Data Analytics and Organizational Performance of Kenya Civil Aviation Authority.

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ABSTRACT: Organizational performance, a pivotal metric determining its sustainability and standing among stakeholders and shareholders, was the focal point of investigation in this study within the Kenya Civil Aviation Authority (KCAA) and its relationship with data analytics. Four specific objectives were established: to evaluate the impact of descriptive analytics on KCAA’s organizational performance; to assess the influence of prescriptive analytics on the same; to understand the relationship between predictive analytics and KCAA’s organizational performance; and to scrutinize the effect of diagnostic analytics on KCAA’s organizational performance. The study drew upon three established theoretical frameworks: the Resource-Based View (RBV), the Technology Acceptance Model (TAM), and the Schumpeterian Innovation Theory. The research encompassed 1400 technical and operational staff across KCAA’s headquarters in Nairobi, Moi International Airport in Mombasa, and Jomo Kenyatta International Airport in Nairobi, along with airline operators and pilots. A pilot study, conducted with 30 respondents, ensured the reliability and validity of the research instrument. Reliability tests yielded a Cronbach alpha coefficient averaging 0.79, indicating strong reliability, while validity tests confirmed the instrument’s validity, with Average Variance Extracted (AVE) values surpassing the 0.5 threshold. The primary study involved 300 randomly selected participants, utilizing questionnaires for data collection. Both descriptive and inferential statistics were employed for data analysis, revealing a strong positive correlation among variables. Specifically, various types of data analytics displayed positive significance: Descriptive Analytics ($\beta = 0.133, t = 2.046, p < 0.05$), Prescriptive Analytics ($\beta = 0.198, t = 3.146, p < 0.05$), Diagnostic Analytics ($\beta = 0.190, t = 3.089, p < 0.05$), and Predictive Analytics ($\beta = 0.120, t = 1.961, p = 0.05$). Diagnostic tests affirmed the absence of multi-collinearity, data normality, and heterogeneous data. Respondents collectively acknowledged the significant impact of data analytics on KCAA’s organizational performance, with the study concluding that KCAA had not fully leveraged data analytics, leading to the recommendation of a policy framework prioritizing their ongoing big data ICT initiatives, and advocating for regular implementation of diagnostic analytics to enhance aviation performance, employee engagement, and overall organizational success.

Key Words: Data Analytics, Descriptive Analytics, Prescriptive Analytics, Diagnostic Analytics, Predictive Analytics, Organizational Performance

I.0 INTRODUCTION

1.1 Background of the Study

Aviation industry is a key driver of the world economy. The crucial basics in preserving the vast global aviation is secure, safe, efficient and ecologically justifiable aviation operations as managed by different aviation authorities in each and every state. Organizational performance is the utilization of financial resources in generating favorable or positive outputs agreeable to the shareholders as well as stakeholders (Abubakar et al., 2019). In the developed world, the aviation industry is highly organized with performance status closely monitored by governments and research organizations (Maneenop & Kotcharin, 2020). The sensitivity of the aviation industry especially in the leading world economy of the USA means that performance can fluctuate if affected by many factors for example the low performance...
witnessed at the height of Covid-19 global pandemic period (Alsharef, Banerjee, Uddin, Albert & Jaselskis, 2021). Similarly, the European aviation industry that is closely dependent on the US market for its performance had to be affected thus requiring stringent measures of cost-cutting in order to remain afloat. Specifically, both manufacturing and passenger sections were severely affected in the period 2020-2021 and to some extent in 2022 with some airlines merging or leasing out their services to stay on the market with low performances witnessed across both the USA and Europe (Belhadi, Kamble, Jabbour, Gunasekaran, Ndubisi & Venkatesh, 2021). The reason behind survival of the automobile and aviation industry in the developed world especially during the hard economic times is utilization of bid data in which all kinds of scenarios can be estimated thus avoiding total collapse of their industry resulting into the continued sustainable good performance by the developed world (Gallego & Font, 2021). However, the developed countries have heavily developed their aviation industry with adoption of Industry 4.0 which is a level of ICT advancement that focuses on communication of things as opposed to humans thus raising the level of performance but with need for big data analytics (Koh, Orzes & Jia, 2019).

In Africa and Indian ocean (AFI) region, aviation performance is measured in terms of regional annual airport operations, flight movements, safety, systems operations and communications, efficiency of the operations in air traffic management and air transport in every state, seamless flow of traffic and regional airports inventory and characteristics. Airport operations include the total number of departures and arrivals from a given airport annually, total cargo quantity handled in tons, which measures increase or decrease of performance in the operations of every airport. In general, this performance was most likely be determined by the different air traffic management, flight movement, operations and safety reports provided by every state in the region, in accordance with the ICAO SARPs.

Even though various theoretical foundations have anchored studies dealing with organizational performance literally all of them focus on establishing the optimization of organization resources with the aim of producing the best outputs for the organization. Performance of various organizations tends to be based on different theoretical foundations but the theory of resource based view (Barney, 2001) has pointed towards use of specific resources to dictate how a firm performs in an industry with emphasis on uniqueness of such resources as the key in raising performance. According to the RBV theory, organizations that perform well consistently anchor their success on proper harmonization of a specific industry resource for best production that will raise their visible organizational performance that can also be competitively measured in the specific economic or industrial sector. Similarly, the aviation industry as whole is heavily reliant on innovations on several fronts and studies have severally applied the Schumpeter’s innovation theory (Sweezy, 1943; Ruttan, 1959; Li et al., 2020) that puts great emphasis on application of technology in research and development. According to Li et al., (2020) data analytics is a field that requires continuous innovations not just to enable handling of complex data but also for efficient application of such data in aid of organizational performance.

The aviation business is perhaps among the key businesses that globally connects the whole world physically and hence making one of the busiest at all given times. Burmester et al., (2018) point out that aviation business is one of the heaviest users of data both raw as well as thoroughly analyzed
Influence of data analytics on customer management, mapping, safety management and air traffic management among other operations in aviation puts the data analytics at the center of the industry (Biliri et al., 2019). The continuing networks across Europe and linking to America in terms of data sharing to improve the safety and connectivity as well as speed of service delivery in the industry has the implication of increased data analytics (Li et al., 2020). This trend has automatically spread to the regional African zone since liaising with the industrialized nations is inevitable especially in the global-dependent aviation industry. Kenya is one of the nations with high connectivity to the rest of the world and a hub of aviation industry in the region thus openly require high performance to meet the high expectations. The influence of data analytics on the organizational performance of KCAA is likely to improve access/equity, capacity of the processes, cost effectiveness, flexibility of the operations, and global interoperability of the aviation systems, safety and safety thus increasing the Kenyan aviation industry performance as demonstrated in studies by Machii and Kaara (2018) as well as Ondieki (2017).

Organizational performance is a crucial measure of an entity's productivity, encompassing financial and non-financial outcomes. Financial achievements include metrics like shareholder value growth, return on investment, and profits. In the aviation industry, this performance can be linked to the increase in flight volumes and financial success (Olaganathan, 2021; Sylva, 2020). Market performance, on the other hand, gauges how well an organization competes in its market and can be influenced by safety records, attracting more customers. Non-financial measures, like resource availability, organizational structure, clear strategy understanding, and innovation, also play a vital role in organizational performance, particularly in dynamic industries like aviation (Serrano & Kazda, 2020).

Data analytics (DA) involves converting fresh data into metadata for analytical purposes, utilizing both qualitative and quantitative analysis to aid in making informed business decisions. DA can be descriptive, prescriptive, predictive, or diagnostic, each serving a different role in analyzing data for insights and decision-making. It can help organizations make better decisions, optimize performance, and adapt to changing circumstances (Araz, Choi, Olson & Salman, 2020).

The Kenya Civil Aviation Authority (KCAA) was founded in 2002 with primary objectives related to safety and security regulation, economic regulation of air services, and the advancement of civil aviation. KCAA’s performance relies on the efficiency of its various directorates and their ability to communicate and collaborate effectively (KNBS, 2020). The organization handles a substantial amount of critical data daily, making data analytics crucial for efficient and secure data management (KCAA Report, 2021).

KCAA has made significant strides in improving safety and security records in the Kenyan aviation industry, but in order to maintain its position internationally, a robust and secure data analytics system is essential. Improved data analytics can respond more efficiently to changes, further enhancing performance in the aviation sector (KCAA Report, 2021).

1.2 Statement of the Problem

The civil aviation authority reports variable returns, with most aviation industry participants underperforming in a competitive data-driven environment (Matikiti et al., 2020). The global aviation
business has had mixed performances over the previous decade, with the developed countries boosting performance despite severe competition (Gallego & Font, 2021). From 2017 to 2020, passenger traffic fell from 14.7% to 11.3%. Customer service, flight operations, air traffic management, and aeronautical information management are some of the industry's systems. Cargo volumes dropped from 17.2% to 9.4% before COVID-19. Service quality has declined compared to other governments' aviation industries, creating competitive hazards to Kenya, the African aviation center, from 19.3 percent to 11.9 percent by 2021 (KCAA Report, 2021).

Various scholars have conducted aviation industry studies with favorable and bad results. After the COVID-19 epidemic plagued the aviation industry, Maneenop and Kotcharin (2020) showed that significant data is needed for good projections. Frankel (2020) used aircraft accident rates to determine US airline performance, while Sylva (2020) used European customer numbers to demonstrate aviation industry performance. Thota, R. T., Bawa, G., & Stansbury, R. S. (2020), Gikonyo (2018), and Odongo, O., Mugambi, H., & Abayo, R. (2019) have shown that consumer volumes affect the Kenyan aviation industry's performance.

Numerous studies show that data analytics are increasingly used to evaluate industry performance. Most worldwide and regional research focus on data analytics and industry performance. Sterner (2020) focused on how climate policies affect aviation consumer satisfaction by reducing airline traffic and CO2 emissions. Kumar (2021) evaluated green performance in developed country airports, focusing on carbon footprint, harmful pollutants, and renewable energy sources as part of the green aviation effort. Gyanwali and Walsh (2020) evaluated performance-influencing elements for Nepal Airlines, while Bogdan and Borza (2019) used meta-analysis and multiple approaches to assess organizational performance. Some studies focused on individual airlines, while others used other methods. This study examines how data analytics affects KCAA performance.

1.3 Objectives of the Study

The study was guided by both general and specific objectives:

1.3.1 General Objective

The general objective of the study was to determine the influence of data analytics on organizational performance at the Kenya Civil Aviation Authority.

1.3.2 Specific Objectives

The specific objectives of this study were:

i. To determine the influence of descriptive analytics on organizational performance at Kenya civil aviation authority

ii. To examine the influence of prescriptive analytics on organizational performance at Kenya civil aviation authority

iii. To determine the influence of predictive analytics on organizational performance at Kenya civil aviation authority

iv. To determine the influence of diagnostic analytics on organizational performance at Kenya civil aviation authority

1.4 Research Questions

i. In what ways do descriptive analytics influence organizational performance at Kenya Civil Aviation Authority?
ii. How does prescriptive analytics influence organizational performance at Kenya Civil Aviation Authority?
iii. How does predictive analytics influence organizational performance at Kenya Civil Aviation Authority?
iv. In what ways do diagnostic analytics influence organizational performance at Kenya Civil Aviation Authority?

1.5 Scope of the Study
This research aimed to explore the influence of data analytics on the organizational performance of the Kenya Civil Aviation Authority (KCAA) by focusing on four specific components of data analytics as its objectives: determining the impact of descriptive analytics, examining the effect of prescriptive analytics, analyzing the influence of predictive analytics, and assessing the impact of diagnostic analytics. The research was grounded in three primary theories: the Technological Acceptance Model (TAM), the Resource-Based View theory (RBV), and the Schumpeterian Innovation theory. Over a span of six months, data collection and processing were carried out to understand the connection between data analytics and KCAA’s organizational performance. The study encompassed multiple locations, including the KCAA headquarters at Aviation House in Nairobi, KCAA manned airports, with participants comprising airline operators, air navigation services personnel, pilots, technical staff, administrative personnel, and section heads from various Air Navigation Services (ANS) departments, totaling 1400 individuals from both airlines and KCAA staff.

2.0 Literature Review
2.1 Theoretical Review
2.1.1 Technological Acceptance Model (TAM) theory
The Technological Acceptance Model (TAM) theory, introduced by Davis (1986), focuses on the factors influencing a firm’s decision to adopt new technology. TAM predicts system acceptance based on ease of use and perceived usefulness, with a primary emphasis on users’ adoption of technology. This model has prompted strategic IT managers to balance user-friendliness and output optimization (Malatji, Van Eck & Zuva, 2020). It aims to achieve equilibrium between technology usage and its necessity for firm performance. However, TAM has faced criticism for its limited heuristic value, explanatory and predictive power, and a focus on individual users rather than broader social processes (Njeri, 2016), Brock and Khan (2017).

2.1.2 Resource-Based View (RBV) theory
In contrast, the Resource-Based View (RBV) theory, proposed by Barney, (1991), emphasizes the importance of internal resources for sustained competitive organizational performance. It relies on the uniqueness and immobility of an entity’s resources. Resource-Based View (RBV) theory has its critics who argue it overlooks the practicality of resource management (Govan & Damnjanovic, 2016). Nevertheless, it is highly applicable to the aviation industry, as it aids in identifying valuable ICT resources to enhance organizational performance by reducing costs and preventing resource wastage (Tate & Bals, 2018).
2.1.3 Schumpeterian Innovation Theory
The Schumpeterian Innovation Theory, developed by Schumpeter, highlights the role of innovation in economic development and market transformation. It assumes innovation as the driving force, originated by an organization's staff and accepted by society in a capitalistic economic environment. Critics suggest that innovation alone isn't the sole driver of economic development and question its source and funding (Kumar & Sundarraj, 2016). It is widely used in the aviation industry to understand value creation, human resources, innovative technology, customer preferences, and information technology application (Popovic et al., 2018).

2.2 Conceptual Framework

![Conceptual Framework](image-url)

**Independent Variables**

- **Descriptive analytics**
  - Data aggregation
  - Data mining
  - Data reporting sources

- **Prescriptive Analytics**
  - Predictions
  - Customer patterns
  - Forecast

- **Diagnostic analytics**
  - Data discovery
  - Drill through
  - Isolation of all confounding

- **Predictive Analytics**
  - Filling of gaps of unavailable data
  - Creation of data models
  - Forecasts of future potential outcomes

**Dependent Variable**

- **Organizational Performance**
  - Increased number of flights
  - Customer satisfaction
  - Increased safety levels

Figure 1.1: Conceptual framework
2.3 Empirical Review

Review of empirical literature compares past studies to the current topic with specific emphasis on the areas of the study objectives in global, regional as well as local context. The review also incorporates theories studied in the previous section on all study variables including TAM, RBV and Schumpeterian as they relate to the components of data analytics and their influence on organizational performance.

2.3.1 Influence of descriptive analytics and organizational performance

Descriptive analytics have played an important role across the ICT field with their application in the aviation industry highly felt. Yusriza, Abdul-Rahman, Jraisat, and Upadhyay's 2022 study in Indonesia examined disruptions in the food supply chain to the aviation industry during the COVID-19 pandemic. They used Bayesian Network models to improve knowledge access for supplying airlines with food. The study highlighted the importance of descriptive analytics in addressing supply chain challenges.

In Europe, Durana, Perkins, and Valaskova conducted a study in 2021 on sustainable smart manufacturing in the airline industry using the Internet of Things. Their research found that data mining and aggregation methods significantly impact decision-making for optimal industry performance, underscoring the need for accurate data processing.

Matikiti, Mpinganjira, and Roberts-Lombard's 2020 study in South Africa focused on customer and service commitment in the airline industry. They recommended the use of descriptive analytics to improve data management and customer satisfaction.

Omondi's 2022 study assessed operational capacity and service delivery in airlines, emphasizing the role of descriptive analytics in personalized service delivery and customer relations.

Njagi and Ndavula's 2020 study on Kenya Airways examined the transformation of operational performances. The research emphasized the importance of technology and data sources in meeting customer needs.

2.3.3 Influence of Predictive analytics and organizational performance

Predictive analytics plays a critical role in the performance of various industries, including the automobile and airline sectors. In India, a study by Belhadi et al. (2021) investigated the preparedness of supply chain flexibility in these industries in the face of the COVID-19 pandemic. The research involved 145 firms and emphasized the need for efficient data processing to meet future demands. The airline industry was found to be inadequately prepared for the pandemic, prompting a recommendation for investment in Industry 4.0 technology.

Mikalef et al. (2020) conducted a study in Norway on big data analytics in the airline industry, highlighting its importance for competitive performance. The study recommended focusing on technical capabilities in utilizing big data. In South Korea, Lee et al. (2019) explored quality management for environmental checks, revealing the underutilization of predictive data in Industry 4.0 upgrades. This led to a recommendation for greater use of predictive data in environmental predictions.

In South Africa, Mhanga's (2019) research revealed a low adoption of technological systems and emphasized the significance of predictive analytics for airline efficiency. The study recommended
widespread adoption to enhance competitiveness. This current study aims to build on these recommendations, focusing on the Kenya Civil Aviation Authority (KCAA).

**2.3.4 Influence of Diagnostic analytics and organizational performance**

Diagnostic analytics naturally focuses in data discovery and isolation of confounding information including recovery data. In Poland, Kucuk-Yilmaz's study in 2019 focused on human risk factors in aircraft maintenance, aiming to validate the complexities of managing airline maintenance operations. The study collected data from seven leading airlines and found numerous complex operations that were not fully optimized, hindering the achievement of high standards. Kucuk-Yilmaz recommended adopting diagnostic data usage to improve maintenance efficiency.

In Pakistan, Hosny, Ibrahim, and Fraig (2018) assessed airline service quality using passenger satisfaction, finding a strong association between passenger satisfaction and the quality of service provided by Pakistan International Airlines (PIA). The study emphasized the need for further research on diagnostic data to enhance service quality.

In India, Gupta (2018) identified key aspects, including security, safety, and ticket pricing, as crucial determinants of customer service quality for airlines operating on the Indian subcontinent. Gupta recommended the adoption of big data for accurate analysis in airline management.

In Africa, Jano, Satardien, and Mahembe's 2019 study focused on organizational support and turnover intentions in the airline industry, specifically airlines operating from Cape Town to Europe and Turkey. Their findings suggested that the poor performance of South African organizations coordinating airline operations was linked to inadequate data utilization and analytics approaches.

Locally, Ndegwa and Muathe (2018) examined intelligence practices in the airline industry and identified poor performance due to suboptimal data usage. They recommended the adoption of high intelligence technology to compete effectively in the airline industry.

**2.3.5 Organizational Performance**

Organizational performance aims to establish a universally accepted standard for measuring success. Research by Adabavazeh and Nikbakht (2020) delved into the aviation industry's performance, emphasizing critical factors within the complex supply chain. They used data envelopment analysis (DEA) to identify key performance indicators such as flight volume, customer satisfaction, and safety records. The study recommended investing in big data and resource allocation for research and development to improve performance.

Amankwah-Amoah and Adomako (2019) focused on business failures in data-rich West African environments, finding that organizations struggled to leverage their data effectively due to a lack of training and expertise. They concluded that handling big data and analytics posed a significant challenge, often requiring foreign experts.

Locally, Odongo et al. (2019) studied the influence of human labor relations on aviation industry performance, using Kenya Airways as a case study. Their research showed that good labor relations positively affected the airline's performance. They recommended implementing efficient communication systems to enhance service delivery and overall airline performance. In summary, these studies underscore the importance of performance indicators, data utilization, and labor relations in achieving organizational success.
Research Methodology

The research design for this study was descriptive, incorporating both quantitative and qualitative approaches. The choice of a descriptive design was based on its ability to provide high response quality and low refusal rates, making it suitable for this investigation. The study aimed to explore the influence of data analytics (descriptive, prescriptive, diagnostic, and predictive analytics) on organizational performance at the Kenya Civil Aviation Authority (KCAA). The target population included all KCAA employees and airlines interacting with customers, totaling 1,400 individuals. To determine the sample size, the Yamane formula was used, resulting in a sample of 300 participants. Stratified random sampling was employed, focusing on KCAA manned airports, and interviewees included staff with a minimum of 3 years of experience in the organization and various airline pilots and dispatchers.

Data collection was done using a semi-structured questionnaire with Likert scale questions and open-ended questions. The instrument was pilot-tested to assess its validity and reliability. The study sought authorization from relevant authorities and institutions before data collection. Data analysis involved descriptive statistics (frequencies, mean, and percentages) for general insights and inferential statistics (ANOVA and regression analysis) to explore relationships between variables. Results were presented using figures, tables, and prose discussions.

4.0 RESULTS AND DISCUSSIONS

4.1 Questionnaire Response Rate

The questionnaires were distributed by electronic mail, whereby every respondent was sent a list of questionnaires in a google form to their individual mails and responses received by g-mail too. A total of 300 were distributed and 173 responses received within 14 days. The rate of response indicates the percentage of questionnaires that were done and returned by the respondents in the field. It's important to note that the analyzed questionnaires were identical to the ones that were returned. The response rate from the sample size is presented in Table 4.1 below.

<table>
<thead>
<tr>
<th>Staff Category</th>
<th>Target Sample size</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeronautical information officers</td>
<td>50</td>
<td>21</td>
</tr>
<tr>
<td>Air traffic control officers</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Aeronautical engineers</td>
<td>40</td>
<td>17</td>
</tr>
<tr>
<td>Air transport officers</td>
<td>40</td>
<td>24</td>
</tr>
<tr>
<td>Administration staff</td>
<td>50</td>
<td>47</td>
</tr>
<tr>
<td>Airline Pilots</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td>Flight dispatchers</td>
<td>40</td>
<td>26</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>300</strong></td>
<td><strong>173</strong></td>
</tr>
</tbody>
</table>

As indicated by Phelon (2017), the rate of return displayed is considered satisfactory and aligns with the perspective held by many researchers, who deem a response rate exceeding 50% as favorable and adequate.

4.1 Influence of Descriptive Analytics on Organizational Performance
The initial objective of the study aimed to determine the impact of descriptive analytics on the organizational performance of KCAA.

4.1.1 Descriptive Statistics for Descriptive Analytics

Findings are presented in Table 4.9 using Frequency, Mean and Percentage with a scale of Very High Extent (VHE), High Extent (HE), Some Extent (SE), Small Extent (SmE) and No Extent (NE).

**Table 4.2: Descriptive Analytics and Organizational performance**

<table>
<thead>
<tr>
<th>Influence of Descriptive Analytics (x)</th>
<th>frequency(f)</th>
<th>f(x)</th>
<th>Percentages(%)</th>
<th>Mean(∑fx/∑f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHE</td>
<td>65</td>
<td>325</td>
<td>38</td>
<td>4.069</td>
</tr>
<tr>
<td>HE</td>
<td>74</td>
<td>296</td>
<td>43</td>
<td>4.069</td>
</tr>
<tr>
<td>SE</td>
<td>19</td>
<td>57</td>
<td>11</td>
<td>2.947</td>
</tr>
<tr>
<td>SmE</td>
<td>11</td>
<td>22</td>
<td>6</td>
<td>2.091</td>
</tr>
<tr>
<td>NE</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>173</td>
<td>704</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Among the respondents, sixty-five (38%) expressed the view that descriptive analytics significantly enhance organizational performance to a very high extent. Seventy-four (43%) respondents believed that descriptive analytics contribute significantly to high levels of organizational performance. Nineteen respondents (11%) indicated that descriptive analytics have a moderate impact on organizational performance to some extent. Ten respondents (6%) perceived a limited effect of descriptive analytics on organizational performance to a small extent, while 4 (2%) respondents felt that descriptive analytics had no impact on organizational performance. In summary, it can be concluded that descriptive analytics exert a substantial influence on organizational performance at KCAA, with a rating scale ranging from 1 to 5 (5 indicating a very high extent), yielding a mean score of 4.069.

4.1.2 Inferential Statistics for Descriptive Analytics

4.1.2.1 Regression Model Summary of Descriptive Analytics on Performance

Table 4.3 displays the model summary outcomes for the impact of descriptive analytics on KCAA’s performance. The results demonstrate that the influence of data analytics on KCAA’s performance is statistically significant, with an R-squared value (R2) of 0.094. The F-statistic, represented as F (1, 172) = 28.380, also indicates significance with a p-value < .05. These findings imply that 9.4% of KCAA’s performance can be attributed to descriptive analytics, while the remaining 90.6% is influenced by factors not encompassed in the study and the error term.

**Table 4.3: Model Summary of Descriptive Analytics on Performance**

<table>
<thead>
<tr>
<th>Model</th>
<th>R Square</th>
<th>R</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.313*</td>
<td>.098</td>
<td>.094</td>
<td>.40645</td>
<td>.098</td>
</tr>
</tbody>
</table>

*Predictors: (Constant), Data Analytics  
Dependent Variable: Performance

4.1.2.2. Regression ANOVA of Descriptive Analytics on Performance
Table 4.4 displays the results of the Regression ANOVA. The output reveals that data analytics exerted a significant impact on performance, as evidenced by the significant F-statistic (F (1, 172) = 28.380, p<.05). These results indicate that the regression model effectively predicted the outcome variable, which is the influence of data analytics on KCAA’s performance.

Table 4.4: Regression ANOVA of Descriptive Analytics on Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Regression</td>
<td>4.389</td>
<td>1</td>
<td>4.389</td>
<td>28.380</td>
<td>0.000b</td>
</tr>
<tr>
<td>Residual</td>
<td>28.380</td>
<td>172</td>
<td>0.165</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32.769</td>
<td>173</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance
b. Predictors: (Constant), Data Analytics

The findings regarding descriptive analytics align with the assertion made by Mangortey et al. (2020), emphasizing the importance of adequately employing descriptive analytics to garner support from various aviation stakeholders. This support can manifest in different forms, such as a preference for using the authority's services over those of other providers, selecting air routes within the Nairobi flight information region, fostering collaborative partnerships, and providing essential information. The majority of the research respondents expressed the belief that descriptive analytics significantly enhance organizational performance at KCAA, with a mean score of 4.088, indicating a high extent of influence on KCAA's organizational performance.

4.2 Influence of Prescriptive Analytics on Organizational Performance

The second objective was to establish the influence of prescriptive analytics on organizational performance at KCAA.

4.2.1 Descriptive Statistics for Prescriptive Analytics

The descriptive statistics results for prescriptive analytics are displayed in Table 12.

Table 4.5 Prescriptive Analytics

<table>
<thead>
<tr>
<th>Response on prescriptive analytics</th>
<th>Frequency</th>
<th>Frequency f(x)</th>
<th>Percentages (%)</th>
<th>Mean Σf(x)/ Σf</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHE</td>
<td>55</td>
<td>275</td>
<td>32</td>
<td>3.936</td>
</tr>
<tr>
<td>HE</td>
<td>78</td>
<td>312</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>19</td>
<td>57</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>SmE</td>
<td>16</td>
<td>32</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>NE</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>173</td>
<td>681</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

The results presented in Table 4.12 reveal that 55 (32%) of the respondents believed that prescriptive analytics significantly enhance organizational performance at KCAA to a very high extent. A majority of 78 (45%) respondents indicated that prescriptive analytics have a high extent of influence on organizational performance at KCAA. Additionally, 19 (11%) respondents stated that prescriptive analytics moderately enhance organizational performance at KCAA, while 16 (9%) respondents believed that prescriptive analytics contribute to organizational performance to a limited extent. A small percentage of 5% (3 respondents) felt that prescriptive analytics had no impact on organizational performance at KCAA. These ratings, using a scale from 1 to 5 (with 5 representing a
very high extent), yielded a mean score of 3.936 and a standard deviation of 1.026, signifying that prescriptive analytics have a significant impact on enhancing organizational performance at KCAA to a high extent.

4.2.2 Inferential Statistics for Prescriptive Analytics

4.2.1.1 Regression Model Summary of Prescriptive Analytics on Performance

Table 4.6 displays the model summary outcomes. The results demonstrate that the influence of prescriptive analytics on KCAA's organizational performance is statistically significant, with an R-squared value (R2) of 0.078. The F-statistic, represented as F (1, 172) = 21.863, is also significant with a p-value < .05. These findings indicate that 7.8% of KCAA's performance can be attributed to prescriptive analytics, while the remaining 92.2% is influenced by factors not encompassed in the study and the error term.

Table 4.6: Model Summary of Prescriptive Analytics on Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.286a</td>
<td>.082</td>
<td>.064</td>
<td>.41002</td>
<td>.082</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>19.3123</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>171</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Prescriptive Analytics
b. Dependent Variable: Performance

4.2.1.2 Regression ANOVA of Prescriptive Analytics on Performance

Table 4.7 displays the results of the Regression ANOVA. The output reveals that prescriptive analytics had a significant impact on performance, as specified by the significant F-statistic (F (1, 172) = 21.863, p<.05). These results affirm that the employed regression model was appropriate for predicting the outcome variable related to the influence of prescriptive analytics on the organizational performance of KCAA.

Table 4.7: Regression ANOVA of Prescriptive Analytics on Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>3.675</td>
<td>1</td>
<td>3.675</td>
<td>21.863</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>28.896</td>
<td>172</td>
<td>.168</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>32.571</td>
<td>173</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance
b. Predictors: (Constant), Prescriptive Analytics

The findings regarding prescriptive analytics are in accordance with Keles (2019), who argues that aligning prescriptive analytics with organizational strategic goals enables the authority to advance its initiatives by leveraging technology to align with its vision. The key lies in identifying how individual proficiencies, as well as those collectively formed can be recognized. This alignment allows organizations to acclimatize to the dynamic hassles of the aviation industry, catering to the needs of customers. A similar study by Bogdan and Borza (2019) found that by utilizing business intelligence and customer feedback platforms designed for service users and analyzing customer behavior, large datasets can continuously enhance service delivery capacity. Furthermore, the results of a study by Gallego and Font (2021) with ANOVA results indicated that prescriptive analytics
exhibited high significance when regressed against performance in the tourism industry, which is heavily reliant on the aviation sector. In summary, the popular opinion to this research was that prescriptive analytics significantly enhance organizational performance at KCAA to a high extent, with a mean score of 3.936, indicating a strong positive impact on KCAA's organizational performance.

4.3 Influence of Diagnostic Analytics on Organizational Performance

The third objective was to determine the influence of diagnostic analytics on organizational performance at KCAA.

4.3.1 Descriptive Statistics for Diagnostic Analytics

Results of descriptive statistics for diagnostic analytics are presented in Table 4.8.

<table>
<thead>
<tr>
<th>Rating on effect of diagnostic analytics</th>
<th>Frequency</th>
<th>F(x)</th>
<th>Mean $\sum fx/\sum f$</th>
<th>Percentages (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHE</td>
<td>19</td>
<td>95</td>
<td>3.358</td>
<td>11</td>
</tr>
<tr>
<td>HE</td>
<td>80</td>
<td>320</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>33</td>
<td>99</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>SmE</td>
<td>26</td>
<td>52</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>NE</td>
<td>15</td>
<td>15</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>173</td>
<td>581</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

The results displayed in Table 4.15 reveal that 19 (9%) of the respondents believed that diagnostic analytics significantly enhance organizational performance to a very high extent. A majority of 80 (46%) respondents expressed the view that diagnostic analytics have a high extent of influence on organizational performance at KCAA. Additionally, 33 (16%) respondents stated that diagnostic analytics moderately enhance organizational performance to some extent, while 26 (15%) respondents believed that diagnostic analytics contribute to organizational performance to a limited extent. A smaller percentage of 15 (9%) respondents felt that diagnostic analytics had no impact on organizational performance. In summary, it can be concluded that diagnostic analytics exert a significant influence on organizational performance at KCAA to a high extent, with a mean score of 3.358 and a standard deviation of 1.13. These ratings were based on a scale from 1 to 5 (with 5 indicating a very high extent).

4.3.2 Inferential Statistics for Diagnostic Analytics

4.3.2.1. Model Summary of Diagnostic Analytics on Performance

Table 4.9 presents the model summary outcomes. The outcomes of this study point out to the fact that diagnostic analytics on the organizational performance of KCAA is statistically significant, with an R-squared value (R2) of 0.083. The F-statistic, represented as F (1, 172) = 23.264, is also significant with a p-value < .05. These findings suggest that 8.3% of KCAA's performance can be attributed to diagnostic analytics, while the remaining 91.7% is influenced by issues that are not encompassed in the study and the error term.

Table 4.9: Model Summary of Diagnostic Analytics on Performance

<table>
<thead>
<tr>
<th>Rating on effect of diagnostic analytics</th>
<th>Frequency</th>
<th>F(x)</th>
<th>Mean $\sum fx/\sum f$</th>
<th>Percentages (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHE</td>
<td>19</td>
<td>95</td>
<td>3.358</td>
<td>11</td>
</tr>
<tr>
<td>HE</td>
<td>80</td>
<td>320</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>33</td>
<td>99</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>SmE</td>
<td>26</td>
<td>52</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>NE</td>
<td>15</td>
<td>15</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>173</td>
<td>581</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.1 shows the Regression ANOVA. Results show that diagnostic analytics had a significant effect on performance $F (1, 172) = 23.264, p<.05)$. This demonstrates that the chosen regression model was appropriate for forecasting the dependent variable related to the impact of diagnostic analytics on KCAA's performance.

Table 4.1: ANOVA of Diagnostic Analytics on Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>3.891</td>
<td>1</td>
<td>3.891</td>
<td>23.264</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>28.724</td>
<td>172</td>
<td>.167</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>32.615</td>
<td>173</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance
b. Predictors: (Constant), Diagnostic Analytics

The research findings on diagnostic analytics align with the perspective of Machii and Kaara (2018), who emphasize that diagnostic analytics represents a crucial aspect of data analytics, often overlooked. They highlight that it involves scrutinizing past performance and learning from it to improve future outcomes. In the aviation industry, where vigilance is essential, this task is sometimes underestimated as aviation players tend to focus more on future prospects rather than analyzing historical data to drive improvements. Furthermore, Gyanwali and Walsh (2020) argue that diagnostic analytics serves as a pointer of an administration's obligation to project achievement by carefully considering past failures. In summary, the majority of respondents in this study believed that diagnostic analytics significantly enhance organizational performance at KCAA to a high extent, with a mean score of 3.34, indicating a substantial positive impact on organizational performance.

4.4 Influence of Predictive analytics on Organizational Performance

The fourth objective of the study sought to establish the influence of predictive analytics on the organizational performance at the KCAA.

4.4.1 Descriptive Statistics for Predictive analytics

Results for descriptive statistics on predictive analytics are presented in Table 4.11.
The results presented in Table 4.11 reveal that 36 (21%) of the respondents believed that predictive analytics significantly enhance organizational performance at KCAA to a very high extent. A majority of 74 (43%) respondents expressed the view that predictive analytics have a high extent of influence on organizational performance at KCAA. Additionally, 27 (16%) respondents stated that predictive analytics moderately enhance organizational performance to some extent, while 26 (15%) respondents believed that predictive analytics contribute to organizational performance to a limited extent. A smaller percentage of 9 (5%) respondents felt that predictive analytics had no impact on organizational performance. From the above, majority that predictive analytics to a high extent enhance organizational performance at KCAA with an average mean of 3.90.

### 4.4.2 Inferential Statistics for Predictive analytics

#### 4.4.2.1. Regression Model Summary of Predictive Analytics on Performance

Table 4.12 presents the model summary outcomes. The results specify that the effect of predictive analytics on the organizational performance of KCAA is statistically significant, with an R-squared value of 0.047. The F-statistic, represented as $F(1, 172) = 13.251$, is also significant with a p-value < .05. These findings suggest that 4.7% of KCAA's performance can be attributed to predictive analytics, while the remaining 95.3% is influenced by factors not encompassed in the research and the error term.

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
<th>Sig. F Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.227$^a$</td>
<td>.051</td>
<td>.047</td>
<td>.41680</td>
<td>.051</td>
<td>13.251</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>df1</td>
<td>df2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>172</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Predictive Analytics
b. Dependent Variable: Performance

#### 4.4.2.2. Regression ANOVA of Predictive Analytics on Performance

Table 4.13 displays the outcomes of the Regression ANOVA. The output reveals that predictive analytics had a significant impact on performance, as indicated by the significant F-statistic ($F(1, 172) = 13.251$, p<.05). This suggests that the regression model employed was appropriate for predicting the outcome variable, which is the influence of predictive analytics on the organizational performance of KCAA.

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
</table>

---

VHE          36  180  3.90  21%
HE           74  296  43%
SE           28  84   16%
SmE          26  52   15%
NE           9   9    5%
Total        173 621 100%
Findings on predictive analytics are in conformity with Ganiyu (2017) who argues that Predictive Aviation Analytics uses aggregated aviation data from the past to "teach" the computer what is the most common sensory information and which sensory information indicates problems. Predictive analytics embodies a persistent collection of attributes, knowledge, and competencies that define establishments and their members, reflecting corporate organizations' capacity to anticipate potential issues and align their capabilities with strategic shifts in the business direction. The majority of respondents indicated that predictive analytics significantly enhance organizational performance at KCAA to a high extent, with a mean rating of 3.588. This suggests that predictive analytics plays a substantial role in the effective application of organizational performance at KCAA.

4.5 Combined Inferential Statistics on Data Analytics and Performance

After regression analysis of sub variables of data analytics against the dependent variable, there was further exploration of the testing. This involved inferential statistics based on the linear regression model \( Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + e \). Table 4.14 shows the output of the linear regression model.

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.419(^a)</td>
<td>.176</td>
<td>.173</td>
<td>.38845</td>
<td>R Square Change</td>
</tr>
<tr>
<td>1</td>
<td>2.302</td>
<td>1</td>
<td>2.302</td>
<td>13.251</td>
<td>.000(^b)</td>
</tr>
</tbody>
</table>

\( a. \) Dependent Variable: Performance

\( b. \) Predictors: (Constant), Predictive Analytics

Table 4.14: Model Summary of Data Analytics on Performance

4.5.2. ANOVA for Data Analytics on Performance

Table 4.15 displays the results of the Regression ANOVA for Model 1. The output suggests that the regression model employed was appropriate for predicting the outcome variable: Influence of data...
analytics on the performance of KCAA, as indicated by the significant F-statistic (1, 172) F = 52.320, p<.05).

**Table 4.15: ANOVA on Performance and Data Analytics**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>7.895&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1</td>
<td>7.895</td>
<td>52.320</td>
<td>.000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Residual</td>
<td>25.972</td>
<td>172</td>
<td>.151</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>33.867</td>
<td>173</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: performance
b. Predictors: (Constant), Data-Analytics

### 4.5.3. Regression Coefficient for Data Analytics on Performance

Table 4.16 provides the results of the regression coefficients for the four independent variables representing data analytics in relation to the dependent variable, performance. In Model 1, it is evident that all the independent variables exerted a significant influence on the performance of KCAA (p<=.05). Specifically, Descriptive Analytics (\( \beta = .133 \ t = 2.046, \ p<.05 \)), Prescriptive Analytics (\( \beta = .198 \ t = 3.146, \ p<.05 \)), Diagnostic Analytics (\( \beta = .190 \ t = 3.089, \ p<.05 \)), and Predictive Analytics (\( \beta = .120 \ t = 1.961, \ p<.05 \)) were significant statistically on organization performance. Among these variables, prescriptive analytics exhibited the greatest influence on performance with a beta coefficient of 0.198, followed by diagnostic analytics with a beta coefficient of 0.190, descriptive analytics with a beta coefficient of 0.133, and predictive analytics with the smallest influence, indicated by a beta coefficient of 0.120.

**Table 4.16: Coefficients on Performance and Data Analytics**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>.690</td>
<td>.381</td>
<td>1.811</td>
</tr>
<tr>
<td>Descriptive Analytics (DeA)</td>
<td>.158</td>
<td>.077</td>
<td>.133</td>
<td>2.046</td>
</tr>
<tr>
<td>Prescriptive Analytics (PrA)</td>
<td>.260</td>
<td>.083</td>
<td>.198</td>
<td>3.146</td>
</tr>
<tr>
<td>Diagnostic Analytics (DiA)</td>
<td>.194</td>
<td>.063</td>
<td>.190</td>
<td>3.089</td>
</tr>
<tr>
<td>Predictive Analytics (PrA)</td>
<td>.115</td>
<td>.059</td>
<td>.120</td>
<td>1.961</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance
b. Predictors: (Constant), Descriptive, Prescriptive, Diagnostic, Predictive

The regression coefficients in the model \( Y = \beta + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + e \) can be expressed as follows: \( Y = 0.690 + .133DeA + .198PrA + .190DiA + .120PrA + .381 \). In summary, data analytics has a statistically significant influence on the performance of KCAA. Specifically, for every unit of performance, there is an input of .133 from DeA, .198 from PrA, .190 from DiA, and .120 from PrA, with an associated industry error of .381. However, there is a constant of .690 for every 1 unit of performance, in the absence of data analytics.

The key findings regarding the determinants of successful implementation of organizational performance at KCAA align with the assertions of Mikalef et al. (2019), who propose that the
promotion of success in any project involves increasing the influence of success drivers and enablers while decreasing the influence of factors that lead to disappointment in organizational performance at KCAA.

It is important to know that each KCAA customer has their own needs. Some customers may be sensitive to time and others may be sensitive to the price of services. Some customers appreciate the value of luxury and time, while for others, it doesn’t matter. KCAA can therefore make different and tailor made offers to different airlines, pilots, flight crew and other of its customers to cater for different components of their needs whilst at the same time supporting them. Depending on the type of service offered descriptive analytics strategy helps generate the highest amount of revenue from each customer through the knowledge of their preferences and areas of improvement the organization needs to focus on.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings
In this section, we present the results of the study on the success factors influencing organizational performance at KCAA (Kenya Civil Aviation Authority). The primary objective of the research was to investigate the impact of data analytics on KCAA's performance in Kenya. The study was guided by four research questions: How does descriptive analytics affect organizational performance at KCAA? What is the influence of prescriptive analytics on organizational performance at KCAA? How does predictive analytics influence organizational performance at KCAA? In what ways do diagnostic analytics impact organizational performance at KCAA?

Furthermore, the study drew upon the theoretical frameworks of Technological Acceptance Model (TAM), Resource-Based View (RBV), and Innovation theories in its literature review. The research design employed for this study was descriptive in nature, and it involved random sampling of 300 target respondents from various airports under the jurisdiction of KCAA. Ethical considerations and appropriate data collection procedures were strictly observed throughout the study. This included obtaining the necessary approvals, including an authority letter from KU graduate school and a permit from NACOSTI, along with an introduction letter to the respondents emphasizing the confidentiality of their participation.

To ensure the reliability and validity of the research instrument, a pilot study was conducted, covering 10% of the sample size, to test the questionnaire's effectiveness. Data collected was subsequently cleaned and processed using the SPSS computer package. Before conducting the main data analysis, various diagnostic tests, including assessments for multicollinearity, normality, and homoscedasticity, were performed to eliminate any potential biases in the data. The data analysis encompassed both descriptive and inferential statistics. Descriptive statistics included the computation of frequencies, percentages, and means. Additionally, inferential statistical analyses involved correlation analysis for model summary and one-way ANOVA tests to explore relationships and draw meaningful conclusions from the collected data.

5.1.1 Descriptive Analytics
The study's findings suggest that a majority of the survey participants share the view that descriptive analytics plays a significant role, to a considerable extent, in influencing the effective execution of organizational performance at KCAA. This observation was substantiated by the calculation of the
central tendency measure, which disclosed a relatively high mean rating of 4.1, indicating a substantial contribution of descriptive analytics to the enhancement of organizational performance within KCAA. Furthermore, the standard deviation for this variable was 0.959.

The application of inferential testing further corroborated the existence of a noteworthy connection between descriptive analytics and the successful execution of organizational performance at KCAA. The Pearson correlation analysis, which assessed how descriptive analytics corresponded with the response patterns of other independent variables, unveiled strong correlation coefficients that ranged from 0.6135 to 0.9809. These robust correlation coefficients underscored the credibility and dependability of the information supplied by the respondents concerning the impact of descriptive analytics on KCAA’s organizational performance.

5.1.2 Prescriptive Analytics

The study findings specified that a majority of the respondents held the view that prescriptive analytics significantly enhances organizational performance at KCAA, to a high extent. This perspective was supported by the measure of central tendency, which revealed a relatively high mean rating of 3.95, signifying that prescriptive analytics contributes significantly to the enhancement of organizational performance at KCAA. The standard deviation for this variable was 1.038.

Inferential testing further substantiated the existence of a significant relationship between prescriptive analytics and the successful implementation of organizational performance at KCAA. The Pearson correlation analysis, which examined the response pattern of prescriptive analytics in relation to the response patterns of other independent variables, revealed high correlation coefficients ranging from 0.7475 to 0.9254. These substantial correlation coefficients confirmed the credibility and reliability of the information provided by the respondents regarding the impact of prescriptive analytics on organizational performance at KCAA.

5.1.3 Diagnostic analytics

The study’s results indicated that a majority of the surveyed individuals held the perspective that diagnostic analytics significantly contributes to the enhancement of organizational performance at KCAA to a substantial degree. This viewpoint was substantiated by the central tendency measure, which unveiled a relatively high mean rating of 3.38, indicating a significant role of diagnostic analytics in improving organizational performance at KCAA. Additionally, the standard deviation for this variable was 1.144.

Further validation of a meaningful connection between diagnostic analytics and the successful execution of organizational performance at KCAA was achieved through inferential testing. The Pearson correlation analysis, which compared the response pattern of diagnostic analytics to that of other independent variables, unveiled strong correlation coefficients ranging from 0.6616 to 0.8258. These robust correlation coefficients affirmed the trustworthiness and consistency of the data delivered by the respondents concerning the influence of diagnostic analytics on KCAA’s organizational performance.

5.1.4 Predictive analytics

The study’s results indicated that a majority of the participants shared the perspective that predictive analytics significantly contributes to enhancing organizational performance at KCAA to a considerable degree. This viewpoint was bolstered by the central tendency measure, which unveiled a
relatively high mean rating of 3.736, signifying that predictive analytics exerts a substantial positive influence on organizational performance within KCAA. Furthermore, the standard deviation for this variable was 1.186.

The presence of a significant relationship between predictive analytics and the successful execution of organizational performance at KCAA was further confirmed through inferential testing. The Pearson correlation analysis, which assessed how predictive analytics corresponded with the response patterns of other independent variables, revealed strong correlation coefficients ranging from 0.9359 to 0.8385. These robust correlation coefficients affirmed the credibility and dependability of the information supplied by the respondents concerning the impact of predictive analytics on organizational performance at KCAA.

5.2 Conclusion of the Study
The results of this study indicate that the implementation of data analytics has a favorable effect on the aviation industry’s performance in Kenya. This research demonstrates that both corporate-level and business-level performance within the organization experience significant improvements as a result of adopting business analytics.

5.2.1 Descriptive Analytics
The study findings indicate that descriptive analytics significantly enhance organizational performance at KCAA, with a high extent of influence. The independent variables exhibited strong correlation coefficients ranging from 0.6135 to 0.9809, affirming the reliability of the respondent information. Additionally, the standard deviation of 0.959 confirms the robust relationship between data analytics and organizational performance.

5.2.2 Prescriptive Analytics
The study findings demonstrate that prescriptive analytics significantly enhance organizational performance at KCAA, with a high level of influence. The high mean of 3.95, indicated strong impact of prescriptive analytics on organizational performance, with a standard deviation of 1.038. The Pearson correlations among the study variables displayed high correlation coefficients ranging from 0.7475 to 0.9254, affirming the reliability and credibility of the respondent information.

5.2.3 Diagnostic Analytics
The study findings indicate that diagnostic analytics have a substantial impact on organizational performance. The measure of central tendency revealed a relatively high mean of 3.38, signifying that diagnostic analytics significantly enhance organizational performance at KCAA. The standard deviation was 1.144, and the Pearson correlation coefficients ranged from 0.6616 to 0.8258, affirming the reliability and credibility of the respondent information.

5.2.4 Predictive analytics
Inferential testing confirmed a significant relationship between predictive analytics and the successful implementation of organizational performance at KCAA. The central tendency revealed a mean of 3.736 and a standard deviation of 1.186. The high correlation coefficients, ranging from 0.9359 to 0.8385, further validated the credibility of the respondent information, indicating that predictive analytics significantly enhance organizational performance at KCAA.

In order to achieve service delivery improvement and customer satisfaction for various aspects of organizational performance, engagement of data analytics should happen from the planning stages to
completion of various KCAA customer-oriented undertakings. This should be carried out in accordance with the standards and recommended practices established by the International Civil Aviation Organization (ICAO). The primary objective is to enhance the efficiency of service delivery, ultimately contributing to the improvement of the aviation business.

5.3 Recommendations of the Study
With KCAA's ICT strategy already established and aligned with the organization's vision, the integration of data analytics can significantly contribute to the realization of corporate objectives by providing a comprehensive plan for daily operations. To ensure the effective implementation of this framework, strong support from top-level organizational management is essential. This support will enable the ICT department to advocate for its needs at the corporate level, influence policy decisions, and guide the organization toward effectively utilizing ICT-driven data analytics to support and execute its strategic initiatives.

The research emphasizes the importance of regularly implementing diagnostic analytics to allow various stakeholders in the aviation industry sufficient time and opportunities to adjust their strategies, adopt new technologies, enhance routines, and improve employee and organizational performance.

5.4 Suggestions for Further Research
Based on the insights gained from this research, the researcher suggests that similar studies should be undertaken in other segments of the aviation industry beyond KCAA. This is because the success of organizational performance in aviation relies on the collaborative efforts of multiple stakeholders within the aviation sector working cohesively as a team.

References


