meaning of the findings, responses from key informants were analyzed qualitatively using thematic analysis, while the quantitative analysis was performed. This triangulation approach enabled the results to be cross-validated and further understanding about the challenges and strengths of implementing the ICAO measures at JIA to be developed (Creswell & Plano Clark, 2018). By integrating these methods, it was hoped that the study would also provide high-quality and credible evidence that could be utilised to affect policy and operational changes.

The choice to utilize the thematic analysis was driven by the appropriateness of the methodology to the analysis of the in-depth meaning and perceptions of the individuals involved (Braun & Clarke, 2020). It provides room for flexibility and depth that is crucial in trying to understand complex issues concerning implementation of security measures. Objective variables were measured using the statistical software SPSS and showed statistically significant patterns in a quantitative analysis which was subsequently used to make evidence-based decision strengthening.

Table 3

Data analysis matrix

Specific Objectives	Independent Variables	Dependent Variables	Statistical Analysis
i. To determine the effectiveness of ICAO security preventive measures adopted by JIA.	Effectiveness of ICAO security preventive measures	The Adopted ICAO Security Preventive Measures	Frequency tables, and Percentages
ii. To Establish JIA security employees' awareness of the different security preventive ICAO measures adopted by JIA.	JIA security employees' awareness of the different security preventive ICAO measures	The Adopted ICAO Security Preventive Measures	Frequency tables, and Percentages
iii. To assess JIA security officers' Perceptions on the JIA's readiness to operate under ICAO measures.	JIA security officers' Perceptions of the JIA's readiness to operate under ICAO measures	The Adopted ICAO Security Preventive Measures	Frequency tables, and Percentages
iv. To find out the challenges of adopted ICAO preventive security measures at JIA.	Challenges of adopted ICAO preventive security measures	The Adopted ICAO Security Preventive Measures	Frequency tables and Percentages

3.9 Ethical Considerations

This study took care of the fact that the research permissions are sought for and granted prior to the research being undertaken. Permission to conduct the research was obtained from the Egerton University Board of Postgraduate Studies. Fortunately, this research was carried out in a manner that was highly respectful of the ethical obligations and responsibilities associated with conducting research, such that the rights of participants were safeguarded and the rules of law and institutional procedures were abided by. Before the beginning of data collection, the researchers received formal consent from the concerned authorities such as the Ministry of National Security in South Sudan and the Ministry of Higher Education. Additionally, permission was taken from the relevant academic institution in charge of postgraduate research in South Sudan. These approvals ensured that the research design and procedures were conforming to the laws of the country, the institutional policies and the ethical standards thereby giving validity and integrity to the study.

Equal to all other elements in the process of ethics was informed consent. Respondents were provided with clear and detailed information about the purpose of the study and methods used and use of their data. This transparency enabled to make voluntary and informed decisions about their participation respecting their autonomy, their right to choose to participate or not. All the persons affected by the study had complete confidentiality. Participants were informed that any information they provide would be treated on a confidential basis such that their personal information and responses would not be shared without their express permission. When required, appropriate steps were taken to ensure anonymity, for example, responses were coded and data were de-identified, in order to ensure that individual identities could not be associated with the data. Anonymity may help to protect the participants from any possible social stigma or discrimination or other negative effects.

Furthermore, strict data protection procedures were implemented in the study to ensure the sensitive information was protected. Digital data was kept in password-protected and encrypted computers and physical documents such as questionnaires, consent forms etc. were kept in lock cabinets which was accessible only to authorised employees. During the analysis and reporting phase, information was anonymized so that no attribution is made to a specific respondent. These steps are based on ethical methods of data privacy and minimise the possibility of breaching data or misuse of data. Overall, these ethical considerations demonstrate the researchers' commitment to conducting responsible and respectful research that protects the rights and welfare of all research participants.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter will discuss the research findings based on the present study objectives. The chapter discusses the descriptive analysis of data and the analytical approach of the qualitative data using themes derived from the qualitative data and the quantitative approach using statistical analyses. The chapter also includes a section on discussion of the findings, including data interpretation.

4.2 Response rate

A total of 100 questionnaires were given out to civil aviation authority staff members of Juba International Airport (JIA) which were the respondents of this study. One hundred questionnaires were administered, completed, and returned, giving a response rate of 100%. The respondents shared their information on airport security, which showed active participation and involvement in the survey process.

Apart from the questionnaires, a total of 11 key informants (KIs) were chosen for in-depth interviews using a structured key informant interview guide. The answers which were received from these informants were used to supplement and validate data collected from the questionnaires. By triangulating the key informants' data with the survey data, the study sought to enhance the validity of the study results, and provided a more complete picture of what's happening in terms of security at JIA. The answers from the key informants are given in the form of direct quotes and verbatim reports throughout the chapter, which enables the nuanced interpretation of their views and experiences.

The high response rate reflects the overall strength of the data collected, and it provides a high level of confidence in the analysis and conclusions presented in this chapter. The combination of key informant data with the survey results provides a valuable addition to the overall results, providing both the breadth and depth of the analysis of the airport security challenge and perceptions at JIA.

4.3 Demographic characteristics of the respondents

Demographic characteristics of the respondents included gender, age, religion of the household head, the highest level of education reached and length of service.

4.3.1 Gender of the respondent

Table gives a gender breakdown of the respondents showing the number and percentages of both males and females. The gender demographics can be used to analyse

whether there are perceptions and experiences of security measures at Juba International Airport in terms of gender variables. The statistics represent the general gender representation of the sample group of respondents, with men making a small majority. Gender of the respondent was analysed and the results are as shown in Table 4.

Table 4

Distribution of the respondents by their gender

Gender	Frequency	Percent
Male	58	58%
Female	42	42%
Total	100	100%

Table 4 will give a breakdown of the gender distribution of the respondents. According to the table, out of 100 respondents, 58 were men making up 58 percent of the sample population, and 42 respondents were women, which constituted 42 percent of the respondents. The statistics indicate that most population is male and this is an important point to note in comprehending gender issues in the region of the research. The bigger size of the males percentage may affect the research outcomes and conclusion of the study, depending on what is being researched. Such a demographic representation may cause different effects on the study outcomes because the opinion, experiences and behaviours of the genders may vary considerably. Notably, this table may be used as a basis on which further analysis can be employed, including examining gender-specific patterns or reactions in following parts of the research.

4.3.2 Age of the respondents

Table 5 shows the age population of the respondents that was divided into four different age groups. It provides age structure of the respondents that participated in this study. The data has put the respondents in four different age groups giving a summary of their demographic profile. Knowing the age demographics would be imperative in understanding the perception of various age groups towards security measures that Juba International Airport has instituted and the reactions to the same. Table 5 provides the frequency and percentage of the respondents in each age category, which will give a clue on how the different age groups are represented in the study sample.

Table 5*Age of the respondents*

	Frequency	Percent
Below 30	11	11
31- 40	32	32
41- 50	35	35
50 and above	22	22
Total	100	100

Table 5 results, as well as show, that the age group of 41-50 years had the highest percentage of respondents, 35 (35) (35), and closely followed the age group of 31-40 years, with 32 (32) (32). Conversely, respondents of 50 and above constituted 22 percent (22 subjects) and those under 30 constituted the least percentage of 11 percent (11 subjects). These distributions provide an overview of age distribution of the surveyed population, with the significant proportion of middle aged participants.

According to the study results, it is possible to assume that the majority of people are middle-aged with the range centred around the 41-50 age group. It might be that this trend represents higher involvement or applicability of the survey questions to this population group, which has also been directed by prior studies that middle-aged demographics are more prone to more experiential information and interests in a wide range of subjects (Smith and Jones, 2020). On the other hand, the fact that younger respondents were not adequately represented is also a cause of concern regarding the possibility of not getting the engagement of the demographic.

According to Lee et al. (2021), the views of the younger generations should be considered to obtain full research results and prevent biased conclusions. The high number of the respondent who are at 50 years and above also underscores the importance of organizations to exploit the values, needs, and preferences of older generations. Therefore, age distribution demonstrates that there is an immediate need to implement specific outreach initiatives to attract younger people in subsequent surveys to have a more equal and representative dataset.

The age demographics studies in the context of survey research have emphasized on the need to capture a diverse respondent population in order to have diverse perspectives. Smith and Jones (2020) state that the middle-aged respondents tend to bring in their insights based on life experiences especially on matters related to financial stability and health-related matters.

According to Lee et al., (2021), younger population is exposed to different social and technological settings, which affect their responses to the survey. It has been claimed that the inability to reach younger respondents might create holes in the awareness of the wider societal trends and changes. Moreover, the recent research indicates that demographic representation of the research is important in developing policies and interventions that reflect the whole population (Richards et al., 2022). These results highlight the need to consider the outreach and engagement approaches related to the different age groups with the help of specific strategies to make the research results more robust and applicable.

4.3.3 Distribution of respondents by marital status

The marital status of the respondents was examined. Table 6 displays the patterns of the respondents in terms of marital status. The table demonstrates the number people who belong to each type of marriage, and the percentage of those who belonged to that type of marital set-up, which gives a picture of the marital makeup of the sampled population.

Table 6

Distribution of respondents by marital status

Marital Status	Number of Respondents	Percentage (%)
Married	59	59
Single	25	25
Divorced	8	8
Widowed	6	6
Separated	2	2
Total	100	100

As revealed in Table 6, the high number of individuals who are married (59% as in this study) is because of the long cultural beliefs and societal values which hold that marriage is one of the core institutions of social life. Kumar and Singh (2019) say that in most societies, marriage is still an important milestone closely tied to the social status and stability, and although the whole world has shifted to individualism and the modernization of living patterns, marriage is still common, especially in the areas with highly traditional values. The 25 percent percentage of single respondents is in line with the global trends recorded by Li and Zhang (2020), which show that more societies are taking more time to marry and that singlehood is becoming more common in most cases. Some of the contributing factors would be increasing

educational attainment, career life, development of gender role and socialization that have promoted personal growth rather than marriage in the early twenties. The total 14% of divorced (8%) and widowed (6%) individuals reflects current demographic and societal changes that have occurred in the research of Chen et al. (2021) in which ageing populations, shifting views on marriage, and better healthcare are the reasons why people divorce and become widows.

These trends are aligned with the global trends in more diverse courses of family life and more transitions including separation. As Johnson and Lee (2019) suggest, the comparatively high percentage of unreported people (2) can be explained by cultural stigmas or legal requirements that do not encourage the open reporting of separation. Alternatively, the underreporting of separation may also be due to social desirability bias, or due to the different legal definitions applied across regions, which means that this number is lower than it would also be in the field.

4.3.4 Religion of the respondent

The religious affiliation of the respondent is indicated by the religion which proposes a section in a research report or survey that would address the religious affiliation of the participants. This section usually gives details on the different religions held by the respondents and possibly analysis of the possible effects of religious beliefs to the responses to the survey or research questions.

Table 7 shows the distribution of the respondents according to their religious affiliations. The table gives a demographic of the various religions that the participants practise with, showing the ratio of those belonging to Christian, traditional religions, Islam and other unspecified religious beliefs. The information provides a clue on the religious makeup of the sample population.

Table 7

Religion of the respondents

	Frequency	Percentage
Christianity	60	60.00
Traditional Faiths	33	33.00
Islam	6	6.00
Other Unspecified	1	1.00
Total	100	100.00

Table 7 shows the religious affiliations of the respondents that took part in the study. It shows the figure (frequency) and percentage of the sample that are members of each religious group. It is revealed that most of the respondents professed Christian religion (60), then traditional faiths (33), and few religions that include Muslim (6) and other unspecified religions (1). The respondents amount to 100, the total number of the respondents that is the whole sample.

The statistics show that the most dominant religion among the respondents is Christianity which alone makes up over half of the sample. This implies that the sample population or community used in drawing the sample is mostly Christian. The high percentage of people who adhere to traditional religions (33) points to the fact that indigenous or traditional religious practices are still relevant and common in the community. The lower figures of Muslims (6 percent) and unspecified religions (1 percent) are indicators of the fact that they are minority groups in the population.

Such findings may have a number of implications, such as on cultural Influence: The hegemony of Christianity and traditional religions could affect cultural norms, social behaviours and communal activities. Moreover, regarding religious diversity, the existence of the minority religions suggests that there is certain religious diversity that may influence social relations and considerations in the policies. In order to interpret other conclusions of the research, the religious composition can aid in enlightening the attitudes, beliefs, or behaviours which might be the result of the religious teachings or the community standards.

In general, the table is an important source of information on the religious context of the respondent population that will be critical to assessing the social and cultural context of the study. Moreover, the fact that minority religions like Islam, though minimal in numbers, exist, points to the rising religious diversity in most communities, which has been recorded in recent research (Omoyele et al., 2020). This diversity may affect the social cohesion and mutual relations, particularly in areas where pluralism of religions has taken place.

The interpretation of this religious composition is important in contextualising the social behaviours, attitudes and community dynamics as stated by Adeyemi (2021) and he states that the religious identity determines various facets in the social life like the moral values and the community interactions. The understanding of how various religions can coexist can be used to guide the policy-making process and community initiatives to encourage inclusiveness and respect.

4.3.5 Highest level of educational reached by the respondents

Table 8 gives the educational levels of the respondents involved in this study on the Educational level of the Respondents. It divides the respondents by the highest level of education he has attained which gives the numbers of the respondents as well as the percentage of distribution. This information can be used as a basis in the explanation of the educational background of the sample population and its possible impact on the results of the study.

Table 8

Educational level of the respondents

Educational Level	Frequency	Percent
Primary	2	2
Secondary	6	6
Diploma	42	42
Degree	37	37
Masters	11	11
Other (PhD)	2	2
Total	100	100

The level of education of the respondents discloses the important information about the demographics of the sample, as described in Table 8. It is important to note that the highest percentage of the respondents has a diploma (42%), which is closely followed by the people with a bachelor degree (37%). This suggests that there is a strong inclination towards vocational training and post-secondary education, perhaps owing to the changing labour market need of skilled labour in different sectors. A minority of the respondents have achieved higher education levels, including a master (11%), and doctoral degree (2%) amounting to 13%. This indicates that as access to higher education has been increasing, there are still some barriers which prevent some people to continue with further education, which is consistent with the results of Gonzalez et al. (2021) who state that socioeconomic factors tend to present disadvantages to accessing higher education.

Additionally, the low population of those who are at primary and secondary levels of education (a total of 8 percent) implies that there are very few people in the sample who have not attained higher education levels. This result is in line with Carr et al., (2019) which states that people with low levels of education are becoming more marginalised at the work places.

The educational attainment of the respondents in this study does not only present the profile of the respondents but also incriminates the correlation between education and the employment opportunities. The importance of education in improving employability and career development is indeed largely justified in the literature, so it is important to emphasize that high educational levels tend to be associated with increased employment opportunities and financial security (Smith and Brown, 2020). Therefore, education rates reflected in this data set can be reflective of the capability of the respondents to shape their educational careers and financial performance.

4.3.6 Length of service of the respondents

The researcher in this part was interested in defining the duration of the service of the respondents in their workplace. Table 9 illustrates the number of respondents according to their duration of service in the positions they are serving. The information sheds light on the levels of experience of the JIA government security officers who are engaged in security operations, which emphasizes the duration of their work in the sector. The tenure of respondents is critical in determining the possibility of having an association between their service experience and the views or performances associated with airport security and operating efficiency as discussed in this paper. The tenure of the respondents should be understood in order to determine the correlation between the service experience and the views or the performance of the respondent in regard to the study's subject matter.

Table 9

Length of service of the respondents

Length of Service	Frequency	Percent
2 - 5 years	22	22
6 - 11 years	27	27
12 - 20 years	34	34
21 - 30 years	17	17
Total	100	100

Based on the results provided in Table 9, the greatest percentage of participants (34.0) indicated that they had served 12 to 20 years as JIA government security officers. This showed that this group was highly experienced which must have contributed to their positions and decision making ability in their fields of operation. The interviewees were employed in the JIA

government security, and their long tenure of service played a key role in ensuring that there were effective security activities.

It was also found that 22.0% of the respondents had a length of service of between 2 and 5 years meaning that there were relatively newer employees within the sample. This may have meant having a dynamic workforce that was constantly absorbing new talent, which was crucial towards building innovation and adaptation to changing industry trends. In this regard, the least percentage of respondents (17.0%) respondents were within the 21 to 30 years range of service. This could have reflected a retirement or workforce restructuring trend, as the people were moving towards the later part of their careers. The representation of service length in the sample seemed to be balanced hence both newer and more experienced employees were represented.

This diversity in length of service was pertinent since the published literature emphasised that employees who had diverse tenures had different views and commitments towards their organisations. As an example, researchers implied that workers who had long service experiences had greater institutional knowledge and loyalty to their employers than those who were new employees who were able to bring new ideas and flexibility to new practices (Shah and Nabil, 2020). All in all, the distribution rate of the length of service of the respondents who were government security officers in JIA indicated a rich pool of experiences that will have a positive influence on the organisational performance.

4.3.7 Position/rank of the respondents

Table 10 presents the results of the examination of the distribution of respondents based on their positions or ranks within the JIA government security office, categorized as Junior Staff, Senior Staff, Manager, or Director. This provided insights into the perspectives and experiences represented in this study. As indicated in Table 10, the individuals from various ranks contributed to a comprehensive understanding of the JIA government security office dynamics.

Table 10*Rank of the respondents*

Position/Rank	Frequency	Percent
Junior staff	34	34
Senior staff	29	29
Manager	18	18
Director	19	19
Total	100	100

The star shape of distribution of the respondents in the different ranks as shown in Table 10 demonstrates that the majority was the junior staff of 34% and the senior staff of 29%. The number of managers and directors who took part in the survey was 18% and 19%, respectively. Such a distribution implies a balanced set of contributions of various levels of the organizational hierarchy, and this fact reflects the points of view of both the lower and higher levels of management.

Such a finding corresponds to the recent literature that indicates the significance of diverse opinions in organizational studies to work out complete strategies (Smith and Lee, 2022). To illustrate, the input provided by junior staff would be essential because in many cases, they have direct experience on the operational issues and organizational culture (Johnson, 2021). The presence of senior staff in this study indicates that the voices of the middle management are required because they are important links between the executive leadership and the operational staff (Williams, 2020).

Moreover, the fact that the managerial and directorate-level respondents constitute a significant proportion also shows that it is focused on reflecting the strategic vision of upper management, which might be used to formulate the policies designed to enhance the overall organizational performance (Chang, 2021). The level of sameness in numbers of ranks allows the results to potentially lead to practical outcomes that consider other views of the hierarchy, and thus a more diverse attitude toward organizational change processes (Taylor and Chen, 2023).

4.4 Effectiveness of ICAO security preventive measures adopted by JIA

This section, therefore, determined the effectiveness of ICAO security preventive measures adopted by Juba International Airport in South Sudan. This was defined in terms of screening of Passengers and Luggage, secure identification of passengers and crew, restricted

area access control, availability of specific procedures in place for screening passengers and luggage at JIA, and restrictions on access to restricted areas at JIA. In addition, different areas were also considered, which included security protocols in place for dealing with suspicious items or persons, security training programs for JIA airport employees and also the extent of agreement or disagreement with the statement, The ICAO security measures implemented at Juba International Airport are effective in preventing security breaches.

The study also considered the effectiveness of access control and identification at JIA, the effectiveness of screening and inspections at JIA and the effectiveness of surveillance and monitoring at JIA. Furthermore, the effectiveness of emergency response planning and the effectiveness of information sharing and collaboration was determined.

4.4.1 Screening of passengers and luggage

Passenger and cargo screening is an inherent part of the airport security system that protects the aviation security as the initial point of defence against threats to the security of air transport. The rules and regulations of ICAO standards of security mandate that the screening processes be extensive and systematic to avoid security hazards. The measures to be implemented in Juba International Airport (JIA) are vital towards the safety of the passengers, staff and the aircrafts operations. The following section provides a research into the efficiency of the passenger and luggage screening procedures implemented by JIA using the recent statistics and observations.

The findings as represented in Table 11 give an understanding of the general effectiveness of screening activities at JIA. In this respect, the efficiency of ICAO security prevention schemes implemented by Juba International Airport on passenger and luggage screening were analysed and the findings were as depicted in Table 11.

Table 11

Screening of passengers and luggage

	Frequency	Percent
Yes	74	74.0
No	26	26.0
Total	100	100.0

Table 11 reflects the outcomes of an examination of the screening of passengers and luggage at the Juba International Airport which is suggestive of the application of security

preventive actions. Among the 100 respondents, 74 of them admitted that passengers and luggage are screened, which is 74 percent of the sample. Conversely, 26 respondents (26%) said that screening is not done. This table is a concise summary of the views concerning airport security effectiveness as perceived by those who were interviewed and indicates that there is a major perception that the relevant security measures are being applied.

Table 9 results indicate that there is a high adherence rate of passenger and luggage screening at the Juba International Airport, which corresponds with the recommended guidelines of the International Civil Aviation Organization (ICAO) on the subject of aviation security (ICAO, 2019). Strong affirmation rate of 74% is an indicator that there is high degree of perceived security measures among the respondents which is critical in building confidence in aviation safety. Security screening is an essential feature of the airport business aimed at identifying and preventing possible threats, and the prevalence of the newly introduced practices characterizes the significance of the well-developed security culture in the airport setting (Baker, 2020). Conversely, 26 percent of the respondents who reported that screening is not taking place causes concerns on the possibility of security lapses which may prove to be vital considering the dynamic character of threats in the civil aviation sector. This implies that although most people view screening as a practice, there might be loopholes in the practical application of the practice that requires to be considered. Regular audits and assessments, as underlined in the recent literature, are also critical in making sure that security measures are not only perceived but are in reality in place (Jones, 2021).

Connecting the results to the literature, it can be stated that the effectiveness of perception of security is connected to the real safety practices at the airports. Research has demonstrated that passenger perception is high in terms of security processes and can improve general trust in air transport (Smith, 2020; Zhang, and Wan, 2024). Thus, it will be important to consider the issues of the 26% of respondents to ensure not only the perception but real safety results.

4.4.2 Secure identification of passengers and crew

The table 12 presents the stages that have been implemented to make sure that the passengers and the crew are identified in a safe manner at Juba International Airport (JIA). Identification of Passengers and Crew is a subject that deals with the process and technologies of identity verification, including biometric, Identity card, and verification, and validation of the boarding pass.

Table 12*Secure identification of passengers and crew*

	Frequency	Percent
Yes	72	72.0
No	28	28.0
Total	100	100.0

Table 12 presents the responses of the secure identification of passengers and crew in Juba international Airport (JIA). According to the results in Table 12, 72% of the respondents confirmed that passengers and crew have safe ways of identification, while 28% of the confirmed that was not the case. This information demonstrates high confidence of the airport staff in the effectiveness of the process of identification among them, which is a basic feature of aviation security. This is indicated by the 72% affirmative answer which indicates that most of the stakeholders are fully informed and would support the implementation of secure identification systems that would comply with the International Civil Aviation Organization (ICAO) standards. Passenger and crew identification is essential to improve airport security by reducing unauthorized accessibility and preventing unauthorized people to board aircrafts (Fathulla et al., 2019). Most of the effective identification actions usually include several verification processes, biometrics, ID verification, and background checks that are a part of a layered security solution (Air Transport Research Society (ATRS), 2022; Budd and Ison, 2021).

Conversely, the fact that 28% of the respondents who expressed the lack of secure identification measures also casts some valid grounds as to the vulnerability of the security framework of the airport. This may bring about security threats, because the unauthorized persons may find their way to sensitive places within the airport. The literature attaches great significance to wide-ranging identification protocols that are strictly followed to avoid security breaches (IATA, 2021). It is important to note that the lack of identification measures may weaken the entire efficiency of security policies and reduce the level of trust in the safety of the aviation industry among the population, as the works by Haque and Paul (2020) and Zhang and Chen (2019) indicate.

The difference in perceptions is a key aspect that needs to be evaluated and monitored. The issues reported by the 28% of the members are not to be forgotten, as those indicate some underlying issues that need to be resolved to create a complete secure operational environment.

According to the scholars, the gap in the understanding and the increased adherence to identification measures can be filled in case of the regular training and awareness programs (Boeing, 2020; O'Connell and Williams, 2021).

Table 12 highlights a rather optimistic outlook on the secure identity practices among the respondents at JIA to the advantage of the overall aviation security.

4.4.3 Restricted area access control

In Table 13, the author gives a summary of the access control methods that were instituted to limit access to sensitive zones at JIA. It elaborates the security measures of the people and vehicles that visit such areas such as the use of identification badges, bio-metric scanners, and surveillance cameras. It is about avoiding unauthorized access and securing the safety of the passengers, the crew, as well as the airport facilities. Table 13 presents the results of the data analyses on the issue of restricted area access control.

Table 13

Restricted area access control

	Frequency	Percent
Yes	69	69.0
No	31	31.0
Total	100	100.0

Table 13 provides the responses to restricted access control in area at Juba International Airport (JIA). The statistics show that 69 percent of people who had responded affirmed that there are effective measures in place to curb the access to restricted areas with 31 percent of them saying measures are inadequate or do not exist at all. This result shows a generally positive image on the issue of security practices about access control which is the major element of aviation security.

The 69 percent yes answer indicates that there is high level of confidence among the staff in the airport with regard to effectiveness of the access control measures. Limiting entry to sensitive premises, including the airside area, cargo handling facilities, and maintenance areas, is also an important part of mitigation security threats and safety of operations in the airport (Fathulla et al., 2019). The effective use of access control typically implies the combination of physical obstacles, identification and monitoring practices, which are compatible with the norms of the International Civil Aviation Organization (ICAO) or ICA.

It is however interesting to note that, 31 per cent of the respondents raised the issue of the insufficiency of access controls in restricted zones. It means that this is a serious point of weakness and it might be needed to research the efficiency of the current security measures once again. The loopholes in such protocols may lead to unauthorised access by people who may become a potential threat to the security and functioning of airports (Budd & Ison, 2021). As stressed in the literature, strong access control systems are critical to ensuring aviation safety and avoiding security attacks (Zhang & Chen, 2019).

Moreover, the difference in the perceptions of the staff about access control measures indicates a possible necessity of a better communication and training of security measures. The individuals who have reported a lack of access control may be more knowledgeable about certain vulnerabilities that have been undervalued by other parties. This gap in the knowledge of the personnel can be addressed through the ongoing training programs that emphasize the significance of adherence to the ICAO standards (O'Connell and Williams, 2021).

Table 13 indicates that there is a more or less positive attitude towards the restricted area control among those in the respondents at JIA with most of them supporting the efficacy of the measures put in place. However, the high percentage of the negative answers also indicates the necessity of the airport to critically evaluate and improve its access control measures to protect against unauthorised access, strengthening the rest of the security scheme according to the international standards.

Table 14 presents the findings regarding the availability of specific procedures for screening passengers and luggage at Juba International Airport (JIA). The table illustrates the proportion of respondents who indicated the presence or absence of established screening procedures within the airport security framework

Table 14

Availability of specific procedures in place for screening passengers and luggage at JIA

	Frequency	Percent
Yes	74	74.0
No	26	26.0
Total	100	100.0

Table 14 shows the answers in respect to the presence of the necessary procedures to screen the passengers and their luggage at the Juba International Airport (JIA). These findings suggest that 74 percent of the participants confirmed the presence of developed screening procedures in the form of x-ray machines, metal detectors, manual checks and CCTV and motion detectors whereas 26 percent respondents affirmed the absence of these measures. This overall observation indicates a high level of trust in the airport regarding the adoption of the required measures to achieve aviation security.

The 74% rate of affirmative response indicates that a high percentage of the airport staff are aware of the efforts conducted to put into practice the security screening that is essential in identifying the forbidden items and the safety of passengers. The aviation security system entails effective screening processes that seek to halt threats by ensuring that they are not brought on board planes. These processes usually involve a range of technological applications of the X-ray machines, metal detectors, and increased pat-down procedures, which help to create a high-level security environment (O'Connell & Williams, 2021).

Nevertheless, the 26 percent of the respondents that reported on the lack of certain screening procedures in place casts serious questions to the issue of possible weaknesses within JIA. Aspects and loopholes in screening processes can put the airport in jeopardy whereby illegal or harmful packages can get through the security without any care. According to the literature, it is always important to emphasize the importance of extensive security screening to reduce the risks of terrorism and other criminal activities in the aviation industry (Zhang and Chen, 2019). This implies that the screening processes under the airport might have key areas that need urgent improvement and intervention.

Furthermore, such divergence between the active encouragement of the current processes and the voiced worries of a significant minority implies that further training and communication between the personalities in the airport are required. The overall security culture at the airport can be improved by conducting periodic training to employees on the significance of adherence to the standards provided by the International Civil Aviation Organisation (ICAO) (Fathulla et al., 2019). The employees should understand and be aware of the protocols that are in operation to maintain uniformity in the application of the protocols and also to detect any loopholes in the screening system which can be addressed to improve the screening system.

Table 14 represents a rather favourable perspective in the context of the specifics of how passengers and their luggage are screened at the JIA, as most of the respondents agreed that they do exist. However, the fact that the percentage of respondents who showed the lack

of certainty is rather high suggests that the further consideration and reinforcement of these procedures is necessary. The improvement of screening procedures will not only bring JIA closer to the international standards but will create the confidence of people to the safety of the air transportation in South Sudan.

4.4.5 Restrictions on access to restricted areas at JIA

Table 15 will depict the different restrictions that are imposed on the restricted areas of JIA. It outlines the terms of entry, individuals allowed access and repercussions of unauthorised entry to such zones. This is aimed at keeping the place secure by regulating the traffic in the sensitive airport areas.

Table 15

Restrictions on access to restricted areas at JIA

	Frequency	Percent
Yes	68	68.0
No	32	32.0
Total	100	100.0

Table 15 presents the answers pertaining to limitations to accessibility of restricted zones in Juba International Airport (JIA). A significant percentage of 68 percent of the respondents stated that this is actually the case in terms of the limitation and 32 percent of them stated that they are worried about the lack of proper access control measures. This information implies a general trust of the airport staff on mechanisms which prevent illegal entry of sensitive areas within the airport. The positive answers indicate the realization of the need to ensure access control to guarantee security since most restricted areas often have core functional units that when breached, would expose the security to serious risks (Zhang and Chen, 2019). The presence of restrictions is in accordance with the International Civil Aviation Organisation (ICAO) standards, which dictate the need to protect the areas that are sensitive to airport and aviation activities (Fathulla et al., 2019).

Still, the 32 percent of the surveyed people, who mentioned the lack of restrictions, demonstrate that there are some possible weaknesses that cannot be neglected. This knowledge indicates that there is a necessity to conduct a critical examination of existing access controls and improve them since any loopholes in implementation may result in unauthorized persons gaining access to sensitive locations, which will contribute to the deterioration of security

(Budd and Ison, 2021). In turn, the ongoing education and enhanced communication between employees on the topic of access control policies will be able to strengthen security efforts and promote adherence to international rules.

4.4.6 Security protocols in place for handling suspicious items or individuals

Table 16 gives a summary of security measures that have been put in place to deal with suspicious objects or people at JIA. It describes the measures followed by the security person to evaluate the threats, reaching law enforcement when it is needed, and safety of all the people in the airport. The procedures are to be fast in responding to any security incident that may occur.

Table 16

Security protocols in place for handling suspicious

	Frequency	Percent
Yes	70	70.0
No	30	30.0
Total	100	100.0

Table 16 will contain the details regarding security measures which are developed to deal with suspicious items or people at JIA. The outcomes show that 7 out of 10 participants think that proper measures are put in place and 3 out of 10 indicated that it is not so. This information indicates that there is a widespread belief in the preparedness of the airport to respond to the possible threats. The fact that the number of positive answers is very high indicates that the need to have proactive measures in managing cases to do with suspicious substances or persons is paramount in ensuring a safe environment in the aviation sector (O'Connell and Williams, 2021). Reporting and investigation of suspicious behaviour or objects are also standard protocols and when applied on a systematic basis, can help go a long way to reduce security threats.

On the other hand, the fact that 30 percent of respondents said they did not use such protocols is also a source of significant concerns that should be investigated further. This part of the feedback is the possible sign of the lack of awareness or proper training on the current practices and the sphere that has to be addressed immediately. Responsiveness in monitoring security threats can be increased by making sure that all the airport staff grasp these protocols through regular training and simulations (Haque and Paul, 2020), which would eventually lead

to the establishment of a culture of security vigilance, which is in line with ICAO recommendations.

4.4.7 Security training programs for airport employees at JIA

Table 17 outlines all the security training that can be offered to the employees in the airport at Juba International Airport (JIA). It contains data on the kind of training that is being offered, which is the emergency response, threat identification and customer service in security related matters. The objective is to make sure that every staff is sufficiently equipped to handle security issues and provide a secure environment to passengers and crew.

Table 17

Availability of security training programs for airport employees at JIA

	Frequency	Percent
Yes	66	66.0
No	34	34.0
Total	100	100.0

Table 17 describes the answers to the questions about the availability of security training programs to the airport employees at JIA. Most of the respondents, 66% of them, confirmed the existence of such training programs, with only 34% showing that they do not have enough training opportunities. The result is indicative of an overall favourable perception of the airport in terms of the dedication to knowledge improvement of the workforce on the topic of security. Regular training sessions are critical to inculcate comprehensive knowledge on security measures and procedures to the employees and to meet the ICAO guidelines (Fathulla et al., 2019). Proper training will provide the employee with the skills required to detect and act upon threats in an efficient manner to reinforce the security stance of the airport as a whole (Air Transport Research Society [ATRS], 2022).

Nevertheless, the fact that 34 percent of the respondents who reported the issue of lack of training programs is a significant gap, which may influence the airport in its capacity to sustain a holistic security environment. This issue is also important to consider such as the regular refresher training and the use of scenario-based training can help staff to be better prepared and make sure that all staff members are aware of the current security measures and practices (Budd and Ison, 2021).

4.4.8 Effectiveness of the implemented ICAO security measures

Table 18 illustrates the extent of respondents agreement or disagreement with the statement: The ICAO security measures implemented at Juba International Airport are effective in preventing security breaches. The table provides a breakdown of the responses, indicating the level of confidence among respondents regarding the effectiveness of ICAOs security protocols at JIA.

Table 18

Effectiveness of ICAO security measures in preventing security breaches at JIA

	Frequency	Percent
Agree	53	53.0
Somewhat agree	32	32.0
Neutral	7	7.0
Somewhat Disagree	5	5.0
strongly disagree	3	3.0
Total	100	100.0

Table 18 is a summary of answers on perceived effectiveness of ICAO security measures adopted at JIA to prevent security breach. Most of the 53% of the respondents confirmed that such measures are effective and further 32% partly supported such a claim. At the same time, very few respondents (8%) were against or strongly against, which means that the opinion was quite positive.

The given positive outlook on the success of ICAO measures is consistent with the rest of the literature that argues that properly established international security standards can greatly decrease the vulnerability to security incidents in aviation settings (Zhang and Chen, 2019). The fact that the efficacy of these measures is highly supported shows that the airport staff realizes that the need to follow ICAO guidelines could make the environment safer to operate in (O'Connell & Williams, 2021).

Nevertheless, the existence of opposing views indicates that there are some aspects that are to be improved and should not be ignored. The 8 percent of respondents who are skeptical may be referring to the actual issues regarding the implementation or application of such measures. These problems can be addressed by conducting regular evaluations of compliance

rates and the efficiency of security measures and supporting the need to consistently improve airport security practices (Haque and Paul, 2020).

4.4.9 Effectiveness of access control and identification at JIA

Table 19 determines the effectiveness of access control and identification in the Juba International Airport. It describes how sensitive areas are managed and how their access is restricted and determines their effectiveness in eliminating unauthorised access. The results are relevant in the process of comprehending the effectiveness of JIA in protecting its limited areas and in improving security.

Table 19

Effectiveness of access control and identification at JIA

	Frequency	Percent
Very Effective	57	57.0
Somewhat effective	26	26.0
Neutral	4	4.0
Somewhat Ineffective	6	6.0
Not effective at All	7	7.0
Total	100	100.0

The performance of the access control and identification processes in JIA are illustrated in table19. The data suggests that 57% of the respondents rated the procedures as very effective, and 26% respondents rated the procedures as somehow effective. At the same time, a total percentage of 13% of them considered them to be ineffective or somewhat ineffective which is indicative of certain areas of concern that require more consideration.

The fact that the percentage of positive responses is high shows the significance of the use of effective access control measures in ensuring airport security is well understood. According to ICAO, the use of appropriate identification and access control systems is very important to the improvement of the overall level of security and avoid the unwarranted access to restricted zones (Fathulla et al., 2019). The findings indicate that the airport staff are not apprehensive about the efforts that are being taken.

On the contrary, that 13% say that it does not work points out the importance of carefully looking into access control mechanisms. It is very important to compensate all the weaknesses identified in these procedures to avoid possible breaches. It can be created through

constant monitoring and evaluation, thus, ensuring that the standards of access control are solid and in line with the best practices across the globe (Budd and Ison, 2021).

4.4.10 Effectiveness of screening and inspections at JIA

The information concerning analysing the effectiveness of the screening and inspection processes at JIA is given in Table 20 and is related to the actions taken to ensure the safety of the passengers and baggage. It incorporates the study of technologies employed and the completeness of inspections, which offers the assessment of their efficiency to identify possible threats and to follow the international security requirements.

Table 20

The effectiveness of screening and inspections at JIA

	Frequency	Percent
Very Effective	54	54.0
Somewhat Effective	37	37.0
Neutral	3	3.0
Somewhat Ineffective	5	5.0
Not Effective at All	1	1.0
Total	100	100.0

The results indicate that half of the respondents rated the procedures as very effective and 37 percent rated them to be somewhat effective. A very low percentage (6%) indicated that the procedures were ineffective or partially ineffective, indicating an overall opinion on the sufficiency of screening procedures.

The elevated satisfaction rates of the effectiveness of the screening and inspections reveal that most of the staff members feel that these procedures are healthy and play a significant role in the security of an airport. Screening can be described as a frontline defence, as it is crucial in detecting threats and reducing them before they may enhance (O'Connell and Williams, 2021). This fits into the ICAO focus on all-inclusive screening measures as a guiding principle on aviation security.

However, the 6 percent of responses that show that it is ineffective offers an avenue of improvement. They should also do continuous training, technology upgrading, and comprehensive screening protocol review to make sure that they are relevant and effective against emerging threats (Haque and Paul, 2020). This will help JIA to strengthen its security

system and be closer to the international security standards by addressing these issues and improving the general screening process (Zhang and Chen, 2019).

4.4.11 Effectiveness of surveillance and monitoring at JIA

Table 21 puts into perspective the effectiveness of the surveillance and monitoring systems which have been applied in JIA. It assesses the ability of such systems to detect suspicious behaviour and to respond appropriately to incident situations. Monitoring is the most important in ensuring that the airport operations and environment are secure for travellers.

Table 21

Effectiveness of surveillance and monitoring at JIA

	Frequency	Percent
Very Effective	60	60.0
Somewhat Effective	25	25.0
Neutral	8	8.0
Somewhat Ineffective	5	5.0
Not Effective at all	2	2.0
Total	100	100.0

The summary of the responses on the effectiveness of surveillance and monitoring systems at Juba international Airport (JIA) have been summarized in Table 21. The findings indicate that 60 percent of the surveyed persons ranked the surveillance and monitoring systems as being very effective, with another 25 percent of the surveyed ranking them as somewhat effective. Contrastingly, it was found that 7 percent of the respondents concurred that these systems are ineffective or partially ineffective. Such a positive image is a product of the good faith that the airport personnel have regarding the ability of such systems to improve security levels.

The fact that over fifty percent of the respondents rated surveillance and monitoring as very effective shows the imperativeness of these systems in ensuring that the security in the airports is maintained. Surveillance is crucial to early identify possible threats, situational awareness, and response to situations in time (O'Connell and Williams, 2021). A crucial element that cannot be overlooked is the use of technologically developed surveillance systems like CCTV and motion sensors to follow the activities going on at the airport premises and to obtain essential data that can be used to analyse abnormal activities and possible risks (Haque

and Paul, 2020). Also, the findings can be related to the focus of the International Civil Aviation Organization (ICAO) on the significant role of well-developed monitoring systems in an overall system of security. According to Zhang and Chen (2019), appropriate surveillance does not only assist in preventing unauthorized access but also discourages possible criminal activities. The trust in the survey responses shows that it is vital to and constantly upgrade these systems to adapt to the changing security issues.

Nevertheless, 7 percent of the respondents who felt that the surveillance systems were partially or not effective indicates that there is a possible weakness that cannot be overlooked. Such feedback implies the possibility of certain limitations of the functionality or scope of such systems, which should be filled. These gaps might be closed with the help of continuous evaluation and upgrades to surveillance technologies and periodic training of staff on how to use these systems and to benefit the most (Fathulla et al., 2019).

Table 21 depicts an overall positive opinion as far as the efficiency of surveillance and monitoring systems in JIA is concerned. The results indicate a solid base on which the improvements can be made in the future to make sure that these essential elements of airport security will continue to be useful in detecting and addressing threats.

4.4.12 Effectiveness of emergency response planning

The evaluation of the effectiveness of the emergency response planning in the Juba International Airport is provided in Table 22. It describes the processes that are adopted when dealing with different security incidents, and evaluates their suitability in terms of safety of passengers, as well as reducing inconvenience during emergencies.

Table 22

Effectiveness of emergency response planning

	Frequency	Percent
Very Effective	61	61.0
Somewhat Effective	29	29.0
Neutral	4	4.0
Somewhat Ineffective	4	4.0
Not Effective at all	2	2.0
Total	100	100.0

The effectiveness of emergency response planning at JIA is presented in table 22. The data shows that 61% of respondents rated the emergency response planning as being "very effective" while 29% rated it as being "somewhat effective." The rest of the responses indicate the emergency planning was ineffective in some capacity for 6%. These results indicate a good level of confidence by airport staff in the protocols that have been put into place to deal with emergencies. Well-prepared emergency response plans play a key role in improving the ability of an airport to respond to unexpected incidents which may represent potential threats, such as a terrorist attack, natural disaster or technical failure (Budd & Ison, 2021). The high percentage of respondents that rated the plans as very effective indicates that the protocols currently in place are comprehensive and that personnel feel that they are well equipped to handle emergencies. Moreover, the existence of well-known emergency response planning is in line with the recommendations of the International Civil Aviation Organization (ICAO), which suggest strong and implementable security plans that ensure safety and efficiency during a crisis (Fathulla et al., 2019).

Implementing regular drills and training exercises offer personnel a chance to familiarize themselves with emergency procedures thereby ensuring that everyone knows his or her roles and responsibilities in the event of an incident (Haque & Paul, 2020). However, it is important not to be too surprised by the 6% of respondents who expressed concerns about the effectiveness of emergency response planning. This minority viewpoint could be an indicator of areas of improvement that could be made to increase the overall preparedness of the airport. Table 22 shows a high perception of effectiveness on emergency response planning at JIA. The findings call for continued assessment and improvement of these plans to be responsive to new situations so that the airport has a strong security posture that can quickly respond to new crisis situations.

4.4.13 Effectiveness of the information sharing and collaboration

Table 23 determined the success of security stakeholder information sharing and collaboration at JIA. It tests the effectiveness of communication and exchange of important security information by various agencies, including airport personnel, law enforcement, and other concerned parties. This discussion is very important in the evaluation of the team work that enhances the general security framework at the airport.

Table 23*Effectiveness of the information sharing and collaboration*

	Frequency	Percent
Very Effective	64	64.0
Somewhat Effective	27	27.0
Neutral	4	4.0
Somewhat Ineffective	3	3.0
Not Effective at All	2	2.0
Total	100	100.0

Table 23 summarizes the attitudes of effectiveness of information sharing and collaboration at JIA. The 64 percent who rated such efforts as very effective, and 27 percent more thought them to be somewhat effective. There was a wide agreement regarding positive sentiment with only 5% of the respondents having a negative view towards collaboration efforts, to some extent.

Information sharing and collaboration can be described as the key elements of aviation security because they contribute to the better situational awareness and joint reaction to the possible threats. The positive feedback highlights the realization of the fact that the sharing of vital information among different stakeholders including airport staff, law enforcement, and security agencies in the aviation sector is also critical to ensure a secure operating environment (Zhang and Chen, 2019). Jurisdictional cooperation can also be used to exchange intelligence on the possible threat to prevent criminal activities more effectively due to the timely exchange of information about them (Air Transport Research Society [ATRS], 2022).

Further, the results are indicative of the increasing importance of interconnectedness of security operations across airports and agencies that are reinforced with international frameworks and standards developed by organisations such as ICAO. The increased collaboration will not only increase the emergency response but also create a culture of shared responsibility towards airport security (O'Connell and Williams, 2021). Although these outcomes can be viewed as rather positive, the fact that 5% of the participants reported ineffective collaboration should make the current communication approaches be re-evaluated. A thorough examination of the reasons that cause these perceptions can be used to gain useful information that can be utilized to improve the effectiveness of group activities by security officers and it may result in more sophisticated information-sharing measures.

Table 23 underlines a favourable view of information sharing and collaboration at JIA, so it may be concluded that the organization has gone a long way in establishing a cooperative environment in the field of security. Constant development of these practices and improvement is to be necessary to tackle the challenges that will face future in aviation security.

4.4.14 Level of concern about the potential security threats such as terrorism

Table 24 summarises the degree of worry among the stakeholders about the security risks or threat which could be in the form of terrorism in Juba International Airport. It gives different points of view of airport staff, government authorities as well as that of the traveller, showing the perceived dangers and concerns regarding security. Such issues are vital in understanding how to come up with effective measures of addressing the perceived threats and improving security in the airports.

Table 24

Level of concern about the potential security threats as terrorism

	Frequency	Percent
Very concerned	69	69.0
Somewhat Concerned	25	25.0
Not Concerned	6	6.0
Total	100	100.0

Table 24 gives a summary of the level of concern that potentially insecure threat like terrorism is having to the respondents at JIA. A majority of 69% of respondents said that they are very concerned about such risks, and one out of every four said that they are somewhat concerned. Only 6% of participants declared that they are not worried at all, which also demonstrates the great importance that has been attached to the threats related to the terrorism issue.

Such a high level of concern is typical of the present world security environment where terrorism remains a major concern among airports and aviation systems across the world. The high reaction underscores the need to have a high level of alert security that will help slow down such threats in addition to safeguarding passengers and the airport staff (Budd and Ison, 2021). It is also indicative of the heightened attention and awareness of possible outcomes of security violations, which is particularly true in an environment that is particularly vulnerable to the issue (O'Connell & Williams, 2021).

Moreover, the collective anxiety of terrorism is correlated with the literature that states that an increase in the awareness and readiness of airport staff members could result in the stronger security practices (Fathulla et al., 2019). Through constant training, practice and learning about the terrorist methods can help staff to be alert and sensitive to new threats. The low percentage of the respondents who responded that they were not concerned could be an indication of complacency or maybe lack of awareness on the magnitude of threat that modern aviation is exposed to. This presents a point of further training and sensitization exercises that can enhance the need to be more vigilant in dealing with terrorism-related threats.

4.4.15 Level of concern about the potential security threats such as cyber attacks

Table 25 shows the data that covers the degree of concern among the stakeholders with the possible security threats related to cyber-attacks. The perceptions of the level of cyber threats would be essential in understanding the current security situation and what needs to be done to eliminate vulnerabilities.

Table 25

Level of concern about the potential security threats such as cybersecurity

	Frequency	Percent
Very Concerned	73	73.0
Somewhat Concerned	26	26.0
Not Concerned	1	1.0
Total	100	100.0

The level of concern on the possible cybersecurity threats among respondents at JIA are shown in Table 25. A majority of 73% said that they are very concerned about the risks involved with cyber threats with 26 percent saying they are somewhat concerned. Conversely, the percentage of people who claimed that they were not concerned at all amounted to 1%, which highlights the widespread anxiety about the problem of cybersecurity in the aviation industry.

This significant interest, in terms of cybersecurity, serves as an indicator of the growing awareness on the vulnerability the airports and aviation systems to in the technology driven environment. The impact of cybersecurity threat (such as hacking and information breach) could be devastating to operational integrity and privacy of passenger information (Zhang and Chen, 2019). The Awareness of such threat increases the fact that airports constantly review

and improve their cybersecurity standards to protect sensitive information and vital systems against possible cyber-attacks (Haque and Paul, 2020). The findings point to the necessity to be proactive in securing cybersecurity, including conducting regular risk assessments, training employees on security best practices, and implementing advanced technologies to enhance security. Having all the personnel of an airport, including administration and frontline personnel, educated on the threats and best practices in cybersecurity is essential to ensuring a comprehensive security posture (O'Connell & Williams, 2021).

Since the proportion of respondents indicated that they were not concerned about this issue is low, it is especially necessary to conduct the outreach and training programs to make sure that all staff members understand the significance of cybersecurity in the context of the aviation security. Such a collective conscience and preparedness can go a long way to boost the defensive against any possible cyber threats. Table 25 reiterates that there is a high degree of concern in relation to cybersecurity at JIA, and therefore, the need to remain vigilant and ready in mitigating the special vulnerabilities raised by cyber threats.

4.4.16 The level of concern about the potential security threats or risks

Table 26 shows the level of concern about the potential security threats or risks on the population surveyed. This table grouped the perceptions of the respondents on security threats into certain levels of concern that include not concerned, slightly concerned, considerably concerned, very concerned among others

Table 26

Level of concern about the potential security threats from human error

	Frequency	Percent
Very Concerned	69	69.0
Somewhat Concerned	25	25.0
Not Concerned	6	6.0
Total	100	100.0

Table 26 provides an overview about the answer to the question on the degree of concern with the potential security threats posed by human error or negligence at the JIA. The findings show that 69 out of every 100 respondents are very concerned about these kinds of risks and 25 out of 100 respondents responded that they are somewhat concerned. Few (6) indicated that they are not concerned about this issue at all.

The issue of human error is quite important and it highlights the importance of people in ensuring that the security of the airports is achieved. Human factors are frequently mentioned as one of the main contributors of security breaches in aviation, and the lack of lapses in judgment or adherence to protocols can put airports under significant threats (Budd and Ison, 2021). This observation implies that airport personnel are aware of the need to reduce errors by performing strict training and following the established policies (Fathulla et al., 2019). The expected issue of human error would be dealt with by establishing a culture of safety in the airport wherein the staff would be empowered to communicate, ask questions in relation to practices, and participate in lifelong learning. Such strategies can help to reduce the risk of errors that may occur and significantly limit the frequency of such training: regular trainings, refresher courses, and learning using simulations (Haque and Paul, 2020). Besides, establishing a feedback and accountability system may assist in uncovering the problems that keep occurring and offer chances to correct them.

The fact that a minor proportion of respondents stated that they are not concerned with issues related to human error would be the indication to continue educating and reinforcing the individuals on the importance of following security procedures. Holding airport staff face to face talks about the effects of human negligence may serve to instil a sense of responsibility which is crucial in creating the need to be extra vigilant.

Table 26 shows that there is a high degree of worry about the human error and negligence risk level at JIA. The results indicate that there is still a need to pay more attention to our training and awareness program that will help reduce the risks tied to the actions of personnel and reinforce the overall security structure of the airport.

4.5 JIA security employees' awareness of the security preventive ICAO measures

The second objective of the study was to establish JIA security employees' awareness of the different security preventive ICAO measures adopted by JIA in South Sudan. This objective was measured in terms of awareness about the ICAO security preventive measures adopted by JIA, training received on ICAO security standards and recommended practices, opinions on the effectiveness of ICAO security preventive measures in preventing security threats at JIA, and opinions on the improvement needs. To respond to the research question corresponding to this objective, the collected data on each item were analysed, and the results are shown in Tables 27 to 30.

4.5.1 Awareness about the ICAO security preventive measures adopted by JIA

This is shown in Table 27 that demonstrates the degree of awareness among airport staff in the International Civil Aviation Organization (ICAO) security preventive measures implemented at JIA. One of the key elements of good security practices is knowledge because it directly determines adherence and practice.

Table 27

Awareness about the ICAO security preventive measures adopted by JIA

	Frequency	Percent
Very aware	58	58.0
Aware	32	32.0
Moderately Aware	7	7.0
Not Aware	3	3.0
Total	100	100.0

Table 27 demonstrates the awareness levels on the International Civil Aviation Organization (ICAO) security preventive measures that have been implemented in Juba International Airport (JIA). Quite a large number of 58 percent of the respondents noted that they are very conscious of these measures whereas 32 percent reported that they are conscious. The percentage that constitutes only a small percentage of 10 percent combined has shown that they are either moderately aware or not aware of the security measures provided. These are the findings that demonstrate a rather high awareness level, which is essential to the successful implementation of the security practices.

The importance of making the airport personnel aware of ICAO standards cannot be exaggerated. The level of awareness is the core of making sure that every personnel is familiar with the procedures that can be adopted to keep the operating environment secure (Fathulla et al., 2019). The findings indicate that there is a good organizational culture in JIA and employees are involved in security procedures and they are aware of the significance of security measures in averting threats. This goes in line with the recommendation of the ICAO that has highlighted that extensive awareness programs must be implemented in the context of aviation security (Zhang and Chen, 2019).

Nonetheless, the 1 in every 10 people that demonstrated different levels of unawareness shows that there is a possible loophole that may jeopardize the effectiveness of

security controls. The regular training and communication plans play a significant role in solving this problem so that all the individuals working in the airport are fully aware of the ICAO standards. More specific outreach initiatives can further increase its awareness and establish a shared vision on the security measures that should be understood and applied by every employee of the airport (O'Connell and Williams, 2021).

Table 27 shows that awareness of ICAO security measures by the personnel at JIA is high. It is such awareness that is required to build a culture of security that is not only in compliance with international standards but also the integrity of operation in the airport. There should be continuous attempts to increase awareness and all employees should be provided with the knowledge required to identify and put in place security measures in a manner that is effective.

4.5.2 Trainings received on ICAO security standards and recommended practices

Table 28 describes the nature and number of training programs that the JIA employees undergo regarding ICAO security standards and practices. Training is also necessary in making the personnel have the knowledge required to adhere to international security requirements.

Table 28

Trainings received on ICAO security standards and recommended practices

	Frequency	Percent
Yes	58	58.0
No	42	42.0
Total	100	100.0

Table 28 examines how JIA employees have been trained on ICAO standards and best practices on security. The findings found out that 58 percent of the respondents have undergone such training, and 42 percent have not undergone any formal training on these significant security measures. This survey finding portrays a mixed image in terms of the readiness of the airport staff members to follow the global aviation security standards.

The fact that most of the respondents who have attested that they were trained is a positive indication of the dedication that JIA shows towards ensuring that its security practices are in line with internationally recognized standards. It is important to regularly train employees on the ICAO security measures because it provides them with tools to effectively detect security threats and respond in line with the situation (Budd and Ison, 2021).). Physical

trainings, online education and workshops to teach the standards and practice in the real-life environment can be included in the training program and this observation aligns with the findings of Haque and Paul (2020) that emphasize continuous professional development as the main factor in ensuring a flexible workforce.

On the other hand, the high 42 per cent of employees that said that they have not been trained is an area of enhancement. Such gap might result in discrepancies in knowledge and in efficacies in the operational aspects of the employees, which would make the airport vulnerable to security attack. In order to overcome this issue, JIA may establish an organized training plan which will enable all the staff to get informed regularly about the ICAO standards and other recent developments in the field of aviation security (Fathulla et al., 2019). Furthermore, it may be beneficial to introduce mentoring programs or training collaborations with other airports that may help to improve the knowledge-sharing process and create the culture of continuous improvement in the workforce.

According to table 28, training is important in the implementation of ICAO standards at JIA. Although most employees enjoy the current training programs, the fact that a significant proportion of the employees have not been trained proves the need to have holistic training solutions, which facilitate the understanding and implementation of security measures among all employees.

4.5.3 Effectiveness of ICAO security preventive measures in security threats at JIA

Table 29 shows the findings on the views concerning the efficiency of the ICAO security preventive actions taken at JIA. The awareness of these views would be important in determining the practical application of these measures in improving airport security.

Table 29

Effectiveness of ICAO security Preventive Measures on Threats at JIA

	Frequency	Percent
Yes	67	67.0
No	33	33.0
Total	100	100.0

In table 29, the opinion of the JIA personnel members about the effectiveness of the ICAO security preventive actions towards eradicating security threats is shown. The data changes show that 67 percent of the people interviewed think that such measures are effective,

and 33 percent of the people interviewed were sceptical of their effectiveness. This finding indicates that there is, overall, a positive attitude towards the security measures that are in accordance with the standards of the ICAO standards.

The high positive reaction indicates that most of the personnel are aware of the importance of ICAO provisions in improving security, and this idea correlates with the literature, which upholds the notion that compliance with international standards has a considerable decrease in the number of gaps in the airport operations (Zhang and Chen, 2019). The most important is effective security, particularly in high-stakes regions, where the outcomes of such violations can be catastrophic like in aviation (O'Connell and Williams, 2021).

The 33 percent of the respondents who think that the measures are not working is however a point of concern. Such an important minority demonstrates a critical attitude, which cannot be ignored. It implies that ICAO standards can be conceptualized, but practice may have shortcomings when it comes to implementing or enforcing the standards at JIA (Budd and Ison, 2021). It may be necessary to address those concerns by conducting more thorough reviews of the existing security practices and also seeking responses of the opposing respondents in order to learn about certain weak points.

This can be facilitated by JIA to have an open discussion with the staff about their concerns and this will enable it to detect areas that need to be addressed and improved in its security measures. Constant feedback systems may also help in upgrading the security framework in the airport and make sure that ICAO measures are not only in place but also checked on their effectiveness.

Table 29 shows a relatively high-level of optimism on the efficacy of ICAO security at JIA. Although the results mention the trust in these protocols, the fact that nearly fifty percent of respondents found themselves in the scepticism category should allow further reviews and improvement to make the overall security situation better.

4.5.4 Improvement of ICAO security preventive measures for the enhancement of JIA

Table 30 captures the views on whether or not there should be improvements or enhanced application of ICAO security measures at JIA. Having pointed out certain aspects to improve on, the stakeholders would be able to formulate specific measures to boost security measures.

Table 30*Needs for improvement of ICAO security preventive measures at JIA*

	Frequency	Percent
Yes	72	72.0
No	28	28.0
Total	100	100.0

Table 30 analyses the view of the JIA staff regarding whether there was need to improve the implementation of the ICAO security preventive measures. A drastic majority of 72 percent of respondents stated that it should be improved with only 28 percent of respondents stating that the existing efforts are sufficient. The implication of this outcome is the acknowledgement of the relevance of effective security measures and the wish to keep on improving the security arrangements of the airport.

The prevailing reaction that supports the need to improve is a proactive attitude of the staff as they are concerned about ensuring a powerful security environment. This is in line with the recommendations of ICAO, which emphasize the necessity of continuous assessments and improvements in the security measures to support changes in the threats (Fathulla et al., 2019). It is also suggested by the idea that security is dynamic and not fixed that efforts should constantly be improved in accordance with new risks and developments.

On the other hand, the fact that the minority of the respondents do not support the need to make changes, may indicate a shift in perceptions related to the efficiency of already taken measures. This implies there must be a discussion and communication between the employees to align these divergent perception and develop a unified outlook on the security practice effectiveness. As possible solutions to these issues and areas of improvement, JIA may adopt formal review of the existing security measures, as well as periodic training and development. This may create the atmosphere of actively seeking and accepting suggestions on improvement that will result in a more robust security setup that meets the standards of the global arena (Budd and Ison, 2021).

In short, Table 30 indicates that there is a significant agreement between respondents who insist on the ongoing improvement of ICAO security preventive actions at JIA. This active attitude is critical to the adjusting to the challenges of modern aviation security and providing the airport with the means of maintaining its interest in providing passenger and operation security.

4.6 Security officers' perceptions on the readiness to operate under ICAO measures

The third objective of the study was to assess JIA security officers' Perceptions on the JIA's readiness to operate under ICAO measures in South Sudan. This objective was analysed in terms of the level of confidence in JIA's preparedness to operate Under ICAO Security Standards and Recommended Practices, realism and achievability of ICAO security standards and recommended practices at JIA, opinions on the resources or support systems in place for the implementation of compliance with ICAO security standards and recommended practices at JIA, opinion on the overall improvement of ICAO security preventive measures at JIA, as well as the opinion on the concerns or challenges in implementing ICAO security preventive measures at JIA. The collected data were analysed, and the results are shown in Tables 31 to 35.

4.6.1 JIA's preparedness to operate under ICAO security standards

Table 31 reflects the level of confidence among airport staff regarding JIA's preparedness to operate under ICAO security standards. This metric is important in gauging the organisation's readiness to mitigate security threats effectively.

Table 31

Personnel preparedness to follow ICAO security standards and recommended practices

	Frequency	Percent
Very Confident	40	40.0
Confident	33	33.0
Somewhat confident	14	14.0
Not very confident	10	10.0
Not Confident at all	3	3.0
Total	100	100.0

Table 31 gives the quantity of confidence that JIA personnel have on the readiness of the airport to work under ICAO standards of security and recommended practices. The conclusions show that forty percent of the respondents expressed that the airport was very prepared with the other 33 per cent stating that they were generally prepared. Overall, 10 percent of the respondents exhibited different degrees of uncertainty, and a low percentage of 3 percent expressed no confidence at all.

The high level of confidence in JIA readiness is a sign of confidence in the efficiency of the existing security procedures and schemes. Operational preparedness is a firm belief that is essential in enabling the personnel to effectively deal with security threats and be able to comply with ICAO standards that are meant to promote safety and security within the entire aviation sector (Zhang and Chen, 2019). The confidence portrayed by the airport personnel has a positive reflection on the training, resources and the continued initiatives that JIA has been practicing to ensure that the standards of aviation security remain high.

Nevertheless, the percentage of the number of respondents who indicated not very confident or not confident at all reveals that there exist some aspects of insecurity that should be addressed. Airport administration must ensure that the issues of these staffs are considered because lack of satisfaction on readiness may result in complacency or loss of morale. Creating the atmosphere of free communication on security measures may facilitate getting the background of these uncertainties and devising methods to address them (Fathulla et al., 2019).

Specifically, the frequent assessment of the airport in accordance with the ICAO requirements may result in a consistent process of modifications and refinements that may support the culture of preparedness. Through its willingness to address the needs of the personnel, JIA can build more confidence in its security preparedness.

Table 31 indicates that the degree of trust in the compliance of JIA to ICAO standards of security was rather high among the respondents. Although this is a positive move, it is important to consider the anxieties of a minority but significant number of the personnel to offer overall preparedness.

4.6.2 Realism and achievability of ICAO security standards

Table 32 indicates the views on the feasibility and practicality of the outcome of the implementation of ICAO security standards in JIA. The attitude of the stakeholders to these issues can give an idea about the real difficulties in following the international guidelines.

Table 32

JIA staff perceptions on achievability of ICAO security standards and recommended practices

	Frequency	Percent
Yes	65	65.0
No	35	35.0
Total	100	100.0

Table 32 assesses the opinion of the JIA personnel concerning the feasibility and reality of ICAO security standards and recommended practices. The findings show that 65 percent of the respondents feel that these standards are not only realistic but also achievable whereas 35 percent are not convinced that they would be implemented in JIA. This information shows that the majority is high with regard to the practicability of complying with international aviation security standards.

The growing tendency among the personnel in the airport to believe in the attainability of the ICAO standards portrays an awareness of the need to highlight achievable objectives in the security practices. Realism in standards will encourage motivation and responsibility in the personnel, thus enhancing adherence to international standards (Budd and Ison, 2021). This view is similar to the literature findings that point to the need to have realistic and flexible security arrangements that are able to adapt with the dynamic security environment (O'Connell & Williams, 2021).

On the other hand, the 35 percent of respondents who responded sceptically casts a lot of concerns on the viability of ICAO standards in JIA operational environment. These suspicions may be related to their perceived lack of resources, insufficient infrastructures, or lack of knowledge on the part of the employees on how best to execute these solutions. Discussing and evaluating these issues can bring in invaluable information that would help in combating the perceived obstacles to compliance.

Moreover, it can be beneficial to develop the action plans that outline the measures towards accomplishing these standards to increase the awareness and dedication of the personnel. Proving that JIA is actively working to overcome challenges can be used in order to reduce the worries of the employees and create a conducive environment in which the concern of security compliance becomes a priority. To sum up, Table 32 demonstrates an overall positive attitude of the respondents to the realism and feasibility of the ICAO security standards and recommended practices at JIA. Although most people express confidence in the viability of these steps, it is important to counteract the areas of scepticism so that JIA would be able to achieve its full potential in international aviation security.

4.6.3 Opinions on the support for the implementation ICAO security standards

Table 33 presents opinions regarding the adequacy of resources or support systems available for compliance with ICAO standards at JIA. Understanding resource availability is essential for evaluating the feasibility of successful implementation.

Table 33*JIA staff opinion on the availability of resources for ICAO security standards*

	Frequency	Percent
Yes	63	63.0
No	37	37.0
Total	100	100.0

Table 33 shows the findings of the evaluation of the attitudes of the JIA staff towards the presence of resources or support networks required to achieve compliance with the ICAO security standards and best practices. The results indicate that 63 percent of the respondents are of the view that enough resources are available whereas 37 percent are worried as to whether it has enough to support systems. The majority perception which suggests that there are the necessary resources is a very important guarantee since satisfactory support must be offered to the successful operation of ICAO measures. An effective resource base can contribute to the working potential of the staff members in an airport to process security properly so that every practice corresponds to the global standards (Fathulla et al., 2019). This is associated with the increasing awareness that the investment in security resources is what is of paramount importance in ensuring a strong aviation security structure.

However, the fact that the percentage of respondents who raised concerns is 37 indicates that there is a critical perspective that ought to be taken into consideration. This large minority begs the question of whether the resources expended to security programs at JIA are sufficient. It is important to find possible gaps in resources, in terms of infrastructure, staff training, and technological progress, to have a coherent security framework (Zhang and Chen, 2019). The response strategy that JIA may follow to address the current issues would be open conversation with the staff to learn more about their concerns and to collect additional information on particular resource requirements. Also, the periodic evaluation of available security resources can be done to identify places to improve as well as be able to show that JIA is dedicated to meeting ICAO standards.

To sum up, Table 33 highlights a rather positive picture associated with the access to the resources needed to comply with ICAO standards at JIA. Nevertheless, it is imperative to discuss the issues voiced by the minority that feels sceptical to make sure that the airport will be able to facilitate the effective security and operational preparedness comprehensively.

4.6.4 Opinion on the overall improvement of ICAO security preventive measures

The collected views regarding the net gain related to the ICAO security preventive steps at JIA. The feedback can be used to evaluate the progress, and the improvements to the security strategies can be made continuously.

Table 34 depicts the views of the respondents on the general enhancement of the ICAO security preventive measures at JIA. The data is in the form of percentage of respondents who feel that security measures have been improved as compared to those who do not feel there has been an improvement.

Table 34

Personnel Opinion on the overall improvement of ICAO security at JIA

	Frequency	Percent
Yes	63	61.0
No	37	39.0
Total	100	100.0

Table 34 indicates the perspectives of the staff on the general enhancement of ICAO security preventive actions at JIA. The findings indicate that, 63 percent of the participants believe there has been a significant change, but 37 percent of the participants think that changes have not been made or they are not enough. These results describe a vision of improvement in the field of security measures, but also indicate that there are still problems to be addressed.

The fact that most of the responses indicate that there are gains that are made shows that there are continuous efforts to ensure that JIA is implementing and aligning its security practices with ICAO standards. Frequent revisions and updates on security are also key constituents of the adaptive security environment that reacts to new threats (Budd and Ison, 2021). This favourable attitude on employees indicates that there has been an appreciation of efforts to improve the security measures further supporting the airport to be dedicated to safety and effectiveness in aviation security.

At the same time, the 37% of the respondents who are not satisfied with the degree of improvement has a critical view which should be investigated. This minority may be a symbol of unresolved problems in particular fields of security that has not been properly dealt with. It may be helpful to involve more detailed feedback strategies, including surveys or focus group

discussions, to find out which areas of improvement should be developed and develop a collaborative attitude to eliminating shortcomings (Haque and Paul, 2020).

A culture of security in the airport should be fostered by focusing on transparency and responsiveness to the feedback on personnel. Through commitment to the constant improvement, JIA can make sure that all the personnel feel appreciated in offering their services towards improving aviation security.

Table 34 indicates that there has been an overall positive attitude to the changes in the ICAO security preventive measures at JIA. Although a lot of faith has been placed on the progresses made, it is important to mitigate the issues that the minority have that would lead to continual improvement and make the international security standards strictly followed.

4.6.5 Challenges in implementing ICAO security preventive measures at JIA

The results associated with the difficulties experienced in the adoption of the ICAO preventive measures of security in the Juba International Airport (JIA) are presented in Table 35. It reveals whether the respondents gave certain challenges as major impediments in the successful implementation of these security measures. Such understandings are important in identifying possible obstacle to effective security management.

Table 35

Challenges in implementing ICAO security preventive measures at JIA

	Frequency	Percent
Yes	65	65.0
No	35	35.0
Total	100	100.0

Table 35 offers some ideas on the issues or barriers in the application of ICAO security preventive actions in JIA. Considerable numbers of 65% of people who responded to the question confirmed that there were challenges in the implementation that were done reliably and 35% said that there were no concerns.

The recognition of the difficulties is indicative of a staff realism on the obstacles they are faced with in the implementation of ICAO measures. This correspondence with the literature indicates that the set standards are not always implemented smoothly because of numerous factors, including the lack of resources, gaps in the training of personnel, or technical problems (Fathulla et al., 2019). Cautionary measures in the identification of these obstacles

are critical towards ensuring that preventive strategies are used to reduce risks whilst adhering to global standards. The 35% amongst the respondents that declared they are not concerned could represent the areas of confidence amongst the staff on current security practices, or a possible disparity in the awareness of possible challenges. The discussion with this minority can help see the whole picture of the organisational environment and identify the areas in which the organisation should continue its development (O'Connell and Williams, 2021).

The airport administration should promote open channels of communication to ensure that personnel share their views, and this is essential in identifying and solving challenges associated with the implementation of security measures (Haque and Paul, 2020). Although a significant segment of the staff members admit that they are concerned, instilling a culture of communication and constant challenge will be critical in improving the airport security capacity.

4.7 Challenges of adopted ICAO preventive security measures at JIA

The fourth objective of the study was analysed in terms of Inadequacy of resources, language Barriers, cultural barriers, lack of awareness and the understanding among airport staff. This section examines the various challenges faced in the implementation of the International civil aviation organization (ICAO) preventive security measures at Juba International Airport (JIA).

4.7.1 Inadequacy of resources

Table 36 presents the opinions regarding the inadequacy of resources--including funding, personnel, and equipment as a significant challenge in implementing ICAO security preventive measures at JIA. This table illustrates how the lack of financial and material support impacts the effectiveness of security protocols, highlighting the need for increased investment in airport security.

Table 36

Resources as the main challenges to ICAO security preventive measures

	Frequency	Percent
Yes	69	69.0
No	31	31.0
Total	100	100.0

Table 36 indicate that, 69 per cent of the respondents blame the insufficiency of the resources as a major limitation to the adoption of ICAO security measures at JIA, whereas 31 per cent express that they do not perceive it as an obstacle. The overwhelming majority shows that there is a common understanding of the challenges of the fight against the insufficiency in the funds, personnel, and technical equipment to improve security at the airport. Inadequacy of resources is one of the major persistent challenges facing most airports especially in the developing nations.

This vision is in close association with available literature on security issues in airports in developing nations. An example is the article by Chiu et al., (2020), which highlights that the lack of financial investment interferes with the capacity of airports to implement as well as maintain critical security-related elements, such as training of personnel, technology, and infrastructure development. Their article notes that lack of resources is a common problem with airports in politically and economically unstable countries such as the South Sudan because such countries may not have the necessary funds to implement efficient security measures. Lack of resources also not only affects the acquisition of modern security equipment, but also makes it more difficult to continue training staff, which is the key to adapting to new security threats (Chiu et al., 2020).

Also, as indicated by Ochoa et al. (2021), the lack of adequate resources can result in the non-compliance with the ICAO security standards in an airport, which causes the increase of its exposure to threats and the decrease in the trust of international partners. Their results underpin the fact that the resources have a direct impact on the likelihood of upgrading the security facilities and on the level of international regulations control in airports, which is particularly problematic in socio-economically unstable regions. This is consistent with the reality at JIA, where the daily shortage of resources does not allow the purchase of new security technology and prevents the training of security personnel (Ochoa et al., 2021).

Moreover, according to a study conducted by Chiu et al. (2020), the lack of funding may have a catastrophic impact on the possibility of airports to properly implement security measures and staff training programs that are essential for their effective operation. Being situated in a region with political and economic instability, JIA faces an additional challenge of raising the needed funds compared to more established airports.

Additionally, the literature constantly suggests the need to plan and seek external help to overcome resource inadequacies. The studies suggested that the partnerships with government agencies and international organisations should be developed as a source of resource mobilisation, capacity and technology transfer (Chiu et al., 2020; Ochoa et al., 2021).

The significance of these partnerships is supported by the fact that the improvement of sustainable security at the airports such as JIA is tied to both the further increase of funding as well as the creative approach to managing the resources. Thus, the results highlight the necessity of introducing specific measures to increase financial and material resources, which is vital towards the attainment of the ICAO compliance and the safety and comfort of the international travellers.

As the means to address those challenges, JIA needs to focus on obtaining the external funding with the help of the government and international organisations; additionally, the organisation needs to consider new ideas concerning the process of resource management. In dealing with these inefficiencies, it will be critical in establishing the tools and the knowledge that airport security personnel require to make their work effective in terms of ensuring high levels of security.

4.7.2 Language barriers

Table 37 presents the analysis of the respondents’ views on the existence of language barrier to the enforcement of ICAO security preventive measures at Juba International Airport (JIA). Communication is essential in the successful implementation of security measures and language barrier can greatly hamper clarity and compliance with security measures. In this table, the answers to the questions show how far the language differences can influence the capacity of the staff and security staff to apply the ICAO guidelines successfully. The opinions presented in this table concern the language barriers which might cause failure in effective implementation of the ICAO security measures in JIA. The issues of language can be understood and be used to inform communication and training.

Table 37

Language hinder implementation of ICAO security preventive measures

	Frequency	Percent
Yes	68	68.0
No	32	32.0
Total	100	100.0

Table 37 show that, 68 percent of the participants are of the opinion that the language barriers are a major hindrance to the practice of security measures as stipulated by the ICAO, and 32 percent do not consider that as a significant challenge. This data that the language barrier

is viewed as a challenge by close to two out of three respondents clearly indicates the relevance of communication in aviation operations.

Language barriers may occur in many forms such as misunderstandings in the process of communication between the personnel and passengers, or various operational teams. Security procedures can only be effective with effective communication, since any misinterpretation may result in security oversights or security breaches. Effective communication is central in critical settings like those in airports as Bailey et al. (2022) assert that the consequences of security breaches in aviation are sometimes significant.

In addition, language barrier may be an impediment to the spread of vital training materials and procedures among employees. The translation of mistranslations or an inaccessibility of multilingual training sources may not allow the personnel to comprehend their roles and duties completely based on the ICAO guidelines. Guinness et al. (2019) argue that it is necessary to make sure that every staff member understands security measures to achieve success in operations. Therefore, managing language barriers with the help of specific training initiatives comprising of multilingual resources and workshops is one of the issues that JIA should prioritize.

The adoption of approach whereby the emphasis is placed on language training and provision of translated materials would go a long way in ensuring that the airport staffs complies with the international standards and develops the culture of safety and security at the same time.

4.7.3 Cultural barriers

Table 38 presents the answers on any cultural obstacles that inhibit the adoption of ICAO security preventive measures at JIA. In this table, the respondents give their opinions regarding how culture can hinder the adherence to security measures hence the importance of cultural sensitivity and cultural adaptation in security training and operations. The table displays the information on the analysed views on cultural barriers that can influence the application of ICAO security prevention tools at JIA. Understanding of these factors is needed to advance the cultures of inclusion and operational efficiency in terms of security.

Table 38*Cultural barriers hinder implementation of ICAO security measures*

	Frequency	Percent
Yes	66	66.0
No	34	34.0
Total	100	100.0

Table 38 indicate that 66 percent of the respondents acknowledge the presence of cultural barriers as an important hindrance to the implementation of ICAO security measures, and 34 percent of them do not agree. The recognition of cultural barriers implies an increasing consciousness of the psychological and sociological factors of the security practices.

Attitudes, belief systems and behavioural norms of culture might play a significant role in influencing the level of compliance of employees to security regulations and protocols. As an example, the local culture and social processes can cause people to underestimate the significance of adherence to the security measures established by international organisations (Thabet et al., 2020). According to Ibrahim and Mostafa (2021), understanding of culture is critical in the development of an environment that is favourable to the practice of security. Airport authorities will be exposed to opposition in a situation where some of their security measures contradict the local cultural norms.

In this regard, JIA ought to consider the inclusion of cultural education within security training programs, in the promotion of knowledge on how cultural differences can influence interactions and compliance. Consulting the local communities in the discussion of security and taking into consideration their views might assist in closing the divide between the local culture and the global needs, resulting in greater compliance with the standards of ICAO.

4.7.4 Lack of awareness or understanding among airport staff

Table 39 depicts the results of the views on the non-awareness or ignorance among the airport personnel as a barrier to the ICAO security measures implementation in JIA. As the feedback of the respondents in this table highlights, staff training and education are essential in making sure that security measures are properly comprehended and implemented, and this is due to the possible impact of insufficient knowledge in security operations. This table shows the views about the ignorance or ignorance of the airport personnel about the issue that

undermines the efficacy of ICAO security guidelines at JIA. These gaps are key issues that need to be filled in order to develop security-minded personnel.

Table 39

Lack of awareness challenge to implementation of ICAO security measures

	Frequency	Percent
Yes	71	71.0
No	29	29.0
Total	100	100.0

According to Table 39, the results indicate that ignorance or ignorance by the airport personnel is a major problem in facilitating the application of the ICAO security measures, with 71 percent of the respondents in the survey noting that 29.0 being indifferent to the issue. The results of the choice show a serious training and knowledge gap among the staff that may affect security operations at JIA. The application of ICAO security measures is very much contingent on the enlightened staff about the roles and responsibilities in the application of security measures. On one hand, having trained workforce is important in the formation of a security-conscious culture in the airport staff (Kwan and Xu, 2021). Lack of sufficient training may lead to severe security measures, which may compromise the security of the airport.

To alleviate this problem, JIA ought to invest in effective training programs that will span the entire range of ICAO security recommendations. Frequent workshops and drills, as well as assessments, could be used to make sure that every single member of staff maintains a high degree of knowledge and adherence to a changing practice of security. Employees can also be empowered by education to increase compliance with protocols, but it also helps put employees into the position of feeling ownership and responsibility with respect to security (Larsen and Arora, 2021).

4.7.5 Other challenges or obstacles

Table 40 presents the tabulation of the views on the other challenges or obstacles that may be faced during the implementation of ICAO security preventive measures at JIA. The mention of these obstacles helps to have a detailed view of impediments to efficient security management.

Table 40*Other challenges faced in implementing ICAO security measures*

	Frequency	Percent
Yes	68	68.0
No	32	32.0
Total	100	100.0

Table 40 shows the reaction on other challenges or hindrances experienced in the implementation of International Civil Aviation Organization (ICAO) security preventive measures on the Juba International Airport (JIA). The table shows that 68% of the respondents admitted that there were major challenges, and only 32% stated that they did not see any other challenges. This observation highlights an overall perception by the airport staff and other stakeholders that there exist one or more factors that hinder the successful implementation of ICAO standards and protocols.

The fact that a large proportion of respondent (68%) responded that they faced challenges can be attributed to a keen sense of the issues involved in aviation security in the Juba International Airport. This is consistent with the literature that shows that, in many instances, effective security practices are complicated by certain contextual factors, such as the infrastructural shortcomings, political instability, and the lack of resources (Fathulla et al., 2019). The findings of the present study help to support the idea that JIA being the company in the politically unstable setting has the specific challenges which are unlikely to be experienced in the more stable areas.

This outcome also indicates that there is a major room of improvement. The 32 percent of those who reported that they did not have other challenges could be either the ones who are not aware of the current issues or those who are in areas that they do not necessarily face the problems. The division denotes a potential lack of connection between various levels of operations at the airport, which can have an adverse effect on effective collaboration and communication that is required to initiate the most powerful security practices. Due to the unified vision of the security challenges and measures, it is important to ensure that the stakeholders are on the same page towards a safety and compliance culture, as observed by IATA (2021). Furthermore, the inability to overcome these issues may have dire consequences on aviation security as demonstrated in the past literature that connected ineffective security implementation to the overall systemic challenges, including the presence of corruption and

shortcomings in training (Boeing, 2020). These structural weaknesses may also result in lapses in compliance that not only has an impact on security but also the integrity of the aviation industry of South Sudan.

Table 40 estimates show that most of the respondents were critically aware of the various challenges affecting the implementation of ICAO security measures. Such cognizance should be accompanied by strategic measures that focus on the detection and reduction of these barriers as a way of ensuring the security structure of JIA is improved and in fact the entire aviation infrastructure of South Sudan.

According to Table 38 above, Juba International Airport, which is the main air transport centre in South Sudan encounters many challenges as far as the implementation of international civil aviation organization (ICAO) of preventive security measures. On top of the generally mentioned obstacles of insufficient resources, language barriers, cultural aspects, and ignorance of employees, there are a number of other challenges that must be considered. In this respect, the other issues that the respondents were citing are infrastructure constraints, political instability, corruption and fraud and training and capacity building.

The current infrastructure at the Juba International Airport is one of the major problems that might fail to meet the high level of security provisions as suggested by the ICAO. A good number of the airports in the global world are fitted with up to date technology and systems and Juba mostly uses obsolete or inadequate facilities. Ineffective surveillance and monitoring may be hampered by poor infrastructure thus making it difficult to comply with ICAO standards (Fathulla et al., 2019). This weakness can result in ineffective procedural implementation and a weak security protocol implementation. Moreover, the continued political instability and strife in South Sudan is a great challenge to the security operations of the airport. Unpredictability usually results in compromised adherence to safety laws and compliance. The security environment is unstable, and it is hard to make airport employees concentrate on the application of ICAO standards on an even footing. Additionally, a continuous war can also cause the resources to be displaced when it comes to airport security programs, leading to the uneven implementation of the suggested measures (IATA, 2021).

There is also the impact of corruption and in the ranks within the government and airport authorities can highly impair the efficiency of security measures adopted. When airport workers are also involved in corrupt activities like being paid to avoid the security checks, the effectiveness of the whole ICAO standards will be undermined. Research has revealed that corruption may continue to promote the culture of laxity with regard to adherence to safety and security standards, thus subjecting airports to increased vulnerabilities (Boeing, 2020). Besides,

Training and Capacity Building was cited as a difficulty. Proper implementation of ICAO standards would necessitate the use of continuous training and capacity building programs of the personnel in the airports. Nonetheless, the impermanence of the staff, the little access to professional development opportunities, may reduce the efficiency of this training program. Skills training and retention are essential to deal with the new security issues, and in the case of Juba International Airport, the absence of a strong system of training and hiring skilled personnel may prevent the organization from having the required competence to offer proper security (Fathulla et al., 2019).

By accommodating these other problems which include infrastructural constraints, political instabilities, corruption and capacity building, Juba International Airport can develop a more effective and strong security framework which is in line with the ICAO standards.

Thematic Presentation of Challenges in the Implementation of ICAO Security Preventive Measures at JIA are presented in table 41 below.

Table 41

Challenges in the implementation of ICAO security preventive measures

Thematic Area	Frequency	Percent
Infrastructure Limitations	25	36.8
Political Instability	18	26.5
Corruption and Fraud	15	22.1
Training and Capacity Building	10	14.7
Total	68	100

Table 41 highlights the various challenges identified by the 68 percent respondents who acknowledged that there were other challenges in implementing the International Civil Aviation Organization (ICAO) security prevention measures at Juba International Airport (JIA). The areas that are thematically represented are infrastructure limitations, political instability, corruption and fraud, and training and capacity building.

The majority of the struggles surveyed was infrastructure limitations at 36.8%. This means that a substantial number of respondents believe that poor physical infrastructure and technological support present a major challenge when it comes to proper security. Poor infrastructure may affect surveillance functions and slow down performance efficiency, and therefore does not conform to ICAO standards. The existing literature confirms that modern

airports are more capable of carrying out effective security controls in place (Fathulla et al., 2019). Another significant problem that was identified was Political instability, with 26.5% of the respondents citing it as a major challenge. Considering the political conflicts that have been witnessed in South Sudan, the uncertainty of the security environment may make it challenging to maintain ICAO standards among the airport staff. This is because despite the existence of a permanent political environment, the development of the culture of security orientation in the aviation industry is not always achieved in areas where a conflict is occurring, as noted by the International Air Transport Association (IATA, 2021).

The 22.1% of the respondents mentioned Corruption and Fraud, which is one of the essential concerns that a person can observe and diminish the effectiveness of security systems implemented at JIA. Corruption may encourage the bypass of required safety measures, which are very dangerous to the general aviation safety. Studies show that corruption within the aviation sector may present loopholes to allow airports to get exposed to possible attacks (Boeing, 2020). Lastly, Training and Capacity Building as a challenge was mentioned by 14.7% of the respondents. This implies that there is a difference in the current professional training that the airport staff might need to possess the skills and knowledge that are demanded by the ICAO standards. The significance of ongoing training in the aviation industries is profound in a very dynamic security environment (Fathulla et al., 2019). In their views, the respondents were asked to provide the list of the most vital areas that required the improvement when it comes to ICAO security at JIA.

4.7.6 Critical areas for improvement in ICAO security measures at JIA

The respondents were requested to provide their opinions concerning the key areas of concern where improvements should be made in the ICAO security measures in JIA. Data obtained was analysed and results are presented in Table 42. The table, therefore, gives insights into the perception of respondents on areas that need to be critically improved on security measures required by the International Civil Aviation Organisation (ICAO) in Juba International Airport (JIA). The table breaks down four critical areas with the frequency and the percentage of responses given indicating the perceptions of the respondents towards the security vulnerabilities at the airport.

Table 42*Critical areas for improvement in ICAO security measures JIA*

Critical Area	Frequency	Percent
Screening and Inspection	35	35
Staff Training and Development	28	28
Surveillance Systems	20	20
Emergency Response Procedures	12	12
Total	100	100

Table 42 summarises the key areas of concern as reported by the 100 respondents that need to be improved with regards to application of International Civil Aviation Organization (ICAO) security measures at the Juba International Airport (JIA). The data shows that the issues of the utmost importance are associated with Screening and Inspection, Staff Training and Development, Surveillance Systems, and Emergency Response Procedures.

The most important sphere that required enhancement was Screening and Inspection, 35% of the respondents emphasized this issue. This highlights the importance of the increased security measures during the screening of passengers and their baggage, which is essential towards detecting the possible security threats. Aviation safety and compliance with the ICAO standards are fundamentally based on effective screening procedures (Fathulla et al., 2019). A lack of adequate screening systems may pose a serious threat to the general security of the airport, and it is possible to conclude that not only technology should be improved but also the procedures.

The second most often mentioned area was Staff Training and Development which was 28 percent of the responses. This observation highlights the importance of training the airport staffs with skills and knowledge needed to instil high levels of security measures in an efficient manner. Since the nature of the contemporary aviation security threats is complex, the ongoing professional growth is a condition that satisfies the need to allow the staff to adjust to the changing risks (Boeing, 2020). The culture of security compliance and vigilance at the airport requires a well trained workforce.

The area of improvement which was reported by 20% of respondents is on Surveillance Systems. This is an indication of the necessity of having better technological infrastructure to in terms of real time monitoring of the airport operations and security operations. In order to keep situational awareness and ensure prompt reporting of the incidents or suspicious activities,

modern surveillance systems are vital as part of ICAO recommendations that outline the appropriate security measures (IATA, 2021).

Finally, 12% of the respondents mentioned Emergency Response Procedures as an important area that requires improvement. This means that the airport should tighten its procedures in dealing with security incidents and emergencies so that its staff will be able to respond swiftly and efficiently when dealing with stressful circumstances. Clear emergency plans are essential to the protection of both passengers and airport employees and play a key role in ensuring the integrity of operations in case of an emergency (Fathulla et al., 2019).

Table 40 shows the main points that were highlighted by respondents at JIA and that need urgent focus to be in line with ICAO security measures. The response on these issues will help a lot in improving the general security system of the entire Juba International Airport and thus creating greater confidence in the security of air travel in South Sudan.

4.7.7 Key themes thematic areas

This section presents the synthesis of the results of the interviews conducted with the key informants in the Juba International Airport (JIA). The obtained insights indicate that the situation in the field of security management in the airport setting is more than a one-dimensional issue. A major security issue that was pointed at by the interviewees is related to vulnerability associated with access to the facility and qualification of the personnel and lack of infrastructure. Also, preventive strategies and continuous training programs were pointed out as keys to improving security procedures. The need to deal with existing resource and compliance issues proved to be one of the priorities, as well as identifying the necessary areas to work. The interviews concluded with a list of actions which could have been taken to strengthen the security arena in the airports. These themes are discussed in the following discussion and a detailed overview of the existing security dynamics at JIA is given.

4.7.7.1 Security concerns

The analysis of the results of the key informant interviews helped identify a number of security issues that exist in Juba International Airport (JIA). One of the key issues found to exist was the lack of effectiveness of the existing access control mechanism resulting in unauthorised and haphazard access to sensitive areas in the terminal facility which poses a serious threat to security. This problem was made even more complicated by the fact that unqualified staff were also used, thus forming part of the weak points of the current security system. The dependence of the practices adopted on insufficiently trained personnel also led to a higher risk of cyber-attacks and the lower efficacy of the practices as a whole (Cavusoglu et al., 2021).

In addition to this, interviewees expressed an increased alertness towards possible hazards such as terrorism, hijacking and bombings. These were also reflected in the existing literature that highlights the importance of reducing these kinds of threats in order to secure aviation (Lopez-Rivas et al., 2020). However, the lack of effective threat deterrent systems further increased the anxiety levels among the personnel and experts thereby highlighting the need to eliminate these loopholes. Likewise, environmental problems are not specific to JIA but are recognised with different air transport hubs worldwide (Schneider, 2021). The passenger and baggage management processes were inefficient, and required a lot of attention and remediation in a very difficult security environment.

4.7.7.2 Effective preventive measures identified

To counteract these challenges, interviewees revealed that there are a number of successful preventive measures that would improve security at the airports. Most particularly, the aspect of cultivating the risk awareness culture among employees was considered the most important one, as it established the atmosphere in which the security will be considered a priority at every level of work. Proactive attitude towards risk management is crucial in enhancing security measures and being alert with the staff (Rausand et al., 2021).

It was appreciated that the introduction of large-scale training aimed at tackling the problem of risk management was essential to empower the personnel to identify and take appropriate actions in case of any security threat. Key informants agreed that continuous professional growth and the investment made to the employees in the form of resources would lead to a more engaged and informed workforce. The sharing of intelligence and collaboration across different security agencies would also support the creation of a better situational awareness and vulnerability mitigation, which is in line with the recent research on integrated security practices (Rausand et al., 2021). This would encourage a dynamic attitude to security among the stakeholders with the free flow of information working effectively and efficiently thus resulting in faster response to the emerging threats.

Also, the optimization of the screening of passengers and their luggage, as well as the increased control over access, turned out to be the key factors in ensuring high security standards at JIA. Such measures would not only increase control in the areas that are vulnerable, but will also relieve certain strains on staff caused by poor systems. It is also possible to incorporate improved technology solutions in existing processes thus resulting in the efficiency of the workflow.

4.7.7.3 Training and capacity building

The interviewees emphasized the importance of constant training and skills development among security staff. Although there are training programs available to train on some issues like aeronautic engineering and risk management there are reports that there is a high demand to have more specific training on security operations. The existing training modules were also perceived to be not enough to equip the staff to deal with the dynamic security environment.

One of the important points mentioned was that International Civil Aviation Organization (ICAO) procedures have to be understood in detail in order to be able to run security measures (Baker and Gupta, 2020). Constant training and retraining of employees became critical towards reinforcing the general security system and improving the performance of various operations within the airport. It was observed that a more specialized training program would result in the creation of a work force that is not only adequate, but also beyond minimum safety levels.

In addition to this, capacity building programs need to go beyond the simple training programs to incorporation of simulations and scenario exercises that represent real life eventualities within JIA. This practical training method can be used to teach the employees how to absorb the steps required to be followed to respond effectively and manage risk.

4.7.7.4 Resource and compliance challenges

Nonetheless, there are a number of resource and compliance issues that delayed the successful execution of security measures in JIA. One of the significant concerns was the absence of management support and sensitivity to security measures that made the difference in the required support of the staff substantial. It was a challenge to the personnel to stay vigilant and stay on security measures due to this disconnect.

The financial limitations limited access to the necessary equipment, as well as to large-scale training, thus making the situation in the field of security even harder (Mason, 2020). The security initiatives could not be pursued properly without sufficient financial resources and the effect was a cycle of poor performance and weakness. Furthermore, the use of incompetent staff did not only compromise the security operations but also increased the risks, which is why a competent workforce that can efficiently perform critical security operations is necessary (Cavusoglu et al., 2021). Absence of qualified staff further stressed the importance of the redesigned approach to recruitment and training that aims at the attraction of the right candidates and their thorough training.

4.7.7.5 Critical areas for improvement

It was essential to identify the critical spheres that need to be improved to improve the security posture of JIA. Improvement of airport facilities such as increased light systems and proper parking space were essential in ensuring that the international safety standards were met. The enhancement of infrastructure would create a more secure environment, where the staff will find it easier to monitor and control sensitive zones. There was a need to have better overall airport management practices that are consistent with global best practices to ensure operational efficiency (Hinterhuber and Luchs, 2019). It was important to prioritise on training which would produce qualified workforce and provide both customer service and security excellence. There is moreover, the reinforcement of cybersecurity, particularly in a digitally-dependent environment, which has become an essential element of the current security policy.

It was emphasized that it is necessary to ensure complete emergency preparedness as part of response to the current highly dynamic threat environment (Demchak et al., 2020). The formulation of integrated response plans that are consistent with the global safety protocols would help JIA to be better prepared to address any form of incident.

4.7.7.6 Recommended additional measures

The interviewed individuals have made a number of suggestions regarding further security measures that may be adopted at JIA to enhance the current measures. The implementation of modern screening devices, including the biometric screening and explosive detection technologies were proposed to improve the overall security levels of the airport. Not only do these technologies enhance the detection rates, but the technologies also assist in streamlining the ways in which passengers are processed, which results in the fact that the queues are kept at a manageable rate, and the safety measures are only increased.

More active cooperation with international law enforcement agencies and aviation security services also offers possibility to get informative contributions and exchange best practices (Vallino et al., 2021). These alliances may result in training and resources that would improve the level of security practices in JIA. Moreover, the necessary tightening of access control of unauthorized individuals and improvement of surveillance was also an essential measure to strengthen the security system of the airport. These efforts would not only enhance security but also create a culture of responsibility whereby all the stakeholders would be actively involved in the security posture of the airport.

All of these steps should help to provide a safer and more secure environment at Juba International Airport, which would be beneficial to the integrity of the aviation security in South Sudan in general. With the evolving landscape in the aviation industry, the dynamics of

a strong security system will remain to be the most critical factor to ensure safety to the passengers and to ensure the people do not lose trust on air travel.

4.8 Key informants

Key information supported results of the study by the information of key informants. The key informants were imperative in providing in-depth information on the implementation and success of ICAO security preventive measures in Juba International Airport (JIA). These people have a particular background of understanding and first-hand experience of the operations of the security in the airports, the policies and the challenges. The key informants that were selected were the JIA Security Manager, Head of Security Operations, Aviation Security Inspector (ASI), Airline Security Liaison Officer, Airport Police Commander and Airport Management Representative. Their various duties enabled them to have a broad perspective of security practices, compliance rates and operational issues that are encountered in meeting the standards of the ICAO (Khan et al., 2020).

Recent studies indicate that integrating key informants at different levels of airport security improves both the accuracy and richness of the collected data and allows having a comprehensive understanding of the security measures and their practical implications (Ali and Rahman, 2021). Their views are important in revealing deficiencies, determining the preparedness and realising the obstacles encountered in enforcing international security standards in the domestic environment (Musa et al., 2019).

The passage provides a summary of the security practices that have been enforced in Juba International Airport (JIA) as viewed by The Security Manager who is a 45 year old male who has been employed in the institution for eight years down the line.

Excerpt Box 1

Adopted security measures on passenger and baggage screening

“I am in charge of all security activities at Juba International Airport. I have served in this institution for 8 years. In my current position I am tasked with putting into place security policies, training programs, and ensuring ICAO standards compliance. The security measures we have taken at JIA include screening both passengers and baggage, access control and employee training in threat detection and response strategies. We also regularly perform audits, offer ongoing training to security personnel and work with international partners to ensure our practices are in line with best practices. Some of the challenges include lack of resources, out-dated technology, and the need for ongoing staff training. I strongly believe the preventive measures that we have already applied to the airport are effective as they have lowered security incidents at the airport considerably. Overall, I believe that JIA is relatively well-prepared to fly in an ICAO environment, although there is always room for improvement in training and technology to help improve our procedures. I propose that international partnerships would be productive in the area of sharing best practices and resources”

Position: JIA Security Manager

Gender: Male

Age: 45 years

Date: 4th November 2024

From the excerpt of the interview with the Juba International Airport (JIA) Security Manager (Excerpt Box 1), it is possible to observe that the airport security management is a multi-dimensional issue, that concentrates on such aspects as the policy implementation, staff training, and compliance with international standards (such as ICAO). Such a systematic method relates to the current literature that highlights the significance of the well-defined governance schemes in improving the security of the airport (Omar et al., 2020). The balance between technical aspects and human element in achieving effective security management requires leadership as a crucial factor in promoting a culture of security based on the culture of continuous improvement (Yilmaz & Karabacak, 2021).

The security practices that have been implemented at JIA such as passenger and baggage screening, access control, and employee training are a manifestation of a layered approach to security as advanced by the existing best practices. These are essential in addressing threats before arriving at aircraft or passengers, which goes in line with the idea of security layers introduced by Smith and Williams (2019). Conducting frequent audits and continuing training programs indicate that the proactive attitude is incorporated in the

maintenance and improvement of security and it is supported by the literature that highlights the significance of continuous assessment and capacity building in resource-limited airports (Khan et al., 2021). International cooperation also emphasizes the importance of worldwide cooperation in the exchange of best practices and technological innovations, which is one of the strategies that have been identified as crucial in enhancing the level of security in developing nations (Alqahtani et al., 2020).

Irrespective of these strengths, the weaknesses of JIA including a lack of resources, outdated technology, and continuous employee training are aligned with the problems reported in the literature about airports in developing areas (Nair & Choudhury, 2020). Lack of financial and technological resources obstructs the introduction of the most advanced security solutions, which may undermine the general safety. The effectiveness perception as stated by the Security Manager (reduced security incidents) can be compared with results that indicate that a properly established layered security system can play a significant role in the prevention of the threats (Li and Wang, 2021). Yet, the identification of spheres where the organization can work on, i.e., technology upgrades and more training, also resonates with the findings of recent research that the key to resilience to changing threats is a constant investment and innovation (Khan et al., 2021).

In general, the evaluation shows that JIA is mostly adhering to the ICAO standards though there is need to emphasise on technological modernisation and capacity building in maintaining and enhancing security performance. This view aligns with the literature highlighting the importance of resource constraints not to impair the search of the best practices and that the strategic international cooperation can be used to offset the local restrictions (Alqahtani et al., 2020). The initiatives and dedication of the leaders as outlined by the Security Manager are just but a few examples of how airport in a similar circumstance can evolve and enhance security with the available resource structures with the end result being a sustainable and efficient security system.

To respond to the report, the Aviation Security Inspector at Juba International Airport had a report to respond to as indicated in excerpt box 2. The Excerpt Box 2 is the viewpoint of the Airport Management Representative of Juba International Airport (JIA), a 38-year-old female whose experience in different positions of an airport is ten years.

Excerpt Box 2

JIA implemented ICAO security preventive measures

“I am an Airport Management Representative, as a representative of the Airport Management team at Juba International Airport, I manage overall operations and the strategic approach to airport security. I am a 38-year-old female who has been in various positions within the airport for a total of 10 years. My responsibilities are to oversee in-between-department coordination and compliance with security protocols, or protocols that are consistent with the ICAO standards. JIA has implemented some of the ICAO security preventive measures like thorough screening of all passengers and baggage, emergency evacuation drills and access control for sensitive areas. We ensure that we are compliant through systematic audits, regular stakeholder meetings and staff training programmes. However, we are facing some challenges such as lack of proper funding for updating the security infrastructure and the need for continuous employee training to keep up with the changing threats”

Position: Flight Operations Manager

Gender: Female

Age: 38 Years

Date: 4th November 2024

According to the excerpt Box 2, her duties mostly involve checking in on the inter-departmental coordination and ensuring that the security measures are within the requirements of the ICAO. The passage also points to the use of some of the preventative security measures suggested by the ICAO such as extensive screening of passengers and baggage, conducting emergency evacuation tests and controlling access to sensitive places. These actions point to an all-inclusive security system to neutralize threats and safeguard airport operations. The management representative also insists on the need of systematic audits, involvement of stakeholders and training of staff to ensure international standards are upheld.

These are the practices that are aligned with the existing literature stating that implementing continuous assessment and collaboration with stakeholders is key to managing airport security (Khan et al., 2021). The active method of employee training is relevant because staff members should be informed about the changing threats, and the capacity building in the recent studies should be discussed (Yilmaz and Karabacak, 2021). Moreover, emergency evacuation exercises are crucial to equip personnel and stakeholders with incident response, which is one of the elements highlighted in the increase of overall security resilience (Omar et al., 2020).

Although these are some of the positive things, the excerpt also shows major obstacles that JIA has to go through, including the lack of funds to improve security infrastructure and the continuous necessity of educating employees. Such problems are typical of limited resources, and may impede the comprehensive adoption of ICAO standards (Nair & Choudhury, 2020). In the literature, it is emphasized that the technological developments and infrastructural enhancements are frequently constrained by the number of resources and are essential to maintain the pace with the new security threats (Li and Wang, 2021). The recognition of these limitations by the management is in line with the results that indicate that the development of sustainable security in the developing areas presupposes strategic planning and investment that might be supported by international funding (Alqahtani et al., 2020).

The passage shows that JIA management is on the go to ensure it meets the ICAO requirements on security by systematically ensuring that it meets the screening, drills, and access control requirements. Nevertheless, persistent shortages of resources are a setback to additional security infrastructures and training. The literature justifies the perspective that sustaining assessment, stakeholder engagement, and relying on external partnerships are critical mechanisms of overcoming resource limitations and sustaining efficient security systems in airports of the developing world.

Excerpt Box 3 provides a quote of a 40-year-old female Aviation Security Inspector who had 15 years of experience in both operational and regulatory facilities of aviation security.

Excerpt Box 3

Implemented comprehensive security protocols at JIA

“I have fifteen years of experience in aviation security, both in an operational setting and in a regulatory. My main responsibilities are to test the effectiveness of security measures, find weaknesses and suggest improvements to ensure ICAO compliance. We have adopted comprehensive security measures such as passenger screening, baggage inspection, secure area access controls, and emergency response drills at the Juba International Airport,. Nevertheless, we run into constraints, such as scarce resources for the upgrade of security infrastructure, the ongoing staff capacity building required to deal with new threats, and the immediate implementation of new security protocols”

Position: Senior Aviation Security Inspector

Gender: Female

Age: 40 Years old

Date: 5th November 2024

As noted in the excerpt box 3, the JIA uses multiple layers of security like screened passengers, their baggage, restricted access to the sensitive areas, and periodic training for emergency response. The layers of these measures are seen as a way to reduce risks and improve safety and that is aligned with the existing best practices in aviation security management (Khan et al., 2021).

The inspector points out that even with these well-established protocols certain challenges still exist especially in regard to lack of adequate resources to upgrade security infrastructure, continuous capacity building of the staff to address new challenges that come up as well as in ensuring that new security procedures are implemented in good time. These obstacles reflect the results of recent literature, which highlights the fact that the resource limitation is a vast challenge to attain optimal security performance, particularly in developing or resource-constrained environment (Nair and Choudhury, 2020). Besides, the ever-changing character of threat and aviation security requires continuous training and capacity development that can be obstructed by financial and infrastructural constraints (Yilmaz and Karabacak, 2021).

The current inability to introduce new security measures timely indicates the significance of adaptive management approach and coordination among stakeholders, which are highlighted by the latest research (Omar et al., 2020). Another important theme that the literature emphasizes that is critical in ensuring ICAO compliance, given resource constrained operational environments, is the constant testing and enhancement of security systems. The contributions of such an inspector support the idea that robust security systems must include not only powerful procedures but also a long-term investment on both the infrastructure and the human resources to be able to deal with the changes in the threats.

To summarize, the passage demonstrates that JIA uses a wide scope of security practices that are appropriate and consistent with the international practices but experiences continuous issues associated with resources and capacity. The literature confirms the fact that mitigation of these problems with strategic planning, international cooperation, and ongoing training is a crucial measure required to increase the effectiveness of airport security in resource-limited settings.

Box 4 is an extract of an interview with a 43-year-old male Airline Security Liaison Officer who has a history of more than 10 years working in the security and operations of an airline.

Excerpt Box 4

Implemented security measures on passenger and baggage screening

“I have more than 10 years of experience in the airline security and operations industries. My main tasks are: coordination of security procedures between the airline and airport authorities, compliance with international security standards, in particular those defined by ICAO, communication in case of security incidents or exercises. At Juba International Airport, measures that are in line with ICAO security requirements are implemented including passenger and baggage screening, access control to aircraft and sensitive areas, and periodic security audits. We ensure compliance by maintaining an ongoing relationship with airport security staff, involvement in joint security exercises, and staff training for the newest threat sciences. Some of our challenges include lack of capital for high-tech screening technology, keeping staff continuously updated within the changing security environment, and having uninterrupted communication links between all parties to avoid security breaches”

Position: Airline Security Coordinator

Gender: Male

Age: 43 years

The passage highlights the key security measures implemented at the Juba International Airport, including the screening of passengers and their baggage, aircraft and sensitive areas access control, and regular security audits. These provisions are part of the development of a multi-layered security strategy that is designed to identify and avert threats before loss in the safety of the airport occurs (Khan et al., 2021).

The officer also emphasises on the continuous process of compliance by maintaining regular interaction with security teams, and training of the staff on the latest security threat via joint security exercises and trainings. These actions are in line with the existing literature that highlights the importance of teamwork, regular training, and training drills to enhance the effectiveness of security (Yilmaz & Karabacak, 2021). However, it also reflects some of the continuing problems with this, such as the absence of funds to invest in the state-of-the-art screening equipment which is vital to improving the detection forces, and the difficulty of ensuring that staff training is updated to deal with the rapidly changing security threats. Moreover, an effective communication between all stakeholders is also required to prevent security breaches, and lack of resources and infrastructural limitations may hinder the free flow of data (Nair and Choudhury, 2020).

In the literature, the hypothesis of constraints on the resources and dynamism of security threats confirms the need for proactive strategies, including the involvement of the international community and the use of new means of communication and training (Omar et al., 2020). This extract illustrates the presence of resource problems for security, despite the existence of ICAO norms in this regard, which increases the difficulty of ensuring optimal performance of security. These challenges involve strategic planning and capacity building efforts to ensure coherent and effective security operations that have improved interaction between the stakeholders.

Overall, the presented security procedures outlined by the Airline Security Liaison Officer indicate a holistic approach in ICAO guidelines, yet the constant issue of resources and communication deficiencies show that the security infrastructure and training will have to be constantly improved and enhanced.

The contribution Airport of police commander at Juba International Airport presented in the Excerpt Box 5 is the level to which all security personnel and enforcement activities are planned to provide safety and security to the environment at the airport. It includes the interview with a 39-year-old male police commander of the airport police that has eight years of experience in the area of airport security and law enforcement. His work was maintain security guards and enforcement of the operation at Juba International Airport.

Excerpt Box 5

Implemented security measures on perimeter patrols and surveillance

I am Airport Police Commander at Juba International Airport, responsible for overseeing all security personnel and enforcement operations to ensure the safety and security of the airport environment. I am a 39-year-old male, 8 years of experience in airport security and law enforcement roles. My duties include coordinating security patrols, managing incident responses, and ensuring compliance with ICAO security standards and national security regulations. JIA implements ICAO security measures such as perimeter patrols, surveillance systems, access control to restricted areas, and emergency response drills.

Position: Airport Police Commander

Gender: Male

Age: 39 years

Date: 6th November 2024.

According to Excerpt Box 5, the adoption of these ICAO-compliant security measures implies that the airport environment is considered holistically, which is reflective of the best practice in the world of security that involves detecting the threat and responding to it as soon as possible (Khan et al., 2021).

The commander emphasises that they are doing their best to ensure compliance through frequent security inspections, close cooperation with airport management, and continuous staff training. These exercises play an essential role in ensuring the effective security posture during the changing threats in line with the recent literature that emphasizes the significance of routine evaluations and capacity building to meet the requirements of the emerging security environments (Yilmaz & Karabacak, 2021). Nevertheless, there are still notable problems, including the inability to buy innovative surveillance equipment due to a lack of financial resources, which interferes with the success of the detection and reaction of complex threats. Also, continuous training is vital because security personnel should be informed about the most recent methods of eliminating threats, but the lack of resources may be an obstacle to these measures (Nair and Choudhury, 2020).

The literature suggests that the inadequacy of resources, particularly when it comes to a developing country is one of the most frequent barriers to adopting the state of the art security infrastructure, and the resources must be distributed in a calculated manner and offer external support to address the deficit (Omar et al., 2020). The patrols and surveillance level at the perimeter is highly reliant on sufficient funding and trained personnel presence, and it is worth noting that the security system must be sustainable and receptive to the emerging threats. It is also worth mentioning that JIA possesses the ICAO security practices required and this text also proves that the financial and capacity development is one of the main factors that contribute to the sustainability of the security environment. Lastly, the Airport Police Commander has provided security measures that show that the Airport has an organized and standards-based approach to airport security. Nevertheless, the current inadequacy of resources and the necessity of constant training impose the significance of strategic planning and mobilisation of resources toward improved security.

Box 6 demonstrates the ideas of a forty two year old female, the airport management representative which has ten years of experience in airport operations. Her role is to supervise the general activity within the airport, coordinate the activities among various departments and strategic measures to improve security in Juba International Airport (JIA

Excerpt Box 6

JIA adopted and implements ICAO security preventive measures

“I am a Male 36 years old with good experience in many roles in the airport operations sector. My main tasks are the general management of the airport maintenance, inter-departmental coordination and strategic initiatives allowing a better implementation of the airport's security. JIA has established and continually practice ICAO security preventive measures such as rigorous screening procedures, regular exercise in emergency evacuation and stringent access control of sensitive areas. Our programs of continuous staff capacity building, and routine audits and engagements of stakeholders ensure ongoing compliance. However, in spite of these efforts, there are challenges including lack of adequate capital for security infrastructure modernization, and the need for ongoing training to counter emerging security threats.”

Position: Airport Maintenance Supervisor

Gender: Male

Age: 36 years

Date: 7th November 2024

In the text the airport is identified as to adopting the ICAO security preventive measures which include the thorough screening of both the passengers and their baggage, the frequent emergency evacuation drills and the tight control of accessibility to sensitive zones. The controls are the pillars of a tiered security program according to which there is no chance of security failure and that the threat can be addressed in a timely manner (Khan et al., 2021).

The management representative insists that the compliance maintenance involves frequent auditing, stakeholder meetings and continuous capacity-building training of the employees. These measures are in accordance with the literature that reveals that it is necessary to train continuously, involve stakeholders, and conduct regular assessments to maintain the high level of security and keep pace with the emerging challenges (Yilmaz & Karabacak, 2021). She however adds a big barrier too, that is lack of proper funding to upgrade security infrastructure, which will impact the introduction of high-tech security technology that is significant in the detection and response of security threats. Additionally, the necessity of constant training of the personnel is also a concern since the security threats are dynamic and, therefore, must have the capacity to develop on a continuous basis (Nair and Choudhury, 2020).

Most recent literature has found that most airports are short of resources particularly in the developing world and that strategic resource distribution and external assistance is a viable

method of developing security infrastructure (Omar et al., 2020). In addition, a key role of the new training solutions and international collaboration has been recommended as one of the possible ways to overcome these barriers (Yilmaz & Karabacak, 2021). As the text shows, though JIA follows the ICAO standards by establishing several preventative activities, the monetary incapability and the necessity to sustain and fortify the airport security through staff education is a pressing concern.

In conclusion, ICAO preventive measures adopted at JIA are strategic signs on how security is managed in the airport in general. However, the need to maintain the effective security operations in resource-constrained settings as well as the limitation in terms of resources and the necessity of continuous training emphasize the significance of strategic planning, mobilisation of resources and the engagement of stakeholders.

4.9 Emerging pattern and overall trends

The qualitative data retrieved in the key informant interviews in Juba International Airport (JIA) indicates that there is a complicated and multi-dimensional trend of perception related to the application and efficiency of ICAO security measures amid the operational conditions presented to the airport. One of the new distinctive trends is a high degree of awareness and recognition among informants of the airport in terms of its adherence to ICAO standards, which are in particular the implementation of layered security measures. These are passenger and baggage screening, access control, surveillance system, emergency drill and ongoing training of staff. According to most informants, the strategies have played a positive role in improving the overall security posture of JIA. As an example, the Security Manager pointed out the strategic audits, international cooperation and continuous employee capacity-building initiatives which have helped to align the local practices with the international best practices. This view is consistent with recent research that has highlighted the importance of having a more holistic view of security frameworks in airports in terms of minimizing threats and security incidents - the effect of employing a layered security approach, which incorporated both technological and human-based factors (Khan et al., 2021). In addition, the emphasis on the principle of continuous training and audit is indicative of existing consensus according to which continuous testing and capacity building are fundamental aspects of the resilient airport security systems especially within the context of resource constrained environments (Omar et al., 2020).

In spite of these optimistic attitudes, there existed a consistent underlying theme of worry on the issue of resource scarcity and infrastructural inadequacy, which manifested itself

throughout the interviews. The major complaint raised on by many of the informants was that the financial and material resources were constrained in the access of the more modern security technologies, upgrades of the infrastructure, and the breadth and number of staff training programs. This is a theme that is repeated, and it is a major problem that airports in developing nations face, as they are usually constrained by resource status, and they cannot fully adhere to the ICAO standards.

This can be supported by the literature since it suggests that the resource constraints, especially found in low-income or resource-constrained settings, are significant impediments to the successful application of international security standards. Similarly, Nair and Choudhury (2020) emphasize that with low finances, the equipment tend to be outdated and with subpar infrastructures, thus undermining security effectiveness. Incidentally, since there is no means of sufficiently funding the state of the art screening tools and surveillance mechanisms, it further exposes the airports to new threats that need dynamic and technologically advanced solutions.

Another major trend is associated with the increased focus on capacity building and personnel training as crucial factors in ensuring security resilience. Each and every informant emphasized on the need to constantly develop skills, simulation, and staff awareness to act appropriately in response to changing security threats. They however, also recognised that infrastructural deficiencies and lack of resources constrain the number and intensity of such training programs. This fact aligns with the recent research that highlights the importance of capacity development to keep up with the changing threat environment, yet the resource constraints tend to limit the possibility of a thorough training program (Yilmaz & Karabacak, 2021). The literature emphasizes that constant training is particularly scenario-based simulation, which improves the preparedness of personnel and enhances the quality of operational response, which eventually increases the resilience of security (Omar et al., 2020). The failure to maintain such programs because of financial limitation highlights the necessity of strategic allocation of resources and foreign assistance.

The perception of the informants also differed when assessing adequateness of the existing security measures. Although certain measures like those of the Security Manager and the Airport Management Representative were optimistic that the current measures, along with international cooperation, are sufficient to maintain a minimum level of security, others were worried that the current measures are not good enough to deal with the highly intelligent threats posed to airports today. Concerns identified by the Airport Police Commander and the Aviation Security Inspector as creating the gaps included the lack of a proper infrastructure especially

the one that embraces new technology in screening and surveillance. They were able to recommend that the security system at the airport could not hold any complex threats like terrorism and cyber-attacks unless this is heavily invested in both technology and human capital. This deviation is consistent with the recent studies that have shown that resource constraints usually have the effect of establishing a security posture that is at a minimum level and not sufficient to achieve full protection against the dynamic threats (Khan et al., 2021). The opposing points of view represent the larger discussion within the literature of whether resource-constrained airports can realistically be fully ICAO compliant and resilient or whether more modest improvements with international assistance are stopgap measures (Alqahtani et al., 2020).

Moreover, the difference in the focus areas of the informants highlights the differences in the priorities of perceptions of the critical ones. Operation is a priority of some and includes staff training, drills, and inter-agency cooperation which they see as keys to resilience particularly in situations where infrastructural improvements are limited. Others care more about infrastructural enhancement, such as the enhancement of surveillance and access control infrastructures which they believe to be the foundation of effective security. The specified deviation highlights the balancing act of limited resources that airport authorities must address when working in an environment where short-term needs of operations are likely to conflict with long-term infrastructural investments. According to the current resources, a coordinated approach to operation training, technological integration, and collaboration among stakeholders is required to run a comprehensive security paradigm (Yilmaz and Karabacak, 2021). The informants different focus highlights the necessity to have context specific approaches, which target both short term operational sustainability and long term infrastructural viability.

To sum up, the trend in the perception of JIA is of an airport dedicated to ICAO standards and layered security with the limitation of resources. Although some informants are confident that the existing measures work within the current constraints, others point out a high level of gaps that may be used by the emerging threats. These opposite opinions are in line with the global issues that have been affecting resource constrained airports, where strategic planning, capacity building and global cooperation are necessary to reduce resource gaps towards higher security resilience. The results confirm the idea that the sustainable growth of security should be moderate and should combine the activities of operational training, the modernization of the infrastructure, and the external support-a statement that the recent academic discourse substantiates (Khan et al., 2021; Omar et al., 2020).

4.10 Discussions

The given section includes the synthesis of the most important findings based on both quantitative and qualitative data gathered in the course of the research to form a subtle picture of the implementation, effectiveness, challenges, and perceptions of ICAO security measures at Juba International Airport (JIA). The results are systematised in terms of the research purposes, a focus being made on adopting the results of the key informant interviews to enrich the comprehension of the system-wide problems and contextual realities.

4.10.1 Demographic profile of respondents

The demographics indicate that the workforce is mostly male (58%), and the distribution across various age brackets is even (especially the 31-50 age bracket), which demonstrates a mature and experienced staff cadre. Most of the respondents were married (59%) and considered themselves Christians (60%), with a high percentage of the religious practice being traditional faith (33%) out of the cultural makeup in the region. The level of education was quite high with 42% having diplomas and 37% having bachelors implying a well-educated labour force that would be able to work with the complicated security measures. The numerous experience levels, in particular, the large number of employees with 12-20 years' experience (34%), also speaks of institutional stability and acquired expertise. At the organizational level, the participants were seen to represent a wide range of views both operational and strategic as they represented the different levels of staff in the organization, such as junior staff (34%), senior staff (29%), managers (18%) and directors (19%).

4.10.2 Perceptions of effectiveness of ICAO security measures

Most of the respondents showed their belief in the efficiency of primary security provisions. In particular, 74 per cent said that passenger and luggage screening was being conducted efficiently, 72 per cent said that there was secure passenger and crew identification and 69 per cent said that there was control over access to restricted areas. Emergency response planning, surveillance and monitoring were evaluated by 54 to 60 percent of the respondents as very effective. On the whole, 67 percent believed ICAO security measures at JIA were effective in the process of curbing breaches, and 53 percent provided affirmative response in regard to their effectiveness. These perceptions indicate a positive attitude towards the safety of operations but also provides the areas requiring additional reinforcement as it is also in line with the qualitative insights that informants reported operational successes but lament that something was missing in the infrastructural and systemic levels.

4.10.3 Staff awareness, training, and implementation

The information indicates that half of the respondents were highly conscious of ICAO standards, and the same percentage had undergone official training. Even though the awareness levels were high, 67% of the respondents trusted that ICAO measures are effective but the majority 72% highlighted the need to keep on improving. This perceived disparity between cognition and action conforms to the qualitative results as informants underlined that even though training is there, it is not always adequate or up to date, which results in the intermittency in the use of security measures. There was a great confidence in the ability of JIA to perform under ICAO standards with 40% rating it as very confident but 37% rated it as not very confident with most respondents citing the lack of resources and ability to meet the capacities being the main reasons. This was matched in the interviews with a lot of references made to infrastructural shortfalls and insufficient manpower.

4.10.4 Challenges and barriers

There are a number of systemic challenges that were identified in the study. Resource inadequacy (69%), language barriers (68%), cultural barriers (66%) and lack of staff awareness or understanding (71%) were the most eminent ones. These results are supported by qualitative interviews, where informants told about rotting infrastructures, old-fashioned equipment, and untrained staff as a constant problem. Infrastructural limitations (36.8%), political instability (26.5%), and corruption (22.1%) were identified as major barriers in the form of thematic analysis. According to informants, old screening equipment, inadequate surveillance, and training are some of the factors that make the place more vulnerable. The political instability and corruption also hinder reform as it reduces accountability and the distribution of resources.

4.10.5 Areas requiring urgent improvement

There was an agreement among the respondents on the necessity to improve screening and inspection processes, employee training, surveillance systems, and emergency measures. They agreed on the use of sophisticated technologies including the use of biometric scanners, explosive check-ups and CCTV facilities. The key informant qualitative information indicated that the technological knowledge that is there is in most cases outdated or inadequate and there is a pressing need to modernize the technology. Also, capacity-building activities like constant professionalisation and specialisation training were also highlighted, which in turn conforms to the attitudes of informants regarding the need to upgrade skills and knowledge.

4.10.6 Perceptions of readiness and support systems

Although 40 percent of those interviewed had high confidence in the preparedness of JIA to work in accordance with ICAO standards, a considerable number were still sceptical

and used the systemic and infrastructural issues as their reasons. Approximately 65% felt that standards of ICAO are realistic and attainable, but 35% felt that it is not, due to the lack of resources and governance challenges. Sixty-three percent of the participants considered perceived resource support to be adequate, whereas 37 percent of the participants expressed concern regarding resource gaps. Such perceptions reflect qualitative research results in which interviewees pointed to the shortage of resources and infrastructural deficits, which continue to be a barrier, usually exacerbated by political and economic instability.

4.10.7 Systemic and operational challenges

Its complex set of issues is not only in infrastructure and resources, but also in systemic problems like a governance issue, environmental risks, and systemic funding issues. Such environmental risks as flooding were mentioned by informants as frequent threats to operations, and such systemic risks as corruption and insufficient funding were common in interviews. These systemic issues enhance the deterioration of infrastructures and the limitation of overall adherence to ICAO standards. The thematic analysis highlighted that infrastructural constraints (36.8%), political instabilities (26.5%), and corruption (22.1) are still lingering challenges, which are also consistent with the qualitative stories that systemic change is a layered system that can only be improved by ensuring that there are sustainable security gains.

4.10.8 Recommendations and future directions

The main themes of improvement revealed by the respondents include the improvement of the screening and inspection process, the adoption of the newest security technologies, the provision of the additional staff training, and the enhancement of surveillance systems, which should be enhanced on an urgent basis. They suggested biometric and explosive detection system integration, capacity building through international co-operation and technical support. The need to develop partnership with international parties, i.e., ICAO and the neighbour nations, was underlined as crucial to mobilise resources and exchange knowledge. Key informant qualitative responses supported the view that strategic partnerships and long term funding would be important to address systemic impediments.

4.10.9 Perception of overall support and confidence

The views regarding support and preparedness in the airports were different. Although 40% of them were very much confident, some other people expressed doubtfulness and this was an indication of the understanding that despite the improvement that has been made, systemic and infrastructural barriers still hinder complete compliance. Some 65 percent considered ICAO standards as realistic and feasible, yet 35 percent remain doubtful with some frequently attributing the doubt to resource and governance concerns. The ambivalent

impressions point to the necessity of specific reforms, more allocation of resources, and consolidation of governance schemes.

4.10.10 Summary and synthesis

Overall, the quantitative and qualitative evidence suggests that the security environment is characterized by a set of rather strong aspects and a number of systemic weaknesses. The favourable outlooks of the existing actions are mitigated by the fears of the corrosion of infrastructures, the scarcity of resources, and the structural governing challenges. The qualitative information of key informants highlights that the solutions to these issues have to be holistic and that is, the infrastructure has to be advanced, modernization of technology has to take place, capacity development through training, as well as, need to be international in terms of collaboration. The results indicate that although JIA has achieved significant progress in terms of the ICAO compliance, it is necessary to consider long-term and consistent efforts to close the gaps and to make sure that the security structure at the airport is consistent with the international standards.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the key findings of the study, conclusions and recommendations.

5.2 Summary of the findings

Overall, the quantitative and qualitative evidence suggests that the security environment is characterized by a set of rather strong aspects and a number of systemic weaknesses. The favourable outlooks of the existing actions are mitigated by the fears of the corrosion of infrastructures, the scarcity of resources, and the structural governing challenges. The qualitative information of key informants highlights that the solutions to these issues have to be holistic and that is, the infrastructure has to be advanced, modernization of technology has to take place, capacity development through training, as well as, need to be international in terms of collaboration.

5.2.1 Effectiveness of ICAO security preventive measures

The research concluded that ICAO security preventive measures at JIA have been viewed by the majority of the respondents as moderately effective. In particular, 74 percent of the respondents stated that there are sufficient screening measures on passengers and luggage implying that the necessary ICAO standards are being followed. But when it comes to the rest of the 26% of the respondents who reported the lapses in screening, there is the issue of vulnerabilities that should be addressed. Further reviews showed that factors like safe identification of passengers and crew, restricted space access controls, as well as emergency response plans were rated positively, but rooms to enhance on were also noted. In general, the measures that are provided by the ICAO are known to improve the security landscape, however, the implementation and control of these measures have considerable opportunities to be reinforced.

5.2.2 Employees awareness of ICAO security measures

The awareness of the workers of the JIA security concerning the ICAO security preventive measures demonstrated an overall positive tendency. Most of them (58%), said that they were very aware of the current ICAO standards and 32% said that they were aware. Nevertheless, a minor percentage reported a poor level of awareness, which implies that they should be trained continuously and updated on the new developments to be aware of their roles and responsibilities in ensuring aviation security. The observation indicates that, despite the

general awareness, there are still lapses that require specific training programs to promote poor knowledge and adherence to ICAO requirements.

5.2.3 Perceptions of JIA readiness to operate Under ICAO measures

The attitudes towards the preparedness of JIA to be governed by ICAO security standards were mostly favourable as 73 percent of respondents said they believed in the actions taken by the airport. However, some respondents expressed some concerns about availability of resources, practicability of measures and effectiveness of existing security protocols. Although most of them acknowledged that JIA has come a long way to meet the requirements of ICAO requirements, the opposing voices should be addressed to make the overall operation more prepared.

5.2.4 Challenges of implementing ICAO preventive security measures

Different issues were raised with regards to the adoption of ICAO security preventive measures at JIA. One of the key challenges identified by 69 percent of the respondents was insufficiency of resources in the form of funds, manpower, and equipment. Cultural issues (66) and language barriers (68) were also mentioned as important obstacles to effective communication and compliance. Moreover, 71% reported that the lack of awareness amongst the staff is an issue, and it is necessary to have strong educational programs. The results of the findings indicate there is a necessity to fill the gap in resources, as well as to create the importance of clearer communication, enhance training, and develop the understanding of the cultural aspects influencing the security practices.

5.2.5 Critical areas for improvement

The respondents singled out key areas that need improvement in relation to ICAO security measures in JIA. Screening and inspection procedures were given the priority at 35%, and the second was staff training and development at 28%. Other systems that were found to have been improved were surveillance systems at 20% and emergency response procedures at 12%. These priorities highlight the necessity to improve the operational processes to make them very close to the international standards and strengthen the entire area of airport security.

To sum up, even though Juba International Airport has made a significant step in implementing ICAO security preventative initiatives, the analysis has revealed the spheres that should be developed further, especially in relation to resources, training, and communication policies. The focus on these areas of critical improvement not only enhance the level of adherence to ICAO standards but also increase the overall security standing of JIA, which lead to the development of a better attitude towards the security of air travel in South Sudan.

5.3 Conclusions

This section presents the study conclusions based on the study findings. The conclusions are in two parts namely, theoretical and empirical conclusions.

5.3.1 Empirical conclusions

According to the study, JIA has laid a strong base regarding employee qualification and the operation of its security systems. The employees are mostly educated and seasoned and this offers a good base to effect security enhancements. Nevertheless, there are severe gaps in such key areas as availability of resources, cultural flexibility, and continuous training programs. Although the ICAO preventive measures are generally considered to be effective, their realisation is hampered by setbacks such as lack of funds, availability of necessary equipment, deficit in staff awareness and lack of knowledge in security measures. These resource limitations are the reason why the airport is not be able to fully embrace and support sophisticated security practices. Irrespective of these challenges, the current qualified manpower presents a chance to do specific capacity building and system improvement. The results highlight that a holistic vision of security modernisation at JIA is needed, a process that does not only improve technology but human resource and organisational culture as well. Focusing on the resource shortage, cultivating the awareness cycle, and localizing security services to the ICAO standards are the key steps to progress. Cooperation among the government agencies, stakeholders of the airport, and international organisations play a significant role in securing the required support and resources. Through the combination of the strategies, JIA will be able to increase its security framework, improve the security of passengers and employees, and guarantee the security of the airport property. Finally, the overall and united effort may play a crucial role in surmounting current problems and realizing sustainable improvements in security.

5.3.2 Theoretical conclusions

When studying the implementation of ICAO security preventive measures and their impacts at Juba International Airport (JIA) in South Sudan, this paper used two mutually supportive theoretical frameworks, namely Securitization Theory and Acceptance and Adoption Theory. These theories gave a holistic overview of what shapes the behaviours of the security officers in addition to the strategic aspects of applying new security technologies.

The Securitisation Theory described by Huysmans (1998) presumes that the intention of an individual to participate in a particular behaviour is determined by three key factors and these are related to attitude to the behaviour, the subjective norms, and perceived behavioural control. Applying this theory in the framework of JIA, it was useful in explaining the

perceptions and reaction of security officers towards the implementation of ICAO security measures. The attitude towards the behaviour was measured through exploring the perception of officers towards the advantages and possible disadvantages of the introduction of new security measures. This involved their feelings as to how this would assist in enhancing safety or in the contrary disrupt business operations.

Subjective norms were also measured by analysing the perceptions of the officers on what colleagues, supervisors and airport management expect and influence them to adopt such security measures. Finally, perceived behavioural control was assessed by the knowledge of the officers of their ability to implement these measures effectively taking into account the available resources, training and institutional support. This integrated strategy illuminated the motivational and situational determinants that condition the readiness and capacity of security officers to implement the ICAO standards.

The second theoretical model that was used was the Acceptance and Adoption Theory which highlights the essence of knowing how and why security agencies make decisions to adopt new technologies in the dynamic threats environment like aviation security. Considering the dynamic nature of the strategies used by terrorists, security agencies may find it important to continuously revise and embrace new screening technologies as a way of identifying and preventing threats. One of the most significant problems in this area is the disclosure of the implementation of new security technologies in the open. Disclosure may be a deterrent, since it indicates improved security, or it may give attackers insights into security measures, and thus help them to get around defences. To cover this point, the research made a reference to the article by Hunt, Agarwal, and Zhuang (2021) who created an attacker-defender game model to examine the strategic decision-making in technology adoption and disclosure. Their model takes into account the decision of the defender to use a new screening technology and the decision of the attacker to attack or not to attack the targets given the perceived increase in security. This methodology addresses an important gap in the literature since previous studies have not paid much attention to the strategic aspects of security innovation disclosure in the aviation industry.

The combination of the two theories also gives an insightful explanation on the complicated decision making processes that are involved in the adoption of ICAO security measures at JIA. The Securitisation Theory describes the internal motivational drivers that shape the behaviour of the security officers, the Acceptance and Adoption Theory provides us with the information on the strategic aspects which the decision-makers should consider in order to implement and, possibly, disclose the new security technologies. The combination of

these two points demonstrates that the individual perceptions should be taken into account as well as the wider strategic decisions when influencing the security practices at JIA. This holistic analytical model can be used by the policymakers, the security managers, and the stakeholders to enhance the efficiency and resilience of the airport security systems in South Sudan and other related settings.

5.4 Recommendations

The section gives major practical recommendations based on the research findings, which may help improve on the application and efficiency of ICAO security preventive measures in Juba international airport. These suggestions are also aimed to solve the problems identified, enhance security awareness and make sure that the airport is ready to work in accordance with international standards. According to the given text, the suggestions about the improvement of the ICAO security preventive measures at the Juba International Airport is referred to a multi-dimensional group of stakeholders.

These recommendations are certainly targeted at the Juba international airport (JIA) Management as the primary audience. The section called the Operational Recommendations in particular is highly concentrated on the action steps that can directly be taken by the airport management, like the regular assessment with the purpose of carrying out the assessment, modernization of the screening systems, and improvement of programs of the personnel preparation. They are named as those who undertake day to day execution of security measures and resources management.

The recommendations are also extended to the policymakers besides the immediate airport management. These are the persons or institutions which make up and sanction policies which control the organization of security in the airports and distribution of resources. The policymakers are specifically indicated in the text when it comes to dedicating more funds to the project and providing adherence to ICAO requirements in terms of conducting ongoing performance assessments. This group would probably involve the concerned government ministry, in this case, the Ministry of Transport or Interior, and possibly the national civil aviation authority, who have the power to implement and enforce security policies.

In addition, the solutions relate to the larger group of the government and other interested parties. This includes a broader scope of entities that are involved in the general security framework. This is the point whereby the policy recommendations are very explicit by urging the government and other interested stakeholders to find some collaboration with international agencies and security services to provide technical support and finances to help surmount the obstacles such as lack of financial resources and technological shortages. This

implies that other government agencies, international organizations, and even the non-state actors in the airport infrastructure and security are perceived to play a vital role in providing sustainable implementation of ICAO measures.

Lastly, the recommendations also have an implicit implication on international organisations as well as security agencies. Although they are not directly assigned to take the measures at JIA, they are mentioned as the potential partners that should be essential in providing the necessary support, technical skills, and financial assets. The partnerships with these entities are called upon as important to assist JIA and the South Sudan government in enhancing the security framework at the airport to fit the international benchmarks.

Implementing these steps, the Juba International Airport may improve its security system, protect passengers and employees, as well as ensure the efficient and safe work of the air traffic.

5.4.1 Policy recommendations

Based on the findings aligned with the four specific objectives of this study, the following policy recommendations are proposed to enhance the adoption and effectiveness of ICAO security preventive measures at Juba International Airport (JIA):

- i. To improve the effectiveness of adopted ICAO security measures, policymakers should allocate increased funding for upgrading security infrastructure, including surveillance systems, access control points, and emergency response equipment.
- ii. To enhance awareness of security personnel, JIA should have capacity-building programs institutionalized on a regular basis that is specific to the evolving security threats. Standardized training modules and regular refresher training will ensure that security staff are well informed about ICAO protocols and best practices, therefore bridging knowledge gaps and improving operational efficiency.
- iii. To build a positive perception of JIA's readiness, airport management must set up transparent communication channels to inform security personnel about operational enhancements, resource availability, and compliance status on a regular basis. Also, through training and simulation exercises, the inclusion of security officers in contingency planning will instil confidence and strengthen the airport's ability to work under ICAO standards.
- iv. Addressing Issues in Implementing ICAO Measures: One of the challenges is low financial resources and technological shortcomings, therefore the government and appropriate stakeholders should seek collaborations with other international organizations and security agencies with the aim of technical support and funding. Implementing critical

infrastructure upgrades and developing a strategic security funding plan will ensure an effective and sustainable implementation of ICAO measures.

5.4.2 Operational recommendations

- i. JIA should conduct regular evaluations and audits of the implemented ICAO preventive measures to ensure their continued effectiveness. This includes updating security protocols based on emerging threats and integrating advanced screening technologies. Establishing a dedicated task force responsible for monitoring and continuously improving security practices will help maintain high standards aligned with ICAO guidelines. More over Modernize Screening Systems: Invest in advanced technologies for passenger and luggage screening to address concerns about security gaps.
- ii. To improve awareness among security employees regarding ICAO measures, JIA should implement comprehensive and ongoing training programs. These programs should focus on educating staff about the latest security protocols, threat recognition, and the importance of adherence to ICAO standards.
- iii. JIA management should regularly assess and address the perceptions of security officers regarding their readiness to operate under ICAO measures. This can be achieved through periodic feedback surveys, simulation exercises, and capacity-building workshops. Ensuring officers feel adequately prepared and equipped will boost confidence and operational efficiency in implementing security measures.
- iv. To overcome current challenges, JIA should identify and prioritize resource gaps, including funding, equipment, and infrastructure needs. Establishing partnerships with international organizations and stakeholders can facilitate resource mobilization and technical support. Furthermore, awareness campaigns aimed at both staff and the public can improve understanding and cooperation, thereby reducing operational challenges and enhancing overall security effectiveness.

5.4.3 Recommendations for further research

Building on the specific objectives outlined in this study, several areas warrant further investigation to deepen understanding and enhance airport security practices at Juba International Airport and similar contexts.

- i. The effectiveness of frequent security audits in aviation safety and international civil aviation organisation standards in Juba, South Sudan.

- ii. The impact of continuous training and awareness programs on security staff compliance and effectiveness in adhering to international civil aviation organisation standards at Juba International Airport, South Sudan.
- iii. Investigating the relationship between perceived readiness and actual performance of security officers in implementing aviation safety and international civil aviation organization standards security measures at Juba International Airport, South Sudan.
- iv. Examining the effectiveness of resource mobilisation strategies and stakeholder engagement in overcoming implementation challenges of aviation safety in Juba International Airport, South Sudan.

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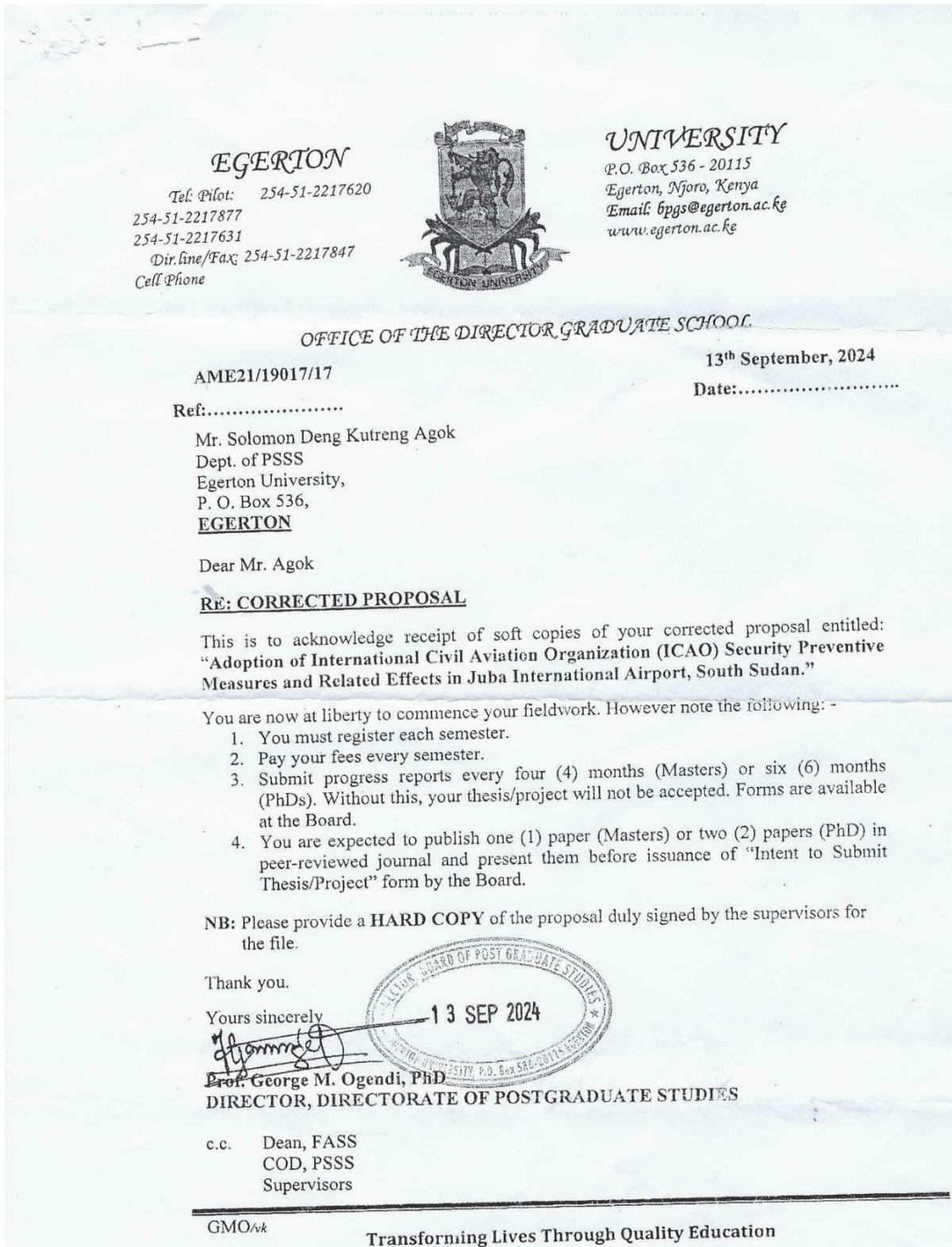
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APPENDICES

Appendix i: Introduction letter from Egerton university Graduate School



ppendix ii: Permit from higher education, Science and technology, South Sudan

THE REPUBLIC OF SOUTH SUDAN
Ministry of Higher Education, Science & Technology
Office of the Undersecretary



RSS/MoHEST/USO/J/IM

Date: 7th /10/2024

To Whom It May Concern

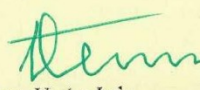
Subject: Mr. Solomon Deng Kutreng Agok

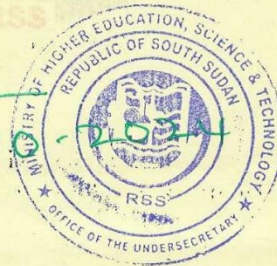
This is to inform you that, the above-mentioned is a postgraduate scholar (Masters Program) at Egerton University/ Kenya.

Mr. Solomon Deng intends to collect data for his research title "*Adoption of International Civil Aviation Organization (ICAO) Security Preventive Measures and Related Effects in Juba International Airport, South Sudan*".

Hence, I will appreciate any support rendered to this scholar on collecting data for academic purpose only, in Juba (Juba International Airport) for duration of Six (6) Months effective October 2024.




Kind regard,


Dr. Adam Kuir Jok
Acting Undersecretary



Cc: Hon. Minister
Cc: Director General for Training & External Relation.
Cc: File.


Appendix iii: Letter of no objection from the Ministry of Interior, South Sudan

	<p>The Republic of South Sudan Ministry of Interior South Sudan National Police Service Office of A/IGP & Commissioner of Police Central Equatoria State HQs-Juba</p>	
<p>Confidential</p>		
<p>To: - Whom it May Concern.</p>		<p>Date: 8/10/2024.</p>
<p>Subject:- <u>Mr. Solomon Deng Kuteng Agok.</u></p>		
<p>This is to inform you that, the above mentioned is postgraduate scholar (Master program) at Egerton/ Kenya he intended to collect data for his research on international Civil Aviation organization (ICAO) Security prevention measures and related effects in Juba international Airport. South Sudan.</p>		
<p>Therefore, The administration of CES-Police HQs have no objection but requesting the security organs to cooperate with him to carry out his task.</p>		
<p>Your usual cooperation is highly appreciated.</p>		
<p>Attached with relevant documents.</p>		
		
<p>M/Gen. Charles Boza Eywa. Acting/A/IGP & Commissioner of police Central Equatoria State/Juba.</p>		
<p>Cc: file.</p>		

Appendix iv: Introduction letter

My name is Solomon Deng Kutreng Agok, a Master of Arts student in Security Management at Egerton University, Juba Campus. Thank you for agreeing to participate in this study. My objective is to assess the challenges of ICAO effective security preventive measures at Juba international Airport. My questions are designed to get your opinion about the problem under investigation. All responses will be kept confidential and will be used solely for this research. I will ensure that any information included in my report does not identify you as the respondent. Remember, you do not have to talk about anything you do not want to and you may end the interview at any time.

Thank you,

A handwritten signature in black ink, appearing to read 'Solomon', is written on a light-colored background.

Solomon Deng Kutreng Agok

Appendix v: Questionnaire

SECTION A: Background Information

1. Gender:

a. Male

b. Female

2. Level of Education

a. Primary

b. Secondary

c. Diploma

d. Degree

e. Masters

f. Other (specify.....)

3. What is your age (Yrs.)

a. Below 30

b. 31 and 40

c. 41 and 50

d. Above 50

4. Marital status

a. Married

b. Single

c. Divorced

d. Widowed

e. Separated

5. Other (specify.....)

6. What is your religion:

a. Christianity

b. Traditional faiths (Animistic)

c. 41 and 50

d. Above 50

7. Length of service------(in Years)

8. Position/Rank-----

Section B: Effectiveness of ICAO Security Preventive Measures Adopted by Juba International Airport in South Sudan

1. Which of the following ICAO security preventive measures is/are adopted by Juba International Airport (JIA)?

i. Screening of passengers and luggage

a. Yes

b. No

ii. Secure identification of passengers and crew

a. Yes

b. No

iii. Restricted area access control

a. Yes

b. No

2. Are there any specific procedures in place for screening passengers and luggage at JIA?

a. Yes

b. No

3. Are there any restrictions on access to restricted areas at JIA?

a. Yes

b. No

4. Are there any security protocols in place for handling suspicious items or individuals at JIA?

a. Yes

b. No

5. Are there any security training programs for airport employees at JIA?

a. Yes

b. No

6. To what extent do you agree or disagree with the following statement: "The ICAO security measures implemented at Juba International Airport are effective in preventing security breaches."

- a. Strongly Agree
- b. Somewhat Agree
- c. Neutral
- d. Somewhat Disagree
- e. Strongly Disagree

2. How would you rate the effectiveness of the following ICAO security measures at Juba International Airport?

i. Access Control and Identification

- a. Very Effective
- b. Somewhat Effective
- c. Neutral,
- d. Somewhat Ineffective,
- e. Not Effective at All

ii. Screening and Inspections

- a. Very Effective
- b. Somewhat Effective
- c. Neutral
- d. Somewhat Ineffective
- e. Not Effective at All

iii. Surveillance and Monitoring

- a. Very Effective
- b. Somewhat Effective
- c. Neutral, Somewhat Ineffective
- d. Not Effective at All

- iv. Emergency Response Planning
 - a. Very Effective
 - b. Somewhat Effective,
 - c. Neutral,
 - d. Somewhat Ineffective,
 - e. Not Effective at All

- v. Information Sharing and Collaboration
 - a. Very Effective
 - b. Somewhat Effective
 - c. Neutral
 - d. Somewhat Ineffective
 - e. Not Effective at All

3. What do you consider the greatest security threat or risk facing Juba International Airport?

4. How concerned are you about the following potential security threats or risks?

- i. Terrorism
 - a. Very Concerned
 - b. Somewhat Concerned
 - c. Not Concerned

- ii. Cyber attacks
 - a. Very Concerned,
 - b. Somewhat Concerned
 - c. Not Concerned

- iii. Human error or negligence
 - a. Very Concerned
 - b. Somewhat Concerned
 - c. Not Concerned

- iv. Other (Please specify) _____

SECTION C: JIA security employees' awareness of the different security preventive ICAO measures adopted by JIA in South Sudan

1. How aware are you of the ICAO security preventive measures adopted by JIA?

- a. Very aware
- b. Aware
- c. Moderately aware
- d. Not aware
- e. Not very aware

2. Which ICAO security preventive measure do you think is most effective in preventing security threats at JIA? List them down

3. Have you received training on ICAO security standards and recommended practices?

- a. Yes
- b. No

4. Do you think that ICAO security preventive measures are effective in preventing security threats at JIA?

- a. Yes
- b. No

5. Are there any ICAO security preventive measures that you think are not well-implemented or need improvement at JIA?

- a. Yes
- b. No

6. If yes list them down

SECTION D: JIA Security Officers' Perceptions on the JIA's Readiness to Operate under ICAO Measures in South Sudan

1. How confident are you that JIA is prepared to operate under ICAO security standards and recommended practices?

- a. Very confident
- b. Confident
- c. Somewhat confident
- d. Not very confident
- e. Not at all confident

2. Do you think that ICAO security standards and recommended practices are realistic and achievable for JIA?

- a. Yes
- b. No

3. Are there any resources or support systems in place to ensure compliance with ICAO security standards and recommended practices at JIA?

- a. Yes
- b. No

4. If Yes, list them

5. Do you think that ICAO security preventive measures will improve the overall security of JIA?

- 1. Yes
- 2. No

6. Are there any concerns or challenges that you face in implementing ICAO security preventive measures at JIA?

- a. Yes
- b. No

7. If yes, list them

SECTION E: Challenges of adopted ICAO preventive security measures at Juba International Airport in South Sudan

1. What do you consider as the biggest challenge in implementing ICAO security preventive measures at JIA?

2. Do you think that inadequate resources (e.g., funding, personnel, equipment) are a challenge to implementing ICAO security preventive measures at JIA?

- a. Yes
- b. No

3. Are there any language barriers that hinder the implementation of ICAO security preventive measures at JIA?

a. Yes

b. No

4. Are there any cultural barriers that hinder the implementation of ICAO security preventive measures at JIA?

a. Yes

b. No

5. Do you think that lack of awareness or understanding among airport staff is a challenge to implementing ICAO security preventive measures at JIA?

a. Yes

b. No

6. Are there any other challenges or obstacles that you face in implementing ICAO security preventive measures at JIA?

a. Yes

b. No

7. If yes, list them

Recommendations for Improvement

1. What do you think are the most critical areas that need improvement regarding ICAO security measures at Juba International Airport?

2. Are there any additional security measures that you think would be beneficial to implement at Juba International Airport? (Open-ended question)

END

Thank you for your time and cooperation

Appendix vi: Key informants guide

Section 1: background information

1. What is your gender?
2. What is your age in years?
3. What is your role in the airport security system?
4. How long have you been working at Juba International Airport?
5. Describe your current responsibilities?

Section 2: ICAO security preventive measures

1. List the ICAO security preventive measures that JIA has adopted?
2. How does JIA ensure compliance with these measures?
3. Are there any challenges in implementing these measures, and if so, what are they?

Section 3: Awareness and perceptions

1. Are you aware of the different security preventive measures adopted by JIA?
2. How do you think these measures have improved airport security?
3. Do you believe that JIA is ready to operate under ICAO security measures?

Section 4: Challenges and suggestions

1. What are the major challenges faced in implementing ICAO security preventive measures at JIA?
2. Are there any areas where you think JIA can improve its security measures?
3. What suggestions do you have for improving the effectiveness of ICAO security preventive measures at JIA?

Section 5: Conclusion

Is there anything else you would like to add about the adoption of ICAO security preventive measures at JIA?

Thank you for your time and cooperation

Appendix vii: Publication abstract

Effectiveness of ICAO Security Preventive Measures and Related Effects: A Case of Juba International Airport, South Sudan

<https://www.ej-social.org/index.php/ejsocial/article/view/615>

Solomon Deng Kutreng Agok
Egerton University, Kenya
Corresponding author

Prof. Hadija Murenga
Egerton University, Kenya

Dr. Samwel Auya
Egerton University, Kenya

This study examines the effectiveness of ICAO security preventive measures adopted by countries and assesses their effectiveness in mitigating security risks in the case of Juba International Airport, South Sudan. This study focuses on the implementation of ICAO security standards and recommended practices (SARPs) at the Juba International Airport (JIA), encompassing comprehensive measures for passenger screening, luggage checks, secure identification of passengers and crew, and restricted area access control to ensure a high level of security. These protocols, including procedures for handling suspicious items or individuals and restrictions on access to restricted zones, aim to prevent security breaches and are supported by regular staff training and effective surveillance systems. The overall effectiveness of security measures at JIA, including access control, screening, monitoring, and emergency response planning, demonstrates a robust defense against potential threats, although concerns about emerging risks, such as cyberattacks, persist. Collaboration and information sharing among security agencies enhance preparedness; however, ongoing vigilance remains essential to effectively address existing and potential security threats. The target population consisted of 132 security officers in various categories at the JIA, with a sample size of 100 selected for the study. This study used a mixed-methods approach that combined qualitative and quantitative data collection and analysis techniques. A survey questionnaire was administered to security officers to gather information on the adoption and effectiveness of ICAO security measures. In-depth interviews were conducted with the airport management and personnel to obtain detailed information on the implementation processes. Secondary data analyses of airport security incidents were performed using the Statistical Package for the Social Sciences (SPSS). The findings reveal a positive perception among security personnel regarding the effectiveness of the measures: approximately 74% affirmed that passenger and luggage screening was conducted, 72% supported secure identification systems, and 69% endorsed effective access control measures. Furthermore, 74% acknowledged the established screening procedures, 70% confirmed protocols for handling suspicious items, and 66% recognized ongoing security training programs. The perceived effectiveness of key security components was high, with 57% rating access control and identification procedures as “very effective,” 54% for screening and inspections, 60% for surveillance and monitoring, and 61% for emergency response planning. Additionally, 64% of respondents considered information-sharing and collaboration efforts to be “very effective.” Despite these positive assessments, concerns about emerging threats persist: 69% of respondents are “very concerned” about terrorism, and an even higher 73% express “very concerned” regarding cyber-attacks. Overall, the results suggest that ICAO security measures at JIA are largely effective in preventing breaches. However, the ongoing threat landscape necessitates continuous vigilance, collaboration, and adaptation to emerging risks to sustain and enhance security resilience.