



## The impact of non-aeronautical revenues on airport performance at Julius Nyerere International Airport in Dar Es Salaam, Tanzania

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### ABSTRACT

The study analyzed the impact of non-aeronautical revenues on airport performance at Julius Nyerere International Airport in Dar es salaam, Tanzania. The study used longitudinal design in which time series data from financial statements and integrated reports for the financial years 2017/18 to 2020/21 was undertaken. The Multiple linear regression models were employed in analyzing the contribution of non- aeronautical revenues on improving the airport facilities. Findings of the study demonstrated that, i) rental fees and car parking charges impacted positively the improvement of the airport facilities, ii) advertisement also positive and significantly contributed on the improvement of the airport facilities at Julius Nyerere International Airport. This implies that, JNIA can further increase its total revenues by expanding the scope of retail operations at the airports under its jurisdiction as additional sources of income. It is recommended that airport managements and other stakeholders responsible for airports' infrastructure and transport to expand more use of NARV's sources so as to improve the service delivery for their passengers and gain more revenues for future financial stability.

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## Introduction

Airports are generally considered as one of the most complex systems in the modern society all over the worldwide, modern airports have developed in the provision of services catering to a varied clientele beyond an air traveler and an aircraft, while still preserving their core functions of facilitating air travel. The majority of airports now have to invest in various services that cater to non-passengers in addition to their core business of handling air travel as a result of these changes if they want to improve their revenue (Jerzy *et al.*, 2021; Aviation Media, 2017). From the 1970s through the 1990s, this transformation from their primary function to a variety of activities that included items that had little to do with air travel, like shopping centers, hotels, restaurants, and lot allocation for different customer service providers, take place (Akoodie & Cloete, 2020; Fuerst *et al.*, 2011).

Prior to COVID-19 pandemic, most of airports at the global, experienced an elevated profit margins stream on aeronautical revenues sources following the increases in airline passengers. It was estimated that, about 3.548 billion people had traveled by air globally between by the end of 2015 (Battal & Bakir, 2017; Jerzy *et al.* 2021). After, the COVID-19 outbreak, the benefits of increased revenue margins from aeronautical sources were adversely affected due to decline in flight volumes and passengers while the cost of airport operations remained largely unchanged as airports could neither close nor relocate their terminals (Babu, 2023; Shin & Roh, 2021). The decrease in passengers put airports under enormous pressure as they had to manage both the operating as well as developmental costs, emphasizing the need for them to augment non-aeronautical revenue as the way of overcoming these challenges (ACI, 2023: Bartle *et al.*, 2021). In this respect, airport operators and management have to consider the best way of introducing various policies that increase the size of non-aeronautical revenue to supplement aeronautical revenues.

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However, some few airports had included karaoke rooms and swimming pools as sources of income, which have increased their earnings (ACI, 2023; Battal & Bakir, 2017). Due to modernization following the advanced technology, most of airports at the global outlook have changed from aeronautical revenues (AR) as their major sources of revenue to non-aeronautical revenues sources (NARVs). This could be the best option of meeting the increased high fixed costs for maintenances and operations of the infrastructure at the airports. Generally, aeronautical revenues in this regard will include vessel landing charges for parking, lighting, boarding bridge, mooring, baggage handling, and passenger facilities (Shin & Roh, 2021). On the other hand, non-aeronautical revenues (NARVs) will include all rental fees for commercial facilities, car parking charges, buildings leasing and land rentals that have been excluded from aeronautical revenues.

In the recent years, non-aeronautical revenues (NARVs) share for airport activities has increased over time, reflecting the changing nature of airport operations around the world. It is estimated that, the global airports revenue from non-aeronautical sources has increased to 38.8 percent equivalent to \$60.4 billion in the year 2021 (Shin & Roh, 2021). NARVs are generated by commercial endeavors (non-operational sources), such as retailing, the sale of goods and services, leasing, or the payment of parking charges (Babu, 2023; Fuerst *et al.*, 2011). Findings from the study by Battal & Bakir (2017) indicated that, about half of all airport revenues in North America, Africa and the Middle East come from non-aeronautical revenues. On the other hand, the share is ranging between 46% and 48% in Asia and the Pacific and 30% in Latin America. This suggests that, in order for airports around the globe to continue operating profitably, they will need to alter their business strategies in order to rely less on aeronautical revenues (ARVs) which can be easily impacted by a variety of factors such as rising operating expenses or global health pandemics like Covid-19.

Due to their inability to produce sufficient cash from aeronautical sources, majority of airports all over the world had experienced the decrease in their revenues especially during the Covid-19 and financial crisis 2008 (Bartle *et al.*, 2021). It was estimated that, about half of all aviation industry revenues worldwide were affected by the pandemic which were decreased by 43.4% percent (down 6 percent from 2019) in 2020 (Joyal, 2022). This was caused by the decrease in the number of passengers who opted to travel by air following the lockdown and low purchasing power of majority people in many counties (Shin & Roh, 2021). However, the emergence of low-cost airlines which has resulted from decreased in air travel expenses due to non-aeronautical revenues increase, has boosted the number of people using air travel to visit various locations throughout the globe. To grab these opportunities, some airports throughout the globe have implemented a variety of strategies to boost their non-aeronautical profit margins by decreasing the operational expenses of airplanes through the reduction of parts of the aeronautical fees to attract more affordable carriers to operate in such airports (Battal & Bakir, 2017; Orth *et al.*, 2015).

Tanzania's desire for air travel has been continuously increasing much like it has been in other nations throughout the world. In comparison to 2016/2017, there were 4,950,994 more passengers that travelled by air between July 2017 and March 2018 (URT, 2018). The bulk of travelers that travel by air in the nation do so through Julius Nyerere International Airport (JNIA), which is the largest and busiest airport in the nation and has a six million passenger capacity annually.

However, the complexity of modern airports and the on-going evolution of air travel have not been taken into account while examining Tanzania's airport business model trends. The focus is still on limited aeronautical revenue streams that could have an adverse effect on the number of flights and passengers, with less attention being placed on non-aeronautical revenue sources. This is demonstrated by proposals to introduce an aeronautical tax, a security fee, with the goal of enhancing airport security infrastructure.

Despite the continuous increasing in non-aeronautical income for most of airports in the country, yet there is still a strong focus on aeronautical revenue streams among airport operators, lawmakers and policy-makers in Tanzania. This situation could hinder the efforts of airports to modernize their facilities and attract more passengers through increased NARVs. Previous studies (Keers & van Fenema, 2018; Shin & Roh, 2021 and Raghavan & Yu 2021) on the other hand, concentrated only on the aeronautical revenue sources and market structures, regulations, and privatization giving a little attention on the NARVs. In this regard, the current study investigated on how NARVs share could contribute to the improvement of airport facilities at JNIA in Tanzania. Findings from this study will inputs on the body of literatures in regard to the important of NARVs in enhancing the financial stability of airports.

## Literature Review

### Theoretical Frameworks and Conceptual review

The study draws its arguments from two theories; the Theory of agency and Evolutionary theory of economic change as discussed below:

#### The Agency Theory

The theory of Agency was emerged during the period of 1960s and 1970s whereby it concentrated on the issue of business ownership and how that affected organizational behavior (Kenichiro, 2015). The theory's proponents contended that businesses are affected by the interests of their owners or major shareholders, which are reflected in the business models chosen and the objectives to be achieved. So, government-owned businesses will be managed by bureaucrats who prioritize social welfare and customer service, while privately owned businesses will have a profit-driven management strategy. Therefore, for airports to increase their profits, it will depend on the nature of the business and flexibility of the owner or shareholders.

The presence of public-private partnership-owned businesses will make an effort to strike a balance between maximizing profits and the welfare of society (Keers & van Fenema, 2018). According to Kutlu (2020), this theory was helpful in the study because it addresses the issue of ownership, which is crucial to comprehending a firm's business model, the priorities set, and its flexibility and autonomy in terms of policies, timeframes to achieve them, as well as areas of priorities. The flaw with this hypothesis, is that it leaves out other aspects of ownership that might also have an impact on a firm's success, such as management policies and how they are carried out in practice.

### **Evolutionary theory of economic change**

The theory was developed by Winter and Nelson in 1982 as a critique of ideas about economic growth, contending that the focus on comprehending firm behavior should not only base on profit maximization and stable business conditions. Instead, it should be based on the overall business firm performance as revenue structure of firms differs from continent to continent and even country to country. General, the theory emphasizes the dynamic change, which is comparable to Darwin's claim about natural selection (Jerzy et al., 2021). Shin & Roh (2021) argued that, the critical role of an airports' management is to be equipped with facilities that offer safe, convenient landing and take-off services for movement of passengers and cargo which will include NAR facilities.

The proponents of this theory contend that instead of concentrating on profit maximization and equilibrium, it is crucial to take into account the entirety of the environment in which a corporation operates in order to understand its behavior. This theory was included in this study because it enhances the agency theory by offering a clearer understanding of the various business models used by airports all over the world to diversify their revenue streams and offer top-notch customer care. Therefore, airport managers now need to concentrate more on different ways to boost performance as the share of NARVs keeps rising due to the aviation industry's evolving nature

### **Empirical literature review and hypothesis development**

Study by Yokomi et al. (2017) noted that, low-cost airline passengers tend to spend more time at airports than other passengers because they are not provided with in-flight meals or drinks. Therefore, the availability of non-aeronautical revenues facilities at the airport will save the purpose as passengers must consume the service before boarding their flights and thus make them to spend a sizable expenditure. The argument was supported by Fuerst (2011) that, in order to rise commercialization and profit margin of airports, deployment of more NARV sources is imperative. This will supplement the aeronautical revenue sources during natural hazards such as economic and financial crisis. Similarly, Babu (2023) recommend the re-investing in NARVs as the way toward financial sustainability ecosystems among airports in USA.

Akoodie & Cloete (2020) analyzed the relation between NARVs and airport performance and found that, the proportion of NARVs to total airport revenue is strongly correlated with the number of passengers, which encourages the expansion of retail, catering, and parking facilities to handle the growing number of people utilizing a specific airport. Similarly, Jerzy *et al.* (2021) argued that in order for airports to improve their performance, management must raise the value of each element individually in order to produce enough non-aeronautical revenues. This calls for further expansion in the NARVs facilities by airport managements all over the world. On the other hand, Shin & Roh (2021) investigated on how NARVs share might affect airport charging policies and found that, the increase in airport's NARVs share has a statistically significant negative impact on the landing charges for the narrow-body jet airliners. This implies that, prices charged for airline services could decrease with increase in NARVs as some expenses will be financed with the income generated by non-aeronautical revenues.

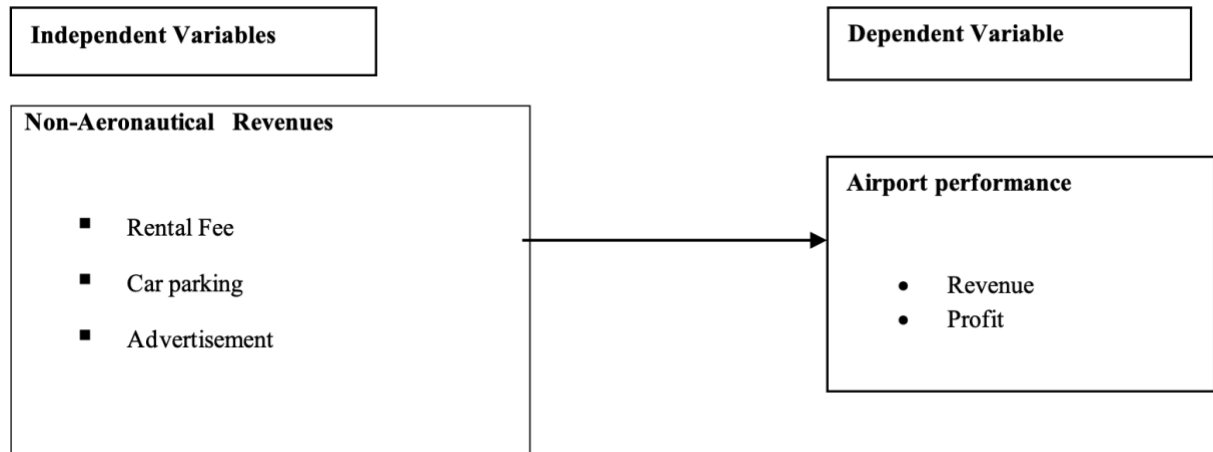
Battal & Bakir (2017) also conducted research on the five busiest European airports over the period between 2008 and 2015 and pointed out that, passenger numbers had steadily increased over the studied period, and that this increase was reflected in the NARVs produced by these airports during the same time period. This relationship between NARVs and passengers indicates that non-aeronautical revenues continue to be a vital component of an airport's bottom line development. Conversely, when too many charges are levelled on airlines, they pass the charges to their customers through the cost of tickets thereby reducing the number of people that travel by air. Similarly, Bartle *et al.* (2021) noted also that, airports all over the world experienced the decrease in their revenues due to their inability to produce sufficient cash from aeronautical sources following the COVID-19 eruption.

McEachern (2016) examined operational and financial efficiency while assessing airport performance in Latin America. The study found that, privatization of airport facilities promoted the improvement of airport performance in terms of generating more NARVs. In contrast, Raghavan & Yu (2021) could not find data to support argument that privatized airports perform better in terms of NARVs generation compared to public owned airports. Dempsey (2021) proposed the general principles of airport finance as a basic requirement to understand whether an airport can be profitable or not by better understanding the sources of airport costs, revenue and their sub-components such as capital and operating expenditures.

According to Jerzy *et al.* (2021), airports should be seen as a type of business ecosystem where different components work together to form a certain whole business. Thus, airports must raise the value of each element (facilities) individually in order to produce enough NARVs. They concluded that airports which had higher rates of ARVS and NARVs per passenger performed well in Europe.

### Conceptual Framework

According to the conceptual framework, the components in this study presented as independent variables that improve the facilities at JNIA are non-aeronautical revenues. These included establishment of car parking, advertisement and introduction of rental fee as alternative sources of income for airports and contribute much on the improvement of their facilities. It is conceptualized that, increase in Non-Aeronautical revenues generated from the rental fee, car parking and advertisement charges could improve the airport's performance at JNIA in Tanzania. The conceptual structure of the study is shown in Figure 1 below.



**Figure 1:** Conceptual Framework of the study

### Research & Methodology

The study was conducted at the Julius Nyerere International Airport (JNIA) located in Dar es salaam-Tanzania. The study employed longitudinal research design in undertaking the study whereby the time series data were gathered from the airport which involved the review of the annual financials and integrated reports of JNIA for the financial years 2017/18 to 2020/21. The length of duration was considered to be enough as suggested by Lakens (2022). The selection of this fiscal year's coverage was due to reason that, it captures the two important periods, the period in which ARV were increasing i.e. before the occurrence of Covid-19 (2017/18 to 2019/2020) and after the Covid-19. The data were processed with the help of Statistical Programmed for Social Sciences (IBM SPSS) Statistics, version 26.0. To analyze the contribution of nonaeronautical revenues, the multiple linear regression models were used. The used of this mode was based on the fact that, the dependent variable (airport performance) is measured as a continuous value. The regression model used was represented by the following equation.

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_1X_3 + \varepsilon$$

Whereby

$Y$  = Airport Performance (number of passengers)

$X_1$  =Rental fee

$X_2$  =Car parking fee

$X_3$  =Advertisement

$\beta_0$  =Constant term

$\beta_1, \beta_2$  &  $\beta_3$  =Coefficients of  $X_{1,2,3}$

$\varepsilon$  =Error term

### Findings and Discussion

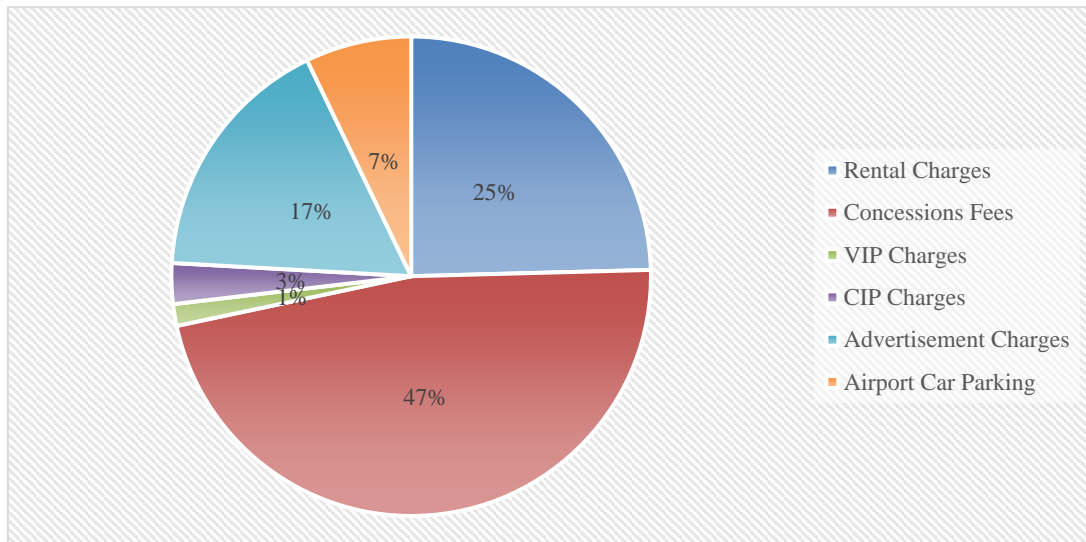
#### The percentage contribution of NARVs at JINIA

Results in Figure 1 indicated that, rental charges contributed for about 25% on the total NARVs generated at JNIA for the 2021/2022. This implies that, the decisions made by airport managements of introducing the rental charges at the airport was viable even though, it is below to what was forecasted before which were expected to bring 40% in the fiscal year 2021/2022. But it has shown a gradual

increase as compared during the Covid-19 pandemic's peak. These findings are supported by Battal & Bakir (2017) that., the share of NARVs was ranging between 46% and 48% in Asia and the Pacific and 30% in Latin America and Africa. Similar to those of Babu (2023) that, about 40% of airports NARV are generated from commercial activities like rental on land, retail services, parking fee and the alike.

On the other hand, advertisement and car parking contributed 17% and 7% respectively to the total value of NARVs at the airport. This gives the implication that, more efforts are needed to improve car packing and advertisement services by the management at JNIA. To enhance the NARVs, the government of Tanzania through Tanzania Airport Authority (TAA), has started to improve the JNIA facilities in order to meet these demands. One of such improvement is the completion of a new terminal building (Terminal three), which costed more than 500 billion Tanzania Shillings (URT, 2020). Other projects that the airport is implementing included, the service and maintenance of the visual docking guidance system at Terminals 2 and 3, the rehabilitation of the airside pavements (patchworks), the improvement of the storm water drainage system, and the repainting of the pavement markings on the airside and landside, are in various stages of implementation.

Moreover, travel concession fees contributed for a large share (47%) of the airport's revenue collection from the NARVs at JNIA. The large share from concession fee could be explained by the reason that, there was no breakdown on the sources of concession fee to distinguish between ARVs sources and NARVs sources; but the entire amount of projected revenues of was combined, making it difficult to determine the amount of concession fees that were solely generated from NARVs sources as opposed to those that came from ARVs sources. These results on the other hand are not far from that of Zhang and Zhang (1997) who investigated the optimal pricing between NAR in concession and aviation profitmaking activities and found the increasing in the airport revenue for international airports.



**Figure 1:** Percentage of selected NARVs sources at JNIA 2021/2022; *Source:* Field Data, 2022

Additionally, VIP and CIP charges were found to be other sources of NARVs at the airport contributing only three and one percent respectively. However, the study discovered that JNIA was intended to introduce new other sources of NARVs from bureau de change, new restaurants at Terminal 2, pharmacy services at Terminal 2, CIP lounge services at Terminal 1, book stores at Terminal 3, mobile money services, and jewelry shops at Terminal 3 as part of diversifying sources of revenue for the financial year 2022/2023.

It was further reported that, the airport (JNIA) management was exploring various strategies in enhancing NARVs and improve its facilities both at terminal three and two in Dar es Salaam. These strategies included retail operation expansions and diversification of revenues sources. The increase in the scope of retail services in terms of retails sales and leasing helped the airport to generate additional income beyond traditional aeronautical revenue sources. On the other hand, diversifying of its income sources to NARVs, helped in mitigating the risks associated with factors like rising operating expenses or occurrence of natural disasters like global health pandemics. In general, improvement of JNIA facilities at terminal three will enable the airport to accommodate 7.2 million passengers annually.

#### **Contribution of Non-aeronautical revenues on improving airport facilities**

To estimate the contribution of NARVs on the improvement of airport facilities, the multiple regression analysis was performed. Results from Table 1 shows that, R-Squared is 78.5 percent, indicating that variations in the dependent variable were explained by rental fees, car parking and advertisement by 79 percent of the variation in non-aeronautical revenues on the improvement of airport facilities at Julius Nyerere International Airport. The higher value of R Squared justifies the fitness of the model under this study.

The value of Durbin-Watson was 1.94 which is below the margin indicating that data were not influenced by the autocorrelation problem. Similarly, the Variance Inflation Factor (VIF) calculations showed that the mean VIF was 2.17 which is below 10, indicating no problem of multicollinearity between the variables included in the regression model.

**Table 1:** Contribution of Non-aeronautical revenues on improving airport facilities

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	8.675	0.303		28.63	0.000
Rental fees	0.874	0.065	-0.364	13.144	0.000
Car parking	0.074	0.020	0.117	3.70	0.021
Advertisement	0.007	0.041	0.162	0.174	0.025
R2	0.785				
VIF	2.17				
Durbin-Watson	1.94				

Dependent Variable: Airport Performance (Number of Passengers)

**Source:** Field Data, 2022

The study findings further indicate that, rental fees indicated to have a positive impact on the improvement of airport facilities at the airport. This implies that, for every unit increase in rental fees revenues will lead to 87% increase in Non-aeronautical revenues at JNIA. This indicates that rental activity is of high important to the airport as it contribute for about 25% of the NARVs at JNIA as indicated in the Figure 1. The increase in NARVs generated from rental fees is attributed by the current decision of airport management to expand the retail operations. These results are in line with those of Shin & Roh (2021) and Babu (2023) who found that, approximately 40% of global airport revenues were generated from NARVs sources in 2017 and 2022. They further concluded that, the increase in airport’s NARVs share has a statistically significant negative impact on the landing charges for the narrow-body jet airliners. Yokomi *et al.* (2017) also found the similar results on the impact of low-cost carriers on nonaeronautical revenues in airports in UK.

Moreover, car parking has shown a positive relation with the performance of airport facilities with a coefficient of 0.0074, implying that, a unit increase in the revenue generated from parking could contribute to the airport performance by 7.4%. The positive contribution from the car charges could be attributed by the current high demand on airline traveling by passengers who in return requires more transport services and the establishment of new modern car parking area. The findings concur with that of Akoodie & Cloete (2020) that contribution of NARVs from retail services to total airport revenue increased more when airports expanded the facilities. The same inclination to findings of Graham (2009) and Shin & Roh (2021) who found that about half of the average airport revenues are made up of NAR, with retail shops as the most significant NARV source.

Similarly, income from advertisement charges increased the performance of the Airport facilities at JNIA by 0.7 percentage. The small percentage was attributed by activities of advertisement being at their initial stage but it expected to increase in future following the increase in passengers and customers at the airport. The further expectation on the increase in NARVs is supported by Jerzy *et al.* (2021) who argued that in order for airports to improve their performance, management must raise the value of each element individual facility in order to produce enough non-aeronautical revenues. Moreover, findings by Hrabovszki (2021) have shown that airports must constantly upgrade their facilities for a variety of reasons, such as security needs, bettering customer experiences, and conveniences in order to draw more aircraft, passengers, and business opportunities, which in turn gives airports opportunities to diversify their revenue sources.

## Conclusions

The study's main goal was to determine how non-aeronautical earnings affected the development of JNIA's airport infrastructure. The study finds concluded that, at 5% and 95% confidence level of significant, rental fees, car parking and advertisement indicate to be most significant factors in contributing to airport performance at JNIA. The results of this study have an implication to airport operators and policy makers that, more efforts had to be located on the improvement and increase on the NARVs. Also, the management of JNIA should reconsider their strategy for expanding their revenue streams by making investments in areas outside

of aviation and airport related concerns. Further research is recommended to extend the study's scope by analyzing a longer period and exploring additional strategies for revenue enhancement. This will enable the airport to assess the impact of non-aeronautical revenues on airport facilities in wider range overtime and in inclusive manner.

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