
Safety Strategies and Security Strategies on the Recovery of Zambia Airports Corporation Limited

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Purpose: This study investigated the effects of two critical organizational strategies (safety strategies and security strategies) on the recovery of the Zambia Airports Corporation Limited (ZACL). The study drew upon two theoretical frameworks to reinforce the variables under investigation: Systems Resilience Theory and the Risk Management Framework.

Methodology: The target population for this study comprised employees of ZACL across the four international airports and selected domestic aerodromes, who are directly involved in safety and security operations. Using Krejcie and Morgan's table, a sample size of 310 respondents was determined and selected through stratified random sampling to ensure representativeness of departments and staff levels. The study adopted an explanatory research design, which enabled the systematic examination of causal relationships between safety strategies, security strategies, and recovery outcomes. Data were collected through structured questionnaires, and statistical analysis included bivariate correlation and multiple linear regression to establish the nature and significance of the relationships among the study variables.

Findings: The results revealed that both safety and security strategies had significant positive effects on ZACL's recovery. Specifically, safety strategies were found to enhance operational resilience, regulatory compliance, and stakeholder confidence, while security strategies improved passenger trust, safeguarded assets, and reduced vulnerabilities to unlawful interference.

Conclusion: The study concludes that investing in comprehensive safety frameworks and strengthening security measures significantly enhance ZACL's recovery process. Findings affirm the intrinsic connection between these two strategies and sustainable aviation resilience. The study therefore recommends that aviation organizations prioritize robust safety management systems, enhance multi-agency security collaboration, and embed resilience planning into their operations. Such measures will not only accelerate recovery but also contribute to the aviation industry's long-term sustainability and competitiveness.

Keywords: Safety Strategies, Security Strategies, Organizational Recovery, Zambia Airports Corporation Limited.

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1. Introduction

The aviation industry is a complex and highly regulated sector requiring effective management practices to ensure safe, secure, and efficient operations (Christopher, 2017). A critical component of this industry is the adoption of safety and security strategies, which play a central role in sustaining operations and restoring confidence after major disruptions. Safety strategies involve structured mechanisms to prevent accidents and mitigate hazards, including the adoption of Safety Management Systems (SMS), hazard identification and reporting, and compliance with International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs). Security strategies, on the other hand, are designed to protect aviation operations from unlawful interference, terrorism, smuggling, cyberattacks, and insider threats, as outlined under ICAO Annex 17. When effectively implemented, safety and security strategies complement each other and form the backbone of aviation resilience, making them indispensable for the recovery of airports and air navigation service providers.

Globally, the importance of safety and security strategies has been underscored through ICAO's efforts to provide strategic direction for member states. The Global Aviation Safety Plan (GASP) outlines long-term objectives and performance targets to continuously improve safety oversight, while the Global Aviation Security Plan (GASeP) establishes a common approach to address evolving security threats. These frameworks provide benchmarks and encourage states to align their aviation systems with internationally accepted practices. In developed regions, robust safety and security mechanisms have not only improved operational efficiency but have also facilitated faster recovery from disruptions. For example, the European Union's Single European Sky ATM Research (SESAR) project has modernized air traffic management systems while incorporating harmonized safety oversight and advanced security systems, creating a more resilient aviation ecosystem (European Commission, 2020). The United States, through the Federal Aviation Administration (FAA), has embedded SMS into all aspects of airport and airline operations and complemented this with the NextGen modernization initiative. These reforms have led to a decline in accident rates and strengthened aviation security through multi-layered passenger screening, risk-based intelligence, and enhanced cybersecurity frameworks (FAA, 2021).

In Asia, several countries have demonstrated how investment in safety and security strategies translates into aviation excellence. Japan has successfully integrated predictive analytics and big data to track safety performance indicators in real time, enabling timely interventions before risks escalate. Singapore's Changi Airport is globally recognized for combining strict safety compliance with cutting-edge security systems such as biometric screening and artificial intelligence-assisted surveillance (Tanaka, 2019). These strategies have enabled the airport to achieve world-class safety records while maintaining passenger confidence and operational efficiency. Similarly, Middle Eastern hubs such as Qatar's Hamad International Airport and Dubai International Airport have positioned themselves as leaders in aviation safety and security by investing heavily in modern surveillance technologies, comprehensive staff training, and coordinated crisis management systems.

South America offers further lessons. In Brazil, major international events such as the FIFA World Cup and the Olympic Games necessitated large-scale investments in aviation infrastructure and safety oversight. Research by Souza and Pinto (2017) highlighted that while air traffic flow improved significantly, the sustainability of these improvements depended on training personnel and strengthening organizational capacity to manage increased safety and security demands. These global examples underscore a common reality: aviation recovery and

resilience cannot be achieved without integrating robust safety and security strategies into organizational frameworks.

At the regional level, Africa faces both opportunities and challenges in embedding safety and security into its aviation systems. The African Union's Single African Air Transport Market (SAATM) is designed to liberalize air transport, promote intra-African connectivity, and stimulate economic integration. However, for SAATM to succeed, African states must align with ICAO's safety and security provisions. While progress has been made in some countries, systemic challenges persist. South Africa, through the South African Civil Aviation Authority (SACAA), has implemented rigorous safety oversight systems and modernized airport security infrastructure. Nigeria, under the Federal Airports Authority of Nigeria (FAAN), has improved its ICAO Universal Security Audit Programme (USAP) scores by adopting advanced surveillance technologies and strengthening security screening processes (Michael, 2018). Nevertheless, many African countries continue to struggle with outdated infrastructure, limited funding, insufficient cybersecurity preparedness, and inadequate personnel training. These challenges weaken the resilience of aviation organizations, slow recovery efforts, and undermine the competitiveness of the continent's aviation industry.

Within this regional landscape, Zambia presents both opportunities and constraints. The Zambia Airports Corporation Limited (ZACL) is tasked with managing four international airports, namely Kenneth Kaunda International Airport, Simon Mwansa Kapwepwe International Airport, Harry Mwaanga Nkumbula International Airport, and Mfuwe International Airport, along with several domestic aerodromes. ZACL plays a crucial role in facilitating tourism, trade, and regional integration. However, the organization has faced significant disruptions in recent years. The COVID-19 pandemic caused a steep decline in passenger traffic and revenues, threatening its operational sustainability. Beyond the pandemic, ZACL continues to face systemic safety challenges, including gaps in hazard reporting systems, limited implementation of SMS across airports, and insufficient runway safety measures. Security challenges also persist, particularly in the form of outdated screening equipment, limited cybersecurity infrastructure, and weak coordination in intelligence-led security. While Zambia has made strides in aligning its operations with ICAO SARPs and has benefited from international technical assistance, ZACL still grapples with embedding these frameworks fully into its recovery strategies (Zambia CAA, 2022).

Despite the critical importance of safety and security, there is limited scholarly research examining how these strategies directly influence the recovery of aviation organizations in Africa. Existing studies have tended to focus on infrastructure expansion, financial performance, and regulatory oversight without giving adequate attention to the role of safety and security in organizational resilience. This gap is significant because failure to prioritize safety and security can jeopardize both recovery and long-term sustainability. For ZACL, integrating safety and security strategies into its operations is not merely a regulatory obligation but a fundamental requirement for regaining efficiency, restoring passenger confidence, and maintaining competitiveness in the regional aviation market.

This study therefore sought to investigate the influence of safety and security strategies on the recovery of Zambia Airports Corporation Limited. By focusing on these two strategic practices, the research aims to provide insights into how ZACL can strengthen its resilience and align with international best practices. The study also contributes to the broader literature on aviation recovery in developing countries, offering lessons that may be valuable not only for Zambia but also for other African states navigating similar challenges.

2. Theoretical Review

The Systems Resilience Theory, first developed by Holling (1973), provides a comprehensive framework for understanding how organizations and systems maintain functionality amid disruptions and prepare for future uncertainties. Resilience is defined as the capacity of a system to absorb shocks, adapt to changing conditions, and reorganize in ways that sustain or improve performance. Unlike traditional risk management models that emphasize control and prevention, the theory highlights adaptability, flexibility, and continuous learning as essential to long-term sustainability. In the aviation industry an environment marked by technological complexity, global interdependence, and exposure to crises—resilience is a critical operational requirement. The theory's relevance is clearly demonstrated in global safety practices such as the Safety Management Systems (SMS) introduced by the International Civil Aviation Organization (ICAO), which promote proactive hazard identification and performance monitoring. The ICAO Global Aviation Safety Plan (GASP) further encourages states to move beyond compliance and adopt adaptive safety mechanisms (ICAO, 2020). Similarly, the Federal Aviation Administration (FAA, 2021) in the United States mandates SMS for airlines and airports, ensuring anticipatory safety management, while the European Union Aviation Safety Agency (EASA) under the SESAR program promotes harmonized, real-time safety oversight across Europe. In Asia and the Middle East, countries like Japan and Singapore have incorporated predictive analytics and artificial intelligence into safety systems, while Dubai and Doha have invested heavily in operational redundancies and advanced monitoring technologies. For Zambia Airports Corporation Limited (ZACL), embedding resilience involves proactive hazard reporting, use of the ICAO Global Reporting Format (GRF) for runway conditions, regular audits, and staff training to move from compliance-based safety to dynamic, learning-oriented systems capable of rapid recovery after disruptions such as the COVID-19 pandemic.

Systems Resilience Theory also applies strongly to aviation security, particularly under ICAO Annex 17, which governs protection against unlawful interference such as terrorism, sabotage, and cyberattacks. It stresses the ability of aviation systems to anticipate emerging threats, adapt security measures, and recover swiftly from disruptions. Globally, resilience principles have been integrated into aviation security through the adoption of multi-layered screening systems, biometric identification, and artificial intelligence-enabled surveillance—exemplified by airports such as Singapore's Changi and Amsterdam Schiphol (Tanaka, 2021). In Africa, countries like South Africa and Nigeria have strengthened aviation security through investments in technology, perimeter control, and inter-agency coordination, improving compliance with the ICAO Universal Security Audit Programme (USAP). However, resource limitations in many African nations, including Zambia, constrain the adoption of high-cost technologies, making resilience a key strategy for optimizing limited resources while maintaining adaptability and recovery capacity. For ZACL, security resilience means enhancing intelligence collaboration, adopting flexible screening systems, and developing robust cybersecurity and recovery plans to ensure operational continuity after security incidents. Despite its advantages, Systems Resilience Theory faces critiques for being conceptually broad and difficult to operationalize, especially in regulated industries like aviation where precision and compliance are critical (Greene, 2012). Nevertheless, it remains invaluable as it links safety and security strategies to adaptation and recovery, emphasizing that disruptions are inevitable but need not be catastrophic. For ZACL, applying resilience principles provides a pathway toward operational continuity, passenger confidence, and

alignment with international best practices—transforming safety and security strategies into dynamic enablers of sustainable performance and competitiveness in the global aviation industry.

3. Empirical Literature Review (hypothesis development)

Aviation safety refers to the condition where risks associated with flight operations are reduced to acceptable levels, ensuring the protection of people and assets. Safety strategies encompass structured systems, operational practices, and organizational cultures that minimize hazards, prevent accidents, and enhance responsiveness to emergencies. Empirical research underscores that safety strategies form the foundation of stability and recovery within the aviation sector. According to Hosseini (2018), effective safety frameworks include hazard identification programs, robust reporting mechanisms, comprehensive accident investigations, and regular audits that ensure compliance with ICAO standards. Globally, ICAO's Global Aviation Safety Plan provides harmonized safety goals and indicators for member states, enabling systematic performance monitoring (ICAO, 2020). Studies show that countries adhering to GASP guidelines exhibit improved safety oversight and adaptability during crises (Michal, 2019).

In Europe, empirical evidence highlights how coordinated regional approaches enhance aviation resilience. Chunlin (2018) found that the European Union Aviation Safety Agency (EASA), under the Single European Sky ATM Research (SESAR) initiative, significantly reduced operational risks such as runway incursions through harmonized oversight and collaborative risk management. The UK Civil Aviation Authority (UK CAA) reported that integrating Safety Management Systems (SMS) across all licensed operators improved hazard reporting and recovery response times after incidents. Similarly, in the United States, the Federal Aviation Administration (FAA, 2021) observed that SMS implementation led to lower accident rates and enhanced regulatory compliance. Jennifer (2017) further documented that proactive safety audits and reporting improved U.S. airports' resilience against disruptions, while Souza and Pinto (2017) demonstrated that Brazil's safety investments before the World Cup enhanced operational continuity despite training challenges. In Asia, Tanaka (2019) and John (2018) found that China's Civil Aviation Administration (CAAC) leveraged predictive analytics and staff training to achieve one of the world's best accident-avoidance records, proving that sustained investment in technology and human capital drives safety resilience.

African evidence presents a mixed picture of progress and constraints. Mutua (2019) reported that South Africa's Civil Aviation Authority (SACAA) strengthened resilience through SMS training, safety audits, and runway programs, while Oluwole (2019) observed that Nigeria's enhanced oversight improved ICAO safety audit scores, bolstering international confidence. However, other African nations face persistent challenges including inadequate infrastructure, limited funding, and weak safety reporting systems, which undermine recovery efforts. In Zambia, the Zambia Civil Aviation Authority (2022) identified significant gaps in hazard reporting and runway condition monitoring at Zambia Airports Corporation Limited (ZACL). Joyce (2021) noted that underreporting, insufficient training, and a weak safety culture impede resilience and delay recovery after incidents. Consequently, ZACL must strengthen training programs, standardize safety systems, and cultivate a robust safety culture to align with international best practices. Based on these insights, the study hypothesized that:

H₁: Safety strategies significantly influence the recovery of Zambia Airports Corporation Limited.

Security Aviation security encompasses the frameworks, technologies, and operational practices designed to protect civil aviation from unlawful interference such as terrorism, hijacking, sabotage, smuggling, and cyberattacks. Security resilience reflects an airports or authority's ability to anticipate, prevent, and recover swiftly from such breaches. Globally, ICAO Annex 17 forms the foundation of aviation security regulation. Hosseini (2018) observed that states with full compliance to Annex 17 experience fewer incidents and stronger recovery capacity. Similarly, Michal (2019) found that airports employing layered systems including biometric screening, intelligence-led policing, and cyber monitoring—recover more rapidly after breaches. Barton (2015) emphasized the critical role of inter-state intelligence sharing in enhancing collective global resilience against coordinated threats, demonstrating that effective collaboration can significantly reduce security vulnerabilities across interconnected aviation networks.

In Europe, regional coordination has been key to building security resilience. Valentina et al. (2018) reported that biometric border controls implemented in major airports such as Amsterdam Schiphol reduced wait times, improved passenger trust, and maintained strong detection capabilities. Institutions such as EASA and Eurocontrol have further strengthened regional resilience through intelligence-led security and collaborative responses to cyber threats. Research confirms that these cooperative measures improved adaptability to emerging risks, including insider threats and drone intrusions. In the Americas, the United States offers a landmark example: post-9/11 reforms, including the establishment of the Transportation Security Administration (TSA), introduced multi-layered, risk-based systems that transformed aviation security. According to the FAA (2016) and Kim (2017), these reforms reduced vulnerabilities, improved operational continuity, and restored public confidence. Likewise, in Brazil, Michael (2018) found that investment in surveillance technologies and inter-agency coordination prior to major events strengthened security readiness, though persistent cyber risks highlighted the need for ongoing innovation.

Across Asia and Africa, diverse approaches to security resilience have emerged. In China, John (2018) and Tanaka (2019) documented the integration of facial recognition, artificial intelligence, and cyber monitoring frameworks that significantly improved detection accuracy and recovery speed, illustrating how central coordination and technology integration enhance resilience. In Africa, Michael (2018) observed that South Africa's intelligence-led policing and advanced surveillance accelerated recovery after attempted breaches, while Valentina et al. (2018) noted that Nigeria's investment in perimeter controls and CCTV improved ICAO Universal Security Audit Programme (USAP) scores. Despite progress, many African states still face resource constraints, weak cyber defenses, and fragmented coordination (Joyce, 2021). In Zambia, the Zambia Civil Aviation Authority (2022) identified vulnerabilities in perimeter security, biometric adoption, and cybersecurity readiness. Mark (2019) reported that slow inter-agency coordination delayed responses to incidents, and Joyce (2021) highlighted under-addressed insider threats due to inadequate training and background checks. These findings indicate that ZACL must invest in personnel training, modern technology, and stronger coordination with national security agencies to build lasting resilience. Consequently, the study hypothesizes that.

H₂: Security strategies significantly influence the recovery of Zambia Airports Corporation Limited.

4. Research Methodology

The study adopted a survey and explanatory research design under a quantitative approach to assess how safety strategies influence the recovery of operations within Zambia Airports Corporation Limited. The explanatory design was appropriate because it enabled the researcher to systematically observe, describe, and explain relationships between variables without manipulating them (Barton, 2015). The study's structured approach ensured that data collected could effectively address the research hypotheses, supporting decision-making with objective, statistically analyzed results.

Sampling Design

The target population for this study comprised 850 aviation personnel drawn from various operational divisions of Zambia Airports Corporation Limited and related entities. This included executive management, cabin crew, customer service representatives, regulatory and compliance personnel, operational staff, maintenance teams, and ground crew. The population was stratified to ensure proportional representation across all job categories. Based on Krejcie and Morgan's (1970) sample size determination table, a representative sample of 264 respondents was selected. Proportional allocation ensured that each category of staff was adequately represented in the final sample. The study employed a cluster random sampling technique, which grouped respondents according to their operational departments to enhance efficiency and relevance.

Data Collection

Data were collected using a structured questionnaire designed to gather both demographic and research-specific information. The instrument consisted of two sections: the first covered demographic details such as gender, age, education level, and years of experience, while the second section focused on respondents' perceptions of safety strategies, security strategies, in relation to the recovery of operations. To ensure accuracy and reliability, a pilot study was conducted with 26 respondents at Lusaka International Airport, representing approximately 10% of the sample size. The pilot helped test the questionnaire's clarity, structure, and internal consistency. The Content Validity Index (CVI) was used to assess the relevance of questionnaire items, with only those scoring above 0.7 retained. Reliability was evaluated using Cronbach's alpha, where a coefficient of 0.7 or higher indicated satisfactory internal consistency. Questionnaires were distributed both electronically and in printed form to maximize participation and inclusivity. Completed responses were reviewed for completeness and securely coded into a database for analysis, ensuring a systematic and bias-free data collection process.

Data Analysis and Model Specification

Quantitative data were analyzed using descriptive and inferential statistics in SPSS. Descriptive analysis summarized respondents' demographic and variable characteristics through means, percentages, and standard deviations, presented in tables and charts. Inferential analysis employed multiple linear regression to examine the effect of independent variables Safety strategies (SS), Security strategies (ST) on the dependent variable, Recovery of Operations. The model specification was expressed as:

$$\text{Recovery of Operations} = \beta_0 + \beta_1\text{SS} + \beta_2\text{ST} + \beta_3\text{SQ} + \beta_4\text{NR} + \varepsilon,$$

where β_0 represents the intercept, β_1 – β_4 are coefficients of respective predictors, and ε denotes the error term. This model enabled hypothesis testing to determine the significance and strength of relationships between variables, providing a data-driven basis for assessing how safety and related strategies contribute to aviation operational recovery.

5. Results and discussions

Out of the 264 questionnaires distributed, a total of 198 were fully completed and returned, yielding a response rate of 75%, which is considered satisfactory for quantitative analysis. This level of response provides sufficient representativeness and statistical power for meaningful interpretation of the study results.

Descriptive and Correlation Results

Descriptive statistics were computed to summarize the central tendency and dispersion of key study variables Recovery of ZACL, Safety Strategies, and Security Strategies. As presented in Table 1, the mean score for Recovery of ZACL was 3.590 (SD = 1.540), suggesting that respondents generally perceived the recovery of operations at ZACL to be moderate. Safety Strategies recorded a mean of 3.936 (SD = 1.070), indicating that safety initiatives such as hazard identification, reporting systems, and staff training are well implemented but could be further strengthened. Security Strategies had a mean of 4.069 (SD = 1.786), reflecting a strong perception that security measures, including surveillance, access control, and compliance with ICAO Annex 17, are integral to maintaining and restoring safe operations.

Also, the results revealed strong positive and statistically significant relationships between the independent variables and the dependent variable (see Table 1). Safety Strategies exhibited the strongest association with recovery ($r = 0.687$, $p < 0.01$), emphasizing that proactive safety management practices significantly enhance operational resilience. Likewise, Security Strategies showed a significant positive correlation with recovery ($r = 0.653$, $p < 0.01$), implying that effective security management contributes to faster restoration of normal operations after disruptions. Additionally, a positive inter-correlation between Safety and Security Strategies ($r = 0.619$, $p < 0.01$) suggests that the two functions are complementary and jointly reinforce recovery outcomes.

Table 1: Descriptive And Correlation Results

n = 198	Mean	Std. Dev.	Recovery of ZACL	Safety Strategies	Security Strategies
Recovery of ZACL	3.590	1.540	1		
Safety Strategies	3.936	1.070	0.687**	1	
Security Strategies	4.069	1.786	0.653**	.619**	1

** . Correlation is significant at the 0.01 level (2-tailed).

Regression Results (Hypothesis Testing)

The regression model was developed to examine the combined and individual effects of safety strategies (ss) and security strategies (st) on the recovery of Zambia airports corporation limited). The model results demonstrate a strong explanatory power, with an R value of 0.741 indicating a high level of correlation between the independent variables and recovery. The R^2 value of 0.549 implies that approximately 54.9% of the variation in operational recovery at ZACL is explained by safety and security strategies combined. The Adjusted R^2 value of 0.543 further confirms that the model provides a good fit, suggesting that the predictors significantly contribute to explaining recovery outcomes, with minimal influence from random error. Additionally, the F-statistic ($F = 118.93$, $p < 0.001$) confirms the model's overall significance, meaning that safety and security strategies jointly have a statistically significant impact on the recovery of ZACL's operations.

The unstandardized coefficients reveal that both independent variables have positive and significant effects on recovery. Specifically, Safety Strategies ($\beta = 0.426$, $t = 7.220$, $p = 0.000$) emerged as the stronger predictor, indicating that a one-unit increase in safety initiatives—such as proactive hazard identification, safety audits, or staff training—leads to a 0.426-unit improvement in recovery outcomes. This result supports Hypothesis H1, confirming that safety strategies significantly enhance operational resilience at ZACL. The finding aligns with prior studies such as Hosseini (2018), who emphasized the centrality of robust safety systems in aviation stability, and Chunlin (2018), who demonstrated that harmonized safety frameworks like EASA's SESAR program reduce operational hazards. Similarly, FAA (2021) and Jennifer (2017) established that implementing safety management systems improves hazard reporting, reduces accident rates, and enhances recovery efficiency. In the African context, Mutua (2019) and Oluwole (2019) observed that consistent SMS training and audits improved resilience, findings that resonate with the present study's conclusion that ZACL's recovery is strongly linked to the robustness of its safety framework.

The model also shows that Security Strategies ($\beta = 0.387$, $t = 6.141$, $p = 0.000$) significantly predict recovery, thereby supporting Hypothesis H2. This implies that enhanced aviation security measures including biometric screening, cybersecurity systems, surveillance technologies, and intelligence-led coordination positively influence ZACL's ability to restore operations following disruptions. The finding corresponds with the ICAO Annex 17 principles and the observations of Hosseini (2018) and Michal (2019), who found that states adopting layered and adaptive security systems recover faster from breaches. Valentina et al. (2018) and Barton (2015) also emphasized that inter-agency collaboration and advanced surveillance technologies build global aviation resilience. Evidence from Kim (2017) and Michael (2018) in the U.S. and Brazil respectively, confirms that multi-layered security reforms and technological integration reduce vulnerabilities and strengthen public confidence—consistent with the current study's results. In Zambia, however, Joyce (2021) and the Zambia Civil Aviation Authority (2022) identified challenges such as inadequate staff training, slow inter-agency coordination, and weak cybersecurity, suggesting that while security strategies have a positive effect, further investments are required to maximize their impact.

Thus, these results underscore that both safety and security strategies are critical determinants of operational recovery within Zambia's aviation sector. Safety strategies—through continuous training, safety reporting systems, and hazard monitoring—provide the structural foundation for resilience, while security strategies enhance protective capacity against external and internal threats. The significant positive coefficients for both predictors confirm that ZACL's recovery depends on an integrated approach that combines proactive safety management and adaptive security systems. These findings reinforce global aviation literature and call for

sustained investment in safety culture, regulatory compliance, and modern security technologies to strengthen Zambia's alignment with international aviation resilience standards.

Table 2: Regression Results

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	0.812	0.144		5.639	0.000
Safety Strategies	0.426	0.059	0.471	7.220	0.000
Security Strategies	0.387	0.063	0.416	6.141	0.000
Model summary Statistics					
R	0.741				
R Square	0.549				
Adjusted R Square	0.543				
Std. Error of the Estimate	0.421				
ANOVA (model goodness of fit)					
F stat	118.93				
F prob	0.000				

6. Conclusion

The research indicates that there is a statistically significant relationship between safety strategies and the recovery of ZACL. This suggests that as the level of safety strategies improves, recovery is expected to strengthen, holding all other factors constant. This finding highlights the importance of structured safety initiatives such as hazard reporting, staff training, and runway safety programs in enhancing operational resilience.

The study also establishes a statistically significant and positive relationship between security strategies and the recovery of ZACL. This suggests that improvements in airport security infrastructure, cyber-security protocols, surveillance, and access controls lead to stronger organizational recovery. This underscores the pivotal role of integrated security measures in safeguarding aviation operations and ensuring sustainable recovery.

7. Study Implications

This research emphasizes the significance of safety and security strategies in driving the recovery of Zambia Airports Corporation Limited (ZACL). The findings hold practical importance for aviation managers, policymakers, and stakeholders who are responsible for ensuring operational resilience and sustainability. They imply that strategic investment in safety programs such as hazard reporting systems, runway safety initiatives, and compliance with ICAO safety management standards can accelerate recovery by minimizing risks and reinforcing confidence among both staff and passengers. Organizations that prioritize proactive safety strategies are more likely to sustain uninterrupted operations and gain the trust of international partners and regulators.

The study also highlights the vital role of security strategies in protecting aviation infrastructure and ensuring passenger confidence. Enhanced security frameworks that incorporate biometric screening, advanced surveillance systems, cybersecurity protocols, and strict access controls are instrumental in safeguarding airport operations against both physical and cyber threats. For ZACL and similar organizations, these measures directly contribute to recovery by preventing unlawful interference and reassuring the traveling public of their safety. Managers should therefore embed security planning into all operational layers, ensuring that it works hand in hand with safety initiatives to strengthen resilience.

The practical implications for the aviation industry in Zambia suggest that ZACL should adopt an integrated approach to safety and security, aligning both strategies within a broader resilience framework. This may involve continuous staff training, regular drills, adoption of new technologies, and alignment of organizational structures to support effective policy implementation. Policymakers should also incentivize investment in safety and security programs by providing regulatory support and ensuring that compliance with international standards is accompanied by capacity building at the organizational level. By prioritizing safety and security strategies as complementary tools, ZACL can strengthen its recovery trajectory and ensure sustainable growth in a highly competitive aviation environment.

8. Limitations and future studies

Although the regression model demonstrated significant explanatory power, it may not capture all relevant factors influencing the recovery of ZACL. Variables such as financial resource allocation, organizational culture, leadership styles, and external macroeconomic factors were not included in this study, yet they may also shape recovery outcomes. Additionally, the study relied on self-reported data from respondents, which may be subject to response bias or social desirability effects. Future research could expand the scope by including additional variables and employing longitudinal designs to capture the dynamic nature of recovery over time. Such approaches would provide a more comprehensive understanding of how multiple organizational strategies interact to influence resilience in the aviation sector.

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