Effects of Eco-Design, Biospheric Values, Green Management and Green Reputation on the Perceived Green Performance of Airport Facilities and Services

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ABSTRACT

The energy-intensive international airport operations represent a critical component of the tourism industry in any economy. Achieving and improving the green performance of airport facilities and services through green practices at international airports is more crucial than ever before due to the positive impact on tourism demand, destination image, economic benefit, social responsibility, cleaner environment, and the overall implications for sustainable tourism development. Hence, it is pertinent to investigate factors that influence green behavior among airport employees and management and their perception of the green performance of airport facilities and services. The essence of this study is to understand how stakeholders' behavior and perception of the eco-design of airport buildings with other sustainable practices can improve green performance at international airports' operations and boost sustainable tourism development at destinations.

Using the Extended Theory of Planned Behavior (E-TPB) and Triple Bottom Line (TBL)/Sustainable Economic Development Theory (SED) (TBL/SED), PLS-SEM, bootstrapping, and Importance-Performance Map Analysis (IPMA) for statistical analysis, this dissertation investigates the effects of eco-design, biospheric values, green management and green reputation on the perceived green performance of airport facilities and services. A two time-lag design with two weeks intervals was used for the multisource-data collection from employees at Nigeria's Lagos and Abuja international airports.

Findings reveal that, first, the biospheric value (BV) of individuals is one of the most crucial factors in influencing pro-environmental behavior among airport employees, which in turn is analogous to improvement in the green performance of the airports. BV also promotes the ability of employees to recognize sustainable practices at the airports, which is critical for destination image and tourist demand. Second, the findings indicate distinct differences in the total effects (importance) and group-specific performance of some of the constructs, such as biospheric values, green airport reputation, eco-design of the airport, and perceived green performance in this cross-sectional study. Theoretical and practical implications and contributions of the study, limitations, and recommendations for future research in line with the findings are also given.

Keywords: eco-design of airport buildings; green management intransigence; perceived green performance; biospheric value; green airport reputation; sustainable tourism

ÖZ

Enerji yoğun uluslararası havalimanı operasyonları, herhangi bir ekonomide turizm endüstrisinin kritik bir bileşenini temsil eder. Turizm talebi, destinasyon imajı, ekonomik fayda, sosyal sorumluluk, daha temiz çevre ve sürdürülebilir turizm gelişimi için genel etkiler üzerindeki olumlu etki nedeniyle, uluslararası havalimanlarındaki yeşil uygulamalar yoluyla havalimanı tesislerinin ve hizmetlerinin yeşil performansının elde edilmesi ve iyileştirilmesi her zamankinden daha önemlidir. Bu nedenle, havalimanı çalışanları ve yönetimi arasındaki yeşil davranışı ve havalimanı tesis ve hizmetlerinin yeşil performansına ilişkin algılarını etkileyen faktörlerin araştırması gerekmektedir. Bu çalışmanın özü, paydaşların diğer sürdürülebilir uygulamalarla birlikte havalimanı binalarının eko-tasarımına yönelik davranışlarının ve algılarının uluslararası havalimanlarının operasyonlarında yeşil performansı nasıl iyileştirebileceğini ve destinasyonlarda sürdürülebilir turizm gelişimini nasıl destekleyebileceğini anlamaktır.

Bu tez, istatistiksel analiz için Genişletilmiş Planlı Davranış Teorisi (E-TPB) ve Üçlü Alt Sınır (Bilanço) (TBL)/Sürdürülebilir Ekonomik Kalkınma Teorisi (SED) (TBL/SED), PLS-SEM, önyükleme ve önem-performans matrisi analizini (IPMA) kullanarak havalimanı tesisleri ve hizmetlerinin algılanan yeşil performansı üzerinde çevre tasarımı, biyosferik değerler, yeşil yönetim ve yeşil itibarın etkilerini araştırmaktadır. Nijerya'nın Lagos ve Abuja uluslararası havalimanlarındaki çalışanlardan çok kaynaklı veri toplamak için iki haftalık aralıklarla iki zaman gecikmeli bir tasarım kullanılmıştır.

Bulgular, ilk olarak, bireylerin biyosferik değerinin (BV), havalimanlarının yeşil performansındaki iyileşmeye benzer şekilde, havalimanı çalışanları arasında çevre yanlısı davranışı etkilemede en önemli faktörlerden biri olduğunu ortaya koymaktadır. BV ayrıca çalışanların, destinasyon imajı ve turist talebi için kritik olan havalimanlarındaki sürdürülebilir uygulamaları tanıma becerisini de desteklemektedir. İkinci olarak, bu kesitsel çalışmanın bulguları biyosferik değerler, yeşil havaalanı itibarı, havaalanının eko-tasarımı ve algılanan yeşil performans gibi bazı yapıların toplam etkilerinde (öneminde) ve gruba özgü performansında belirgin farklılıklar olduğunu göstermektedir. Çalışmanın teorik ve pratik çıkarımları ve katkıları, sınırlılıkları ve bulgular doğrultusunda gelecek araştırmalar için öneriler de verilmektedir.

Anahtar Kelimeler: havaalanı binalarının eko tasarımı; yeşil yönetim uzlaşmazlığı; algılanan yeşil performans; biyosferik değer; yeşil havalimanı itibarı; sürdürülebilir turizm

DEDICATION

God Almighty

Michael Olusanya Bamidele (Late)

Oluwadamilola Bamidele

Boluwatife Bamidele

Ps. & Dcns. Ogunbiyi (Rtd)

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Chapter 1

INTRODUCTION

The phenomenal global achievement of 1.5 billion international arrivals (IA) in 2019 (UNWTO, 2020; WTTC, 2019) is driven by the energy-intensive aviation industry, particularly the airlines. However, the airlines can only do this with effective international airport operations. Over 2500 airports worldwide provided critical infrastructure that supported 4 billion annual global passengers in 2018 (Greer,Rakas, & Horvath, 2020; IATA, 2018). These laudable feet, however, were only possible with a reliable and adequate electricity supply to airports since airport operations depend mainly on enormous energy consumption, though with its negative impact on the environment depending on the sources. Thus, inadequate energy supply to airports, especially in developing countries, and overreliance on fossil fuel energy sources are emerging as a significant concern for green performance at airports and a barrier to sustainable tourism in Nigeria.

The grossly inadequate and inefficient electricity supply in Nigeria and most parts of Sub-Sahara Africa (SSA) is well documented in the literature (Abdullahi, Suresh, Renukappa, & Oloke, 2017; Akorede, Ibrahim, Amuda, Otuoze, & Olufeagba, 2017; Lee, & Brahmasrene, 2016; Monyei, Adewumi, Obolo, & Sajou, 2018). However, the impact on airports' operation and overall tourism sustainability are disproportionately understudied, especially in the Nigerian context. Most importantly, intransigence on the part of airport management, biospheric values of airport stakeholders (attributed to

the natural environment of the airport by management, staff, and passengers, based on their level of concern for the environment, eco-consciousness and awareness of environmental challenges occasioned by global warming and carbon emission), airport reputation and perceived green performance, are also yet to be investigated in the literature.

Similarly, discussion on how the above relates to or the nexus between the constructs and environmental policy integration in aviation and tourism development is still being determined in the literature, especially in the Nigerian and African contexts. While probing the influence of eco-design of airport buildings on customer behavioral intention, Han, Quan, Lho, & Yu, 2020) did not situate their investigation on a defined setting nor do they include green management intransigence and perceived green performance in their variables or construct. Meanwhile, findings further revealed that all regions of the world enjoyed an increase in IA in 2019, with the Middle East leading with (+8%) growth, followed by Asia and the Pacific with a (+5%) surge in IA. Similarly, international arrivals in Europe and Africa (both +4%) increased in line with the world average. In comparison, the Americas saw growth of 2% (UNWTO, 2020). Thus, an airport's resilience and sustainability are paramount to sustaining the tempo of tourism sustainability and growth.

Moreover, as earlier stated, the tourism industry in general and aviation in particular, especially airports operation, is heavily dependent on intensive energy consumption and simultaneously generates vast volumes of carbon dioxide (CO2) emission to the environment due to the general use of fossil fuel-based generating sets as backup (Adedoyin & Bekun, 2020; Balsalobre-Lorente, Driha, Bekun, & Adedoyin, 2020; Balsalobre-Lorente & Leitão, 2020; Barrett, 2019; Greer, Rakas, & Horvath, 2020;

Mannarino, 2018). Essentially, some of the authors argued that without accounting for airport contributions, the aviation sector (flights alone) contributed 2.5% of global greenhouse gas (GHG) emissions in 2018 (Greer et al., 2020). This is consistent with findings in other reports by international agencies and research groups, including Energy Agency (IEA) and ICAO, on the same issue.

Despite the real and perceived negative impact on the environment, it is pertinent to note that a constant, efficient, and reliable electricity supply for powering the quantum of highly sophisticated, specialized equipment and installations within the airport facilities for smooth operation is of utmost importance. This is paramount for faster, safer, secured facilitation and effective processing of passengers and goods from one airport to another to enhance customer satisfaction, reduce operational costs, and for a cleaner environment. Some key areas where this is crucial are equipment, installations, and systems beginning with the access gate: terminal buildings, body, and baggage scanning machines, security gadgets, medical posts, air traffic control towers, and fire service watchtowers. Others include; safety equipment, airfield lighting, navigational and communication equipment, instrument landing systems, and radar monitoring installations, to mention but a few (Alba & Manana, 2016; Greer et al., 2020; Lau, Yousof, M. F. M., Arshad, Anwari, & Yatim, 2010; Alba & Manana, 2017).

The introductory chapter of this dissertation aligns with and follows the conventional structure of a doctoral thesis that generally highlights the philosophical and theoretical rationale of the study and briefly explains the study's design, purpose, methodological approach, contributions, and justification.

1.1 Problem Statement

There is increasing awareness of the impact of the tourism value-chain, especially airports' energy consumption on the environment, and the need for green practices diffusion and environmental policy integration (EPI) in every sector of the economy, including the aviation and the tourism sector (Kucukvar, Alawi, Abdella, Bulak, Onat, Bulu, & Yalçıntaş, 2021; Lu, Hsu, Liou, & Lo, 2018; Nepal, Indra al Irsyad, & Nepal, 2019; Olfat, Amiri, Bamdad & Pishdar, 2016; Upham, 2001). However, expanding literature on aviation-led environmental impacts focuses mainly on the "aircraft and flights" dimension. While the investigation is just emerging specifically on airports' operational activities on the environment, strategies for energy management for airport buildings, and sustainable energy diffusion at airports, yet, there is a dearth of literature in the context of developing countries, emerging markets, and Sub-Sahara Africa (SSA) in particular (Greer et al., 2020; Mannarino, 2018).

Besides, voids further exist globally in terms of a proactive shift towards green performance or sustainable practices as well as the implementation of EPI by airport management, especially in adopting low-emission electricity sources such as solar PV to enhance airport resilience and improving perceived green performance, as well as passengers' airport experience. The exceptions are primarily in airports in most advanced economies like the UK, the US, Spain, Japan, Netherlands, and Dubai (Greer et al., 2020; McManners, 2016). This situation is particularly problematic since, according to the theory of planned behavior TPB, there are predictive psychological factors that affect the behavioral intentions of management toward eco-friendly behaviors, which is worth investigating.

Nevertheless, this connection between tourism and green airport performance is relatively rare in the literature. Therefore, there is a need to probe the effect of 'green management intransigence' (GMI) that connotes 'attitude or resistance to change' with environmental policy integration, eco-design of airport buildings, and biospheric values (of stakeholders, employees, and passengers), to understand the impact on stakeholders' perceived green performance (PGP) of airports, and green airport reputation (GAR); which is almost non-existing in the available literature. The only exception is the 'eco-design of airport buildings' (Han et al., 2020), which links biospheric value, customers' subjective well-being, and airport reputation with customer approach and behavioral intention.

Furthermore, different scholars, particularly Greer, Rakas & Horvath (2020), based on the gaps they identified in their comprehensive meta-analysis of 108 pieces of literature for the periods from 2009 to 2019, and also Barret (2020) have called for future research with emphasis on stakeholders' involvement to expand the literature on a sustainability theme further. Some key airport stakeholders identified are; airport management/board, airport employees, regulatory agencies, airliners, tenants/concessionaires, and the public, i.e., passengers. Hence, the inclusion of decision-makers such as airport management, airport staff, and air passengers in this study.

However, according to McManners (2016), the aviation industry is identified as the most challenging economic sector when implementing EPI and other sustainable development policies and practices. This trend can be attributed to the challenges of balancing airports' substantial economic benefits and the environmental implications; Greer, Rakas & Horvath (2020) also support this assertion. Thus, views are remarkably

divergent in many countries regarding integrating and implementing environmental sustainability or green practices like eco-design of airport buildings and renewable energy adoption, for instance, into aviation policy and adopting green practices at the airports.

Again, there is little or no study that links the above with management intransigence towards eco-design of airport buildings (EAB), the role of biospheric value (BV), green airport reputation (GAR), and how it impacts stakeholders perceived green performance (PGP) of the airports and sustainable tourism development in general. However, Han et al. (2020) called for future probing using case studies, more specific constructs, and innovative practical implications. Hence, this study uses Nigerian airports' settings to include the abovementioned variables, including perceived green performance and eco-design of airport buildings.

Even worse, Greer, Rakas & Horvath (2020) found in their meta-analysis that much of the literature could have demonstrated a broader understanding of how different airports studied use energy, what they use it for, and the sources." Nevertheless, Heard & Mannarino (2018) argued that airports present an ample opportunity for policy-makers and airport operators to explore the implementation of micro-grid, off-grids, on-site, and embedded energy generation, which is consistent with the suggestions by Han et al. (2020). Advanced economies like the US and the UK have demonstrated the realism and practicability of this strategy. However, researchers are still determining its applicability in SSA. Therefore, this study aims to fill another significant gap in the literature (Greer et al., 2020).

Also, Greer, Rakas & Horvath (2020) opined that "research that investigates different energy sources (e.g., solar, bioenergy) and energy transmission strategies (e.g., national grid versus micro-grid, off-grid and or on-site) is just evolving, and more studies in this area are needed." Again, that represents another void identified in extant studies, which is further linked to common limitations in the literature relating to the scope in which a single airport is often used for the case studies, hence, making it sometimes difficult to generalize and connect research results with suggested practical implication or policy outcomes in a broader term.

Meanwhile, the overreliance of SSA, particularly Nigeria, on fossil fuel as the primary source of energy and national-grid electricity distribution and supply for domestic, commercial, and industrial use is currently receiving attention in the literature (Elum & Momodu, 2017; Naibbi & Healey, 2013; Nnaji, Chukwu, & Moses, 2013; Vincent & Yusuf, 2014; Yetano Roche, Verolme, Agbaegbu, Binnington, Fischedick, & Oladipo, 2020).

Interestingly as well, other studies amplify the challenges that the unreliable and inefficient national-grid electricity infrastructure poses to domestic, private, and public sectors, especially the considerable cost to households and loss of revenue to businesses and the economy at large (Ekpo & Bassey, 2016; Scott, Darko, Lemma, & Rudd, 2014; Hussaini, 2020). Again, these studies rarely link these domains to green management intransigence, airport operations, eco-design of airport buildings, and biospheric value; neither is the mediating effects of green management intransigence, biospheric value, and green airport reputation on perceived green performance of the airport is ever probed.

Thus, this current study examines the nexus among the constructs and the effect on perceived green performance by answering the following questions;

a.) How does the eco-design of airport buildings impact green airport reputation and perceived green performance of airports?

b.) Does the relationship between green management intransigence, eco-design of airport buildings, and biospheric values of airport stakeholders affect green airport reputation and perceived green performance?

c.) Does the green management intransigence, biospheric values of airport stakeholders, and green airport reputation mediate the effects on perceived green performance?

1.2 Research Purpose and Rationale of Study

1.2.1 Purpose of the Dissertation

The purpose of this study is, first, to investigate the relationship between eco-design of airports (EAB), biospheric value (BV), green management intransigence (GMI), green airport reputation (GAR), and perceived green performance (PGP), and their impact on destination image and tourist demand. The second is to examine factors influencing green behavior among airport employees and management and their perception of the airports' green performance and reputations. The third is understanding how employees' behavior and perception of the eco-design of airport buildings with other sustainable practices can improve green performance at international airports' operations.

Fourth is to provide theoretical and practical implications and contributions to the field of sustainable tourism development and green practices in the aviation industry, as

well as to suggest avenues for future research in line with the findings of this study. Proponents of E-TPB introduced additional predictive factors that are context-based, i.e., social impression, environmental consciousness, and environmental ethics and beliefs to the above-highlighted original predictive factors of TPB (Chen, & Hung, 2016; Paul, Modi, & Patel, 2016). Hence, E-TPB reveals and explains psychological factors that stimulate individual pro-environmental behavior that influences and enhances how airport staff, passengers, and other stakeholders perceive the green performance of the airports, which also impacts the green airport reputation.

Therefore, E-TPB and the TBL/SED are deployed to justify the logical interaction between the different constructs in this thesis. The E-TPB is mainly used here to expatiate and predict airport management's intention and behavior towards green practices, such as the shift towards clean energy sources for the airports, and energy saving/conservation, among others. It further delineates how pro-environmental or anti-environmental behavior by the management to or not to adopt eco-design for their new airport buildings and engage in green practices is linked to and influenced by triple factors of social, economic, and environmental circumstances such as; cost implication, time-factor, social responsibility, government policy, and regulatory demands, among others, as highlighted in TBL/SED theories later in this thesis.

This thesis proposes and validates a model with possible pathways investigating the impact of the relationship between EAB, BV, GMI, GAR, and PGP among airport stakeholders (management, staff, and passengers). The moderating effect of BV, GMI, and GRA on PGP has also validated the cognitive and psychological perspectives towards pro-environmental and sustainable practices and the perceived green performance of airports. The focal point is to encourage and attract more international

arrivals for sustainable tourism development and, by implication, positively impact the country's GDP.

Consequently, the four main objectives of this study include;

To determine the relationship between biospheric value (BV) and pro-environmental behavior among airport employees.

To assess the impact of biospheric value on airport employees' ability to recognize and adopt sustainable practices at airports.

To examine the association between eco-design of airport buildings, green management intransigence, and perceived green performance among airport management employees.

To investigate the interplay between biospheric value (BV), green airport reputation, eco-design of an airport, on perceived green performance.

1.2.2 Contribution and Significance of the Dissertation

This study has important implications for the tourism industry by providing insights into the factors that affect green performance in international airport operations, highlighting the significance of sustainability initiatives for airport operators, and contributing to a sustainable tourism management knowledge base. From a theoretical perspective, the study contributes to the body of knowledge on sustainable tourism management by using the Extended Theory of Planned Behavior (E-TPB) and the Triple Bottom Line Theory/Sustainable Economic Development Theory (TBL/SED) to investigate the relationships between eco-design of airport buildings, biospheric values of airport stakeholders, green management intransigence, green airport

reputations, and perceived green performance of airports with sustainable practices. The study provides empirical evidence for the importance of these factors in promoting sustainable practices in airport design and operations.

Furthermore, this study contributes to theory and practice for researchers and policy-makers, particularly tourism management, aviation, and airport managers. First, it escalates the ongoing debate concerning air passengers' airport experience, sustainable management of airports, and the long-term sustainability of the tourism industry, in low and middle-income economies, particularly in Africa and Nigeria.

Second, due to the gap in the literature, the current study builds on, expands, and deepens the theoretical discourse by applying both the evolving 'E-TPB' and TBL/SED, specifically to green management intransigence in airports which is currently scarce in sustainable tourism management literature. It lays bare context-specific factors in behavioral intention literature focusing on environmental psychology peculiar to green management and practices in international airports that could impact the green behavior of other airport stakeholders and sustainable tourism development in general. (See Appendix 2; table showing previous studies with the gap in the literature).

Previous studies that have used TPB and the emerging E-TPB, for instance, even in tourism contexts such as hotel and accommodation sector (Garay, Font, & Corrons, 2019; Han, Hsu, & Sheu, 2010) have focused almost exclusively on customer purchase intention perspectives alone while neglecting management's attitude towards adopting green or environmental behavior, especially in the aviation industry and the airport

sector. Garay et al. (2019), which used decomposed TPB to probe the behavioral intentions of accommodation managers, is the only exception.

Third, this study established interaction among the different variables and constructs, i.e., between GMI and EAB, EAB and BV, and GAR and PGP. The moderating effects of GMI, BV, and GRA on PGP are also validated. This contribution is germane and outstanding to the literature since no study or model in tourism management literature has included GMI and PGP as variables in assessing sustainability in international airport operations. Similarly, the implication for policy and practice is that this study will encourage a shift towards developing eco-design of airport buildings with other green practices such as renewable energy diffusion and micro-grid for electricity supply to such buildings. This will further stimulate the reduction of carbon dioxide emissions to mitigate global warming and climate change in the context of airports operation in Nigeria and, by extension, Sub-Sahara Africa. Above are some of the issues previous studies still need to address.

Fourth, this study contributes to the literature by advancing our understanding of the importance and contributions of airports to tourism and sustainability beyond the numbers of international arrivals in the context of developing countries; it contributes to sustainable development goals in general. The contributions also include reawakening the clarion call on the urgent need for sustainability policy integration between tourism, aviation, and environmental policy to reduce the carbon footprint of tourism and enhance sustainable tourism development and management. The desired outcome can only be possible by factoring other variables such as GMI, EAB, BV, GAR, and PGP into the equation. As such, it will further enrich the emerging debate on environmental policy integration, clean energy sources and consumption at the

airports, energy efficiency/conservation, energy mix, solar PV, biogas, micro and off-grid technology, and stakeholders' perspectives on sustainable tourism development.

Fifth, provided the aviation policy-makers and airport management can change their views and implement proposed measures relating to EPI to improve their green performance by adopting eco-design for airport buildings, solar PV, and micro-grid technology in Nigerian international airports, as obtainable in other regions of the world; the practical implications of this dissertation; will be enormous. These will include; reducing airports' operational costs, reducing corruption, improving air passengers' airport experience, enhancing airport reputation and Nigeria's image, and ultimately boosting both domestic and international tourism while simultaneously reducing CO2 emission, improving the environment, and combating climate change. Overall, the study provides a framework for promoting sustainable practices in airport design and operations, which can contribute to sustainable tourism development in particular and achieving sustainable development goals in general.

Meanwhile, according to Altinay, Paraskevas, & Jang (2015), research in tourism and hospitality aims to discover, apply and integrate new ideas, knowledge, and information from theory to policy and practice in the tourism industry is informed by different factors or triggers. Tourism research's fundamental purposes and triggers include identifying dynamic and innovative ways of managing businesses within the value chain of the tourism industry. Altinay, Paraskevas, & Jang, 2015 opined that research may also be triggered by “a mega-event in a tourism destination that may stimulate research in various areas, from visitor perception to economic, societal, cultural, and environmental impacts on the destination”.

For example, Nigeria may not be a top-rated and regular tourism destination for various reasons beyond the scope of this study despite her rich potential, yet, many unique cultural and religious related events could be classified as or that fit 'mega-events' conditions that could trigger research as described above by Altinay, Paraskevas, & Jang, (2015). Those events draw reasonable numbers of international tourists to a couple of states in the country yearly before Covid-19. Such events include; the Arugungu Fishing Festival in Kebbi State, Osun-Oshogbo Festival in Osun State, Calabar Christmas Carnival in Cross-River State, and Abuja Carnival, Federal Capital Territory (FCT), to mention but a few (Benson, 2014; Olatumile, 2019).

Hence, the context fits nicely into the aims and rationale for this study as it is to tourism anywhere in the globe. Thus, based on the premise that the theoretical framework of E-TPB effectively explains the factors influencing an individual's behavior, including environmentally friendly and anti-environmental behavior, E-TPB is a suitable fit for this study. It measures and determines the biospheric values (of management, passengers, and staff) as a variable in this study that contributes to determining their behavioral intentions towards eco-design of airport buildings, green management intransigence, green airport reputation, and perceived green performance. This investigation is significant because several international and domestic tourists that attend these festivals by default often need to use either of the two airports in this case study to access the destinations at one point or the other.

Congruence to the above, passengers' experience at the airport, as the first point of contact and port entry to the country, will likely shape their assessment, perception, and satisfaction with the festivals. Conversely, their biospheric value is a determinant

factor in the way they perceive the eco-friendliness nature of the airport as they interact with the design of the buildings, facilities, staff, and the general environment of the airport.

Similarly, E-TPB typifies the image stakeholders form in their minds/heads concerning the management, green reputation of the airport, and their behavior and perception of the green performance of the airport, which contributes to their determination to return and revisit the festival sites and to engage in positive or negative word-of-mouth review and recommendation of the country as a whole. On the other hand, TBL/SED theory posit and demand the responsible use of natural resources without compromising the same for unborn generations. The twin theories of TBL/SED relate to the individual's connection, appreciation, and consumption of traditional festival as a tourism product, not only as a social and economic-oriented activity to enjoy but also depicts customers' biospheric value, i.e., the concerns, understanding, and appreciation of the natural and clean environment as socially and economically beneficial to all in the tourism value-chain for today and the future.

Lastly, the Importance-Performance Matrix Analysis (IPMA) used to complement the explanatory power of the Partial-Least Square Structural Equation Model (PLS-SEM) analysis is innovative and a significant contribution of this dissertation to theory and practice. This innovation is laudable as the IPMA elucidates the group-specific divergent opinion about the importance-performance of the different constructs in the study. The above is crucial for management to aptly identify areas that are of uttermost importance to the majority of stakeholders and that need urgent attention from the management.

1.3 Outline of the Dissertation

The first chapter of this thesis discusses the critical information about the problem statement, research purpose, rationale, contributions, significance, and gaps in the literature. The second chapter discusses the literature relevant to the observed variables, theoretical framework, and hypothetical development and research model. The third chapter expatiates the research design for this investigation, chapter four contains the presentation of results and findings of the study, and lastly, chapter five is devoted to discussion, conclusion, and recommendations.

Chapter 2

LITERATURE REVIEW

2.1 The Airport: A Pivotal Infrastructure in International Tourism

Tourism is a rapidly growing industry that is vital to the global economy. According to the World Tourism Organization (UNWTO) (2020), international tourist arrivals grew by 4% in 2019 to reach 1.5 billion, generating USD$1.7 trillion in export earnings. As tourism continues to grow, airports have become a critical infrastructure for the industry. Airports are essential for facilitating international travel, providing a gateway to destinations, and creating economic opportunities for communities Airports Council International (ACI) (2020). Therefore, this section discusses the importance of airports as a critical infrastructure in the international tourism industry and its impact on the global economy.

The aviation industry represents one of the backbones and a catalyst to any meaningful economic development and growth in any country. The industry is a significant factor in the global tourism value-chain, and most importantly, to international tourist arrival and receipts as it is to international travel in general across the world (Alba & Manana, 2016; Fordham, Stephens, Leahu-Aluas, & Fields, 2018). Belobaba, Odoni, & Barnhart, (Eds.). (2015) argue that the global airline industry is critical in facilitating international tourism by providing essential air transportation infrastructure.

According to Forsyth, Gillen, and Wood (2018), air transport liberalization has significantly impacted airline competition and traffic growth, influencing the tourism

industry's development (Law, 2021). Airports, in particular, depict the pillars of this high-tech aviation industry, fundamental to the commercial airline business and the fastest means and mode of transportation for passenger and cargo movements across borders. It can be argued that without airlines and airports, there is no aviation industry; similarly, "commercial airports" cannot exist without airlines, but airlines cannot survive either.

Gudmundsson (2019) highlights the importance of air transport in supporting the growth and development of the tourism industry while noting the need to address various challenges and opportunities associated with this relationship. Hall et al. (2018) corroborated the above assertion. Hence, without airports and electricity, there cannot be commercial flights, domestic or international. Without international flights, the impact of international tourism on GDP will be very negligible (Alba & Manana, 2016; Alba & Manana, 2017; Scott, Darko, Lemma, & Rudd, 2014).

Airports serve as the first point of contact for tourists entering a new country, and the airport's quality can significantly impact their travel experience. Modern (Smart airports) are designed and redesigned to provide a seamless passenger experience, with state-of-the-art facilities, comfortable lounges, and a range of shopping and dining options (Rajapaksha & Jayasuriya, 2020). As such, airports have become destinations in themselves, with some of the world's busiest airports, like Dubai International Airport and Singapore Changi Airport, offering a range of entertainment and leisure activities (Rajapaksha & Jayasuriya, 2020).

Furthermore, the airport has as its primary function the provision of access for air transportation of both passengers and cargo. In the last few decades, the aviation

industry, including airports (private, military, and commercial) and commercial airlines (budget and high-end), has grown exponentially and rapidly. Of course, this is both in response to the increase in demands and also a catalyst for rising in demand as a function of increase and improved economic activities in emerging markets in China, India, and Africa (Fordham, Stephens, Leahu-Aluas, & Fields, 2018; Nwaogbe, 2018; Alba & Manana, 2017). Airports also play a crucial role in tourism by connecting tourists to their destinations. Many remote destinations can only be reached by air, and airports serve as a gateway to these destinations (Law, 2021). For example, airports like Queenstown Airport in New Zealand and Incheon International Airport in South Korea provide access to remote destinations like Milford Sound and Jeju Island, respectively (Fu, Hong Tsui, Sampaio, & Tan, 2021; Rajapaksha, & Jayasuriya, 2020; Yang, & Chang, 2021). The connectivity of airports has helped open up new destinations, increasing tourism and economic growth (Xie et al., 2020).

Moreover, airports are not only essential for facilitating international travel, but they also play a significant role in the economy. Airports create jobs, stimulate local economies, and generate revenue for governments. According to the Airports Council International (ACI) (2020), airports support 88.5 million jobs and contribute USD$3.5 trillion to the global economy. In addition, airports generate revenue through various sources, including airport fees, landing fees, and retail and food and beverage concessions. Airports also stimulate local economies by creating new opportunities for businesses. Song & Witt (2019) also posit that airports generate demand for services like ground transportation, hotels, and restaurants, which creates new economic opportunities for communities.

According to a study by Oxford Economics (2017), for every 100 passengers that pass through an airport, 68 jobs are created in the local community. Additionally, the presence of an airport can attract new businesses and investment to the area. Recent studies suggest that airports and airlines can impact international tourism demand dynamically, with potential implications for policy and strategy in this area (Chen & Wen, 2021; Zhang, Zhang, Zhu, & Wang, 2017)). Airports have become a critical infrastructure in the international tourism industry. They serve as a gateway to destinations, provide a seamless passenger experience, and create economic opportunities for communities. As the tourism industry grows, airports will become even more critical for facilitating international travel and promoting economic growth. The challenge for airport operators will be to continue to improve the passenger experience while managing the increasing demand for air travel. By doing so, airports can help to drive the growth of the tourism industry and promote economic development.

However, one of the critical challenges facing the air transport and tourism sectors in recent years has been the COVID-19 pandemic, which has caused widespread disruption and uncertainty (Fadzil, Abu Bakar, Idrus, Azmi, Mohammad, & Ali, 2021; Cai, Xu, & Gao, 2021; IATA, 2020; Kavoura, & Pappas, 2020). The United Nations World Tourism Organization (UNWTO) reports that international tourist arrivals declined by 73% in 2020 due to the COVID-19 pandemic, marking the most considerable decrease (UNWTO, 2021). Similarly, Wang and Zhang (2020) provide empirical evidence of the significant impact that COVID-19 has had on international air transportation and tourism, based on a case study of China. Nonetheless, recent developments indicate that these two crucial global economy sectors are picking up on an encouraging note with further prospects, as predicted by IATA (2021).

Conversely, energy security is very crucial to any economy, and often, it shapes policy and decision-making in developed economies in terms of economic, security, and social policies and regulations geared toward meeting the energy needs of their citizenry (Azzuni & Breyer, 2020; Scott et al., 2014; Upham, 2001). Unfortunately, this perspective is lacking in SSA. A sequel to the above, and as earlier noted, alongside the boom in global energy demand and consumption, is also the expansion in the aviation industry, with the resultant astronomical increase in the energy needs of airports. However, this also led to an escalation in energy costs for airports, airport managers, and operators (Ortega Alba & Manana, 2017). Nevertheless, the positive impact on the socio-economic growth and development in many countries is a phenomenon. However, the environmental cost cannot be ignored either. It calls for adopting "sustainable development" principles, emphasizing its integral element of environmental policy integration (EPI), for proper and adequate sustainable practices across boards.

Furthermore, the TBL/SED theory underpins sustainable development, which includes and upholds the principle of EPI; the focal point is demanding responsible use of natural resources without compromising the same for unborn generations. It is in this light that the nexus between airports, tourism, economy, environment, and sustainability is shaped across sectors, including sustainable electricity supply to airports (Fordham et al., 2018; Lu et al., 2018; Yetano Roche, Verolme, Agbaegbu, Bennington, Fischedick, & Oladipo, 2020). It also reveals a convergence between TBL/SED and E-TPB and their fit for this study. Therefore, the following segments delineate different concepts, social, economic, and environmental or sustainable policies and practices, and organizations, as well as theories, constructs, and variables relevant to this study as deduced from extensive literature scrutiny.

2.2 Tourism, Economic Growth, Energy Consumption, and CO_2 Emission

Tourism is a critical component of economic growth in many countries worldwide. However, the nexus between tourism, economic growth, energy consumption, and CO2 emissions have raised concerns about the long-term sustainability of the industry, and it has been the subject of much research in recent years (Adedoyin & Bekun, 2020; Bamidele, Ozturk, Gyamfi, & Bekun, 2022; Bekun, Gyamfi, Bamidele, & Udemba, 2022; Brida, Cortes-Jimenez, & Pulina, 2016; Nguyen, Lobo, & Greenland, 2016). As earlier stated, tourism is one of the world's most dynamic and fastest-growing industries and has significantly contributed to global economic growth. According to the World Tourism Organization (UNWTO), international tourist arrivals reached 1.5 billion in 2019, generating over USD$1.5 trillion in global revenue.

However, the rapid growth of tourism has also led to concerns about its impact on the environment, particularly in terms of energy consumption and CO2 emissions. In recent years, policymakers and industry stakeholders have begun to explore ways to promote sustainable tourism practices that balance economic growth with environmental protection. This section, therefore, delineates the nexus.

First, the nexus between tourism and economic growth is multifaceted. Tourism creates jobs, generates revenue, and contributes to infrastructure development. According to the World Travel and Tourism Council (WTTC), the global travel and tourism industry contributed 10.4% to the global GDP. It supported over 319 million jobs in 2019 (WTTC, 2020). In addition, tourism has a multiplier effect on the

economy as it stimulates other sectors such as transportation, accommodation, food and beverage, and entertainment sectors.

Several studies have examined the relationship between tourism and economic growth, with most findings revealing a positive correlation between the two variables (Bekun et al., 2022; Ozpolat, Ozsoy, & Destek, 2021). For instance, Huang, Zhang, and Xu (2021) found that tourism can stimulate economic growth by creating employment opportunities, increasing foreign exchange earnings, and improving infrastructure. Similarly, Lei and Zhu (2016) argue that the positive relationship between tourism and economic growth is due to the multiplier effects that result from tourist spending, such as the increased demand for goods and services such as air travel and accommodation, including food and entertainment, especially at global destinations.

Similarly, Li, Wu, & Patwary (2022). highlights that tourism can stimulate economic growth through the multiplier effects of indirect and induced economic impacts. They argue that tourist spending leads to increased demand for local goods and services, which creates more employment opportunities and increases local income levels. For instance, a study by Huang and Lio (2017) found that tourism positively and significantly impacts economic growth in China. A study by Balaguer and Cantavella-Jorda (2002) also examined the impact of tourism on the Spanish economy and found that tourism had a positive effect on the country's economic growth. Moreover, tourism has been found to contribute to reducing poverty in developing countries and emerging economies such as Kenya, Egypt, Zimbabwe, Thailand, Brazil, and South Africa. (WTO, 2019).

Despite the positive impact of tourism on economic growth, there are also concerns about the adverse effects of tourism, such as overcrowding, environmental degradation, and cultural erosion. Studies suggest that the relationship between tourism and economic growth is dynamic. For example, Brida et al. (2018) argue that the relationship between tourism and economic growth is context-specific and varies depending on destination competitiveness, policy, and market demand.

Second, tourism is notorious as a highly energy-intensive industry that relies on energy for virtually everything in the value chain, from transportation to accommodation, dining to relaxation, and from entertainment to recreational activities (Gössling & Scott, 2007; Raihan, Muhtasim, Pavel, Faruk, & Rahman, 2022; Raihan, & Tuspekova, 2022). For instance, airports are critical infrastructural facilities that play significant roles in modern transportation systems. Hence, the increasing demand for air travel has led to a significant rise in the energy consumption of airport operations. Energy consumption in airport operations can be categorized into two main areas: airport building energy consumption, i.e., terminal buildings, and aircraft energy consumption. Airport buildings, for example, consume a significant amount of energy in various forms, such as heating, ventilation, air conditioning (HVAC), lighting, and other electrical appliances. HVAC systems consume the most energy, accounting for around 40% of the total energy consumption in airport buildings (Hendel et al., 2015). It is because airports require a high level of thermal comfort for passengers and staff, and the large, open spaces that characterize airport buildings pose a significant challenge to the efficient operation of HVAC systems. The energy consumption of airport ground operations is discussed broadly later in this report.

In the case of aircraft energy consumption, the energy consumed by aircraft operations at airports is primarily related to aircraft movement on the ground and during takeoff and landing. Ground support equipment (GSE) such as baggage carts, fuel trucks, and ground power units (GPU) consume significant energy. In addition, aircraft engines consume much fuel during takeoff and climb. According to Raza & Lin (2020), the energy consumption of aircraft on the ground is much higher than in the air. However, several measures can be taken to reduce energy consumption during ground operations.

Another example of an energy-intensive sector in the tourism industry is the hotel or accommodation sector. For instance, Gössling and Scott (2007) investigated energy use in the hotel industry in the UK. They found that energy consumption was strongly correlated with the level of service provided. In addition, they found that hotels that offer more luxury services tend to consume more energy. In addition, they found that luxury tourism had a much higher carbon footprint than budget tourism.

Consequent to the above, the rapid growth of tourism globally has led to an increase in energy consumption and CO_2 emissions, with the attending negative impact on the environment, even in developing countries (Adedoyin & Bekun, 2020; Nguyen et al., 2019; Zhang, & Liu, 2019).

Moreover, alongside the soaring global energy demand and consumption, as well as aviation growth, is the fallouts in the forms of the negative impact of CO2 and GHG emissions with its devastating effects on the global environment (Alba & Manana, 2016; Scott et al., 2014). For instance, it is reported that there has been a 50% increase in both energy consumption and CO2 emission in the last two decades, while according

to the forecast, the period of 2015-2040 will witness up to a one-third increase in global energy demand (Alba & Manana, 2016; Ozpolat et al., 2021; Tarkang et al., 2020).

Several investigations revealed causality and relationships between energy consumption and CO2 and GHG emissions and global warming and climate change. For instance, Ortega & Manana (2016) argued that energy consumption in some advanced economies soared in value from 20% to 40% in the last two decades to the period of study, with the transportation sector second only to the manufacturing sector (Alba & Manana, 2016). The assumption is supported by the assertions by other scholars that energy consumption and economic growth and development go hand in hand, and without the former, there cannot be the latter (Akorede et al., 2017; Edomah et al., 2016; Monsalud et al., 2015; Monyei et al., 2018; Ozpolat et al., 2021; Scott et al., 2010, 2012; Ssali et al., 2019).

Third, tourism significantly contributes to global carbon emissions due to massive energy consumption, accounting for approximately 8% of global greenhouse gas emissions (UNEP, 2018). According to the International Energy Agency (IEA), the global tourism industry was responsible for 5% of global CO2 emissions in 2019, with transportation being the most significant contributor (IEA, 2020). Thus, tourism's leading sources of carbon emissions include transportation, accommodation, and food and beverage. The carbon footprint of tourism varies depending on the type of tourism and mode of transportation, with air travel generally being the most carbon-intensive. However, another study by Gössling et al. (2012) examined the energy use in the cruise industry and found that the carbon footprint per passenger was much higher than that of air travel. In a previous investigation on the carbon footprint of tourism in the

Maldives, Gössling et al. (2011) found that transportation accounted for 90% of the carbon emissions.

To say tourism contributes significantly to greenhouse gas emissions, global warming, and climate change is an understatement. Several other studies have examined the relationship between tourism, energy consumption, and carbon emission. As a result, Adedoyin & Bekun (2020), as an example, discovered a unidirectional relationship flowing from tourism to carbon emission and energy consumption in many tourism-dependent Island nations and from the regional gross domestic product (RGDP) to energy consumption. Conversely, there is a bi-directional causal effect between tourism and urbanization. The obvious implication is that in countries that depend highly on tourism, the volume of tourist arrivals can be used to predict the effect of the relationship between CO2 emission, RGDP, and energy consumption, but it cannot be done the other way around, in other words, energy consumption rate cannot determine tourist arrival.

Another study by Scott et al. (2014) examined the carbon footprint of tourism in New Zealand and found that transportation accounted for 77% of the carbon emissions. Recent studies also align with the previous findings on the interaction between tourism and CO2. For example, Park, Kim, and Koo (2020) found that energy consumption in the tourism sector significantly affects CO2 emissions. Similarly, Çınar, Çakmak, and Sisik (2020) found that the tourism industry's CO2 emissions were positively related to the energy consumption levels in the industry. More recently, the COVID-19 pandemic has significantly impacted the tourism industry and its carbon footprint. During the pandemic, travel restrictions and lockdowns have dramatically decreased tourism activity, reducing industry carbon emissions (UNEP, 2021). Nevertheless, as

tourism gradually rebounded after the pandemic, there is currently no indication that the decrease in CO2 emissions will be sustained.

Scholars have also argued that a 1% increase in energy consumption often leads to a 49% increase in CO2 emission. Conversely, an increase of 1% in economic growth is said to automatically cause a 16% rise in CO2. However, a rise in economic growth squared by 1% could reduce carbon emissions by 46% (Hanif, 2018; Ssali et al., 2019; Zaidi & Saidi, 2018). Furthermore, empirical evidence suggests a direct correlation between energy usage in the tourism and aviation sectors and CO2 and GHG emissions. Thus, the impact and contribution to global warming are increasingly receiving attention in the literature (Adedoyin & Bekun, 2020; Balsalobre-Lorente & Leitão, 2020; Khan et al., 2020; Lee & Brahmasrene, 2016; McManners, 2016; Ozpolat et al., 2021; Qureshi et al., 2019; Shurrab et al., 2019; Tchanche, 2017).

Nonetheless, most of the above studies and others focused on developed nations; this is obvious in one of the studies in which all the 35 countries in the panel study are from Europe, the US, Australia, and Asia; the same is with (Ozpolat et al., 2021; Qureshi et al., 2019). Similarly, the extant literature on aviation revealed that attention is concentrated on airline and flight operations (McManners, 2016) and long-haul flights, particularly with their contributions to air pollution and climate change through their tremendous CO2. In contrast, stakeholders and researchers often need to pay more attention to airports' projects and ground operations, including Sub-Saharan Africa, as they focus on other aspects.

In order to reduce the carbon footprint of tourism, there have been efforts to promote sustainable tourism practices. For example, many destinations have implemented

policies to reduce carbon emissions, such as promoting public transportation, using renewable energy sources, and implementing carbon offsetting programs (Dolnicar & Grün, 2020). Some hotels are implementing energy-efficient measures such as using renewable energy sources, installing energy-efficient lighting, and reducing water consumption (Cho, 2016). In addition, eco-tourism has increased, emphasizing sustainable practices and environmental conservation (Gössling & Scott, 2021). For instance, some destinations have implemented policies to promote sustainable transportation, such as bike-sharing programs and electric vehicle charging stations (López-Mosquera et al., 2019).

Several studies have examined the potential for sustainable tourism to reduce carbon emissions. For instance, Neuts et al. (2020) studied the carbon footprint of tourism in Belgium. They found that a shift towards more sustainable forms of tourism, such as cycling and public transportation, could reduce carbon emissions by up to 40%. Similarly, Scherer et al. (2018) studied the potential for eco-tourism in the Brazilian Amazon. They found that sustainable tourism practices could significantly reduce carbon emissions while promoting conservation and local development.

Therefore, energy efficiency is an essential aspect of sustainable tourism practices as it helps to reduce the energy consumption and CO2 emissions associated with tourism activities. Several studies have examined the relationship between tourism and energy efficiency. For example, Li et al. (2021) found that tourism development positively impacts energy efficiency, as it stimulates technological innovation and increases the demand for energy-efficient products and services. Similarly, Sun et al. (2019) suggest that energy-efficient technologies can help reduce energy consumption and CO2 emissions in the tourism industry. They highlight that energy-efficient technologies

such as LED lighting, low-flow showerheads, and intelligent HVAC systems can significantly reduce energy consumption in hotels and other tourism facilities.

The relationship between tourism and carbon emissions is complex and influenced by various factors such as tourism activities, destination characteristics, and travel behaviors. However, there is growing recognition of the need for sustainable tourism practices to reduce the carbon footprint of tourism and promote environmental conservation and sustainability.

2.3 Airports' Sustainability, Energy Usage, and Environmental Impact

Following a meta-analysis study on airports and environmental sustainability, the authors opined that the impact of airport projects and operations on the environment is as significant enough as that of the airlines and, as such, requires careful investigation and analysis (Greer et al., 2020). It was discovered that 15% of the GHG emission in the San Francisco region attributed to aviation, in general, came from the San Francisco Airport energy consumption alone, excluding airlines or aircraft operations. Essentially, airports generally invest hugely in diesel-powered electricity generating sets as a backup against power outages to avoid disruption to smooth ground operations (Mannarisno, 2018).

The massive emission from airport operations, of course, is a substantial negative contribution to the average monthly level of CO2 on the planet, which has exceeded 410 parts per million (ppm) as of April 2018 (Screenath et al., 2019; Sukumaran Screenath et al., 2020; Sukumaran & Sudhakar, 2017, 2018). Other environmental impacts of airports as a result of the enormous energy consumption include the

emission of carbon monoxide (CO), nitrogen oxides (NOx), particulate matter (PM), and the generation of solid waste. Also, airport operational activities often lead to disruption of the natural ecosystems and depletion of water resources (Barret, 2020; Fordham et al., 2018; Greer et al., 2020; Lu et al., 2018).

Congruence to the above, decision-makers and airport management need to develop sustainability plans that encompass standardized empirical metrics to keep track of progress toward achieving the set goals in such plans. This plan is crucial and in line with the concept of EONS earlier mentioned, as described by aviation industry experts, notably the Airports Council International (ACI) (Greer et al., 2020). Various measures can be implemented to reduce the energy consumption of airport operations. These measures can be divided into building, operational, and aircraft. Building measures focus on reducing the energy consumption of airport buildings. The reduction can be achieved through energy-efficient HVAC systems, high-efficiency lighting, and renewable energy sources such as solar panels and wind turbines (Baxter, 2018; Sreenath et al., 2021).

Operational measures focus on reducing airport operations' energy consumption by optimizing resource use (Baxter, 2018; Sigler et al., 2021). The measure is achievable by optimizing ground operations, such as reducing the time aircraft spend on the ground and using more efficient GSE and GPU. Aircraft Measures focus on reducing the energy consumption of aircraft during takeoff and landing. The aircraft measures can is achievable through the use of lightweight materials, more efficient engines, and the use of electric or hybrid-electric propulsion systems (Baxter, 2021; Lee, 2010; Raza & Lin et al., 2020; Sigler et al., 2021).

Moreover, according to San Francisco International Airport (SFO) framework, which is alluded to by other studies, there are five groups of "sustainability indicators for airports," which stakeholders can explore to identify relevant environmental impacts they intend to focus on and address at a time. These sustainable indicators are grouped as energy and atmosphere, comfort and health, water and wastewater, site and habitat, and materials and resources (Baltazar et al., 2018; Chao et al., 2017; Greer et al., 2020; Kilkiş & Kilkiş, 2016; Kimmet Mphil, 2009; Kucukvar et al., 2021). In this current study, the author directs the searchlight on the first two; vis-à-vis energy and atmosphere, i.e., RE solar PV, and comfort and health, i.e., passengers' airport experience in the terminal buildings in terms of the eco-design of the terminal buildings with all that it represents in making the environment naturally welcoming, comfortable and appealing.

Concerning sustainability indicators in "energy and atmosphere," findings revealed that energy consumption in most airports relates to intensive heating, ventilation, and air conditioning (HVAC), including the crucial aspect of light within terminal buildings. The most common energy management practices include; having an "energy monitoring system," using energy-efficient HVAC equipment and lighting, and installation of on-site renewable energy (Alba & Manana, 2016; Lau et al., 2010; Martin-Nagle, & Klauber, 2015; Ortega et al., 2017). However, the type of energy management technique deployed by an airport is contextual and dependent on variables including climate, type/size of the airport, operating hours, and occupancy level (Malik, 2017).

Another indicator of sustainability practices in an airport is the adoption of on-site micro-grid renewable energy generation for efficient and constant electricity supply.

While alluding to this, Barrett et al. (2014) indicated that safety concerns must be carefully analyzed when deciding on some forms of renewable energy, particularly solar PV and wind turbines. Regarding glare and radar interference from these RE installations within the airport environment, Sreenath, Sudhakar, & Yusop (2020) supported this narrative by adding additional concern about airspace penetration.

Nonetheless, from practical experience perspectives based on personal knowledge and little experience of solar PV technology and diffusion, the concern is much more relevant and justifiable to wind turbines for their extraordinary heights with few exceptions. This assumption is supported by findings by Anurag et al. (2017), which emphasize proper siting as the paramount consideration to avoid glare issues in solar PV, consistent with Sreenath et al. (2020).

Solar PV installation must be sited far away from the radar and the control tower, in line with the requirement, to avoid electromagnetic wave interference (Alba & Manana, 2016). Therefore, the "landside" is the most suitable location for siting RE installations in an airport. Hence, the need for the development of policies such as in the US context, the "FAA solar policy and the Solar Glare Hazard Analysis Tool (SGHAT)" (Barrett, 2020), which simultaneously integrates, aviation policy with those of RE, environment, and sustainability.

Simultaneously, one of the metrics to determine the efficacy of on-site RE, including solar PV systems, is the "percentage of the energy demand of the airport met by the solar PV installation" (Dehkordi et al., 2019), as well as the "exergy" which relates to the "quality" of the energy delivered by the on-site RE system (Tchanche, 2019; Kilkiş & Kilkiş, 2016; Sukumaran & Sudhakar, 2018). Another metric that can be used to

evaluate environmental impacts from the installation and the use of RE at airports is the absolute reduction of fossil fuel consumption, which is applied to evaluate solar PV and battery storage projects.

2.4 Airport-Based Renewable Energy (Solar Pv) Concepts and Cases

Renewable energy has become a crucial aspect of modern airports as they strive to reduce their carbon footprint and increase sustainability while reducing reliance on fossil fuels (Baxter, 2018; Sreenath et al., 2021). As earlier noted, airports are energy-intensive facilities that consume significant energy from the national grid. However, this can be mitigated by adopting renewable energy technologies such as solar PV, wind turbines, and biomass. This section discusses the various airport-based renewable energy concepts and explores some cases of airports implementing renewable energy technologies.

Solar photovoltaic (PV) systems are among the most common renewable energy technologies airports adopt worldwide. Solar PV systems convert sunlight into direct current (DC) electricity. The direct current is then converted to alternating current (AC) electricity for airport buildings and infrastructure use. Using solar PV systems at airports can reduce the dependence on fossil fuels, lower electricity bills, and reduce carbon emissions. Hence, there is a recent surge of interest in airport solar photovoltaics (PVs). The surge is partly driven by the rising need for energy security, reducing the financial burden of energy costs, and partly to show commitment to reducing and mitigating the environmental impact of airport operations and energy consumption. Simultaneously, studies investigating the application of Solar PVs in the airport environment in increasing literature (A Focus on the Production of renewable energy at the Airport Site, 2020; International et al. Organization (ICAO), 2017;

Sukumaran Sreenath et al., 2020). (Barrett, 2020; Sreenath, Sudhakar, & Yusop, 2020). Nonetheless, other types of RE technology that can be considered and have been adopted somehow by airports are wind, bioenergy/biomass, fuel cell, geothermal, and solar thermal (Barrett, 2020).

Essentially, the ultimate aim of most airport operators in adopting RE is to achieve a “net-zero carbon” level; this is particularly true for airports in the US (Barrett, 2020; Barrett, 2019; Fordham et al., 2018; Lee & Brahmasrene, 2016). This opinion is alluded to by the argument that the significant factors motivating RE diffusion in airports are reliability, resilience, sustainability, and affordability (Mannarino, 2018). However, reaching such an ambitious goal takes concerted efforts, strategic planning, and commitment to a systematic procedure.

First, the suggestion is to exploit every opportunity to reduce energy consumption through energy conservation and efficiency practices, beginning with establishing an adequate “energy monitoring system” (EMS). Second, this should be followed through with a deliberate effort to shift to low-emission energy sources, i.e., RE, and gradually escalate to “carbon offset” via a complete transition of the airports’ energy supply from fossil sources to renewables (Barrett, 2020; Alba & Manana, 2016). Interestingly, several airports across different regions have already implemented and benefitted from the vast potential of renewable energy technology. Virtually all major airports in the US have incorporated RE into the energy mix of the airport’s operation (Barrett, 2020).

The "only airport" in the world to date that is operating exclusively based on a "net-zero emission" system is Seymour Airport in Ecuador. It is otherwise known as "Galapagos Ecological Airport." The airport derived 35% of its energy needs from

solar PV. In comparison, the remaining 65% is supplied by three wind turbine generators (WTGs) which also serve parts of the Island where the airport is located (ICAO, 2017). However, according to Sukumaran & Sudhakar (2017), Cochin International Airport in India is also a fully solar-powered airport with a 12 MWp solar PV system installed in 2015, making it the world's first fully solar-powered airport; but why it did not make it to the ICAO list as at the time of this report is beyond the scope of this investigation. Below are other empirical examples of on-site RE technology, including solar PV in airports in different regions worldwide.

Notably, the largest airport-based solar PV project comprises 55MW of direct current linked to a grid system. It is privately operated at Tallahassee International Airport in Tallahassee, Florida, USA. It started operation in January 2020 (Barrett, 2020). Similarly, the most extensive geothermal RE technology was constructed in 2016 and operated at Nashville International Airport, Tennessee, also in the United States. In the UK, there is a biomass-fired combined heat and power (CHP) plant at London Heathrow Airport for the heating needs of terminal buildings (Tagliaferri et al., 2018). Changi Airport, Singapore Changi Airport in Singapore has adopted several renewable energy technologies, including a 2.5 MWp solar PV system, which generates approximately 3.5 GWh of electricity per year, and a 9 MWp installation of a solar PV system on the roof of Terminal 1 (Barret, 2020; ICAO, 2017). The airport has also installed a 2 MWp hybrid solar PV and energy storage system, which provides backup power during grid outages.

Another renewable energy technology used for electricity generation at airports is wind turbine generators (WTG). Wind turbines generate electricity by harnessing the power of the wind to rotate turbine blades, which drive a generator that produces

electricity. Using wind turbines at airports can reduce carbon emissions and lower electricity bills but requires adequate wind resources. For example, Amsterdam Schiphol Airport in the Netherlands installed six wind turbines in 2015, which generate approximately 11 GWh of electricity per year (Zheng et al., 2021). Other airports where WTG RE technology has been deployed include; a 125-foot-tall wind turbine generator (WTG) located adjacent to the terminal building at Burlington International Airport in Vermont, the USA, for electricity generation to supplement power at the airport (Barrett, 2020).

Another WTG technology, according to ICAO (2017), is at the East Midlands Airport, UK, operated by the Manchester Airports Group (MAG), and consists of two 45meters high WTGs (the tallest in the world on airport land). As such, the reduction in CO2 emission at the East Midlands airport is estimated to be approximately 300,000 metric tons of CO2 emissions annually, while the biomass-fired HVAC system for heating and cooling the terminals also cuts another 280 metric tons of carbon dioxide yearly (ICAO, 2017).

Similarly, geothermal heat pump (GHP)/biofuel is another RE technology in operation at Stockholm-Arlanda Airport in Sweden. There is also a biomass fuel storage and boiler at Yellowknife Airport, Canada, an 11.6MW combined solar PV and WTGs system at Kansai International Airport in Osaka, Japan, and a 226KW solar PV system at Palau International Airport, a small Island country on the Pacific among others. Biomass is a renewable energy technology that uses organic matter such as wood chips, sawdust, or agricultural waste to produce heat, steam, or electricity. Using biomass at airports can also reduce dependence on fossil fuels, lower carbon emissions, and reduce waste disposal costs. For example, the Helsinki Airport in Finland uses a

biomass-fired heating and cooling system that uses wood chips sourced from local forests to provide heat and hot water to the airport buildings (Hyysalo et al., 2020).

Furthermore, Oslo Airport in Norway has also implemented an 11 MWp solar PV system, which generates approximately 10 GWh of electricity per year (Baxter, 2021). Nevertheless, the airport has also installed a geothermal heating and cooling system, which provides heating and cooling to the buildings by extracting heat from the ground. In addition, Denver International Airport in the USA has implemented a 12.4 MW solar PV system, which generates approximately 20% of the airport's electricity needs (Baxter, 2021). In addition, the airport has also implemented a biomass gasification plant, which converts woody biomass waste into a synthetic gas used to generate electricity and heat.

In Africa, the first airport to implement an on-site RE system was the George Airport in South Africa back in 2015, costing a little over USD$1 million and with an installed capacity of 750KW to supply 41% of the airport's electricity needs (ICAO, 2017). In Malawi, Kamzu International Airport is another example of SSA: an 830-kW grid-connected solar PV system (Banda et al., 2019). Another one on African soil is a 281-kW solar farm at Moshoeshoe I International Airport, Lesotho (Mpholo et al., 2015).

2.5 Overview of The Nigerian Aviation, Tourism, Energy, Environment/Climate Change Policies

In the area of policy integration across sectors, as earlier described, a clear example is in the US with the “FAA solar policy and the Solar Glare Hazard Analysis Tool (SGHAT)” (Barrett, 2020). The US is a typical and ideal example of the integration of

aviation policy with those of RE, environment, and sustainability, which also have a direct bearing on tourism policy, one of the main justifications for this particular study.

2.5.1 Nigerian Civil Aviation Regulations (Nig. CARs)

Regarding aviation policy in Nigeria, the Nigeria Civil Aviation Authority (NCAA) is the regulator and custodian of aviation policy development and regulation. The body also oversees the aviation policy implementation by other aviation agencies in the country. NCAA's policies and regulations are compatible and in strict compliance with all specified guidelines, standards, procedures, and practices, otherwise known as standard and recommended procedures (SARPs).

All these areas are enshrined in the various "Annexes" of the Chicago Convention by the United Nations' specialized global aviation regulatory body, the International Civil Aviation Organization (ICAO), which are also conformed to by International Air Transport Association (IATA) and Airport Council International (ACI)). The general policy is contained in Part 1 of the 20 Parts (Nig. CARs) 2015 main document.

For this study, Part 16 on environmental protection, Part 18, air transport economic regulations, which includes airport services, and Part 19, which concerns consumer protection, are relevant to and are within the scope of this investigation. It is, however, pertinent to clarify that most of the document's provisions, requirements, and procedures focused directly and specifically on the technical and training requirements of aircraft and airline operators and personnel and indirectly on airport operations.

Hence, this section starts with Part 16-environment, corresponding with ICAO Annex 16 on the environment. It spelled out the strict standard, rules, conditions, limits compliance certification, processes, and procedures for checking and taking

precautionary measures against all sorts of environmental pollutions/pollutants, either liquid and gaseous emissions, i.e., fuel spill, hydrocarbons, GHGs, and also noise, particles/or particulate matters. The emphasis is on all emissions and pollution from aircraft and flight operations, i.e., fuels and fueling aircraft and other ground operations by airlines.

However, the environmental protection oversight and inspections that pertains to passenger facilitation and services, operation and maintenance of ground services equipment (GSEs), terminals/buildings, airside and landside facilities, installations, and other operational equipment in general; that are exclusively carried out by airport operators and managers (in this case FAAN) in all airports are covered by the directorate of aerodromes and airspace standards (DAAS) of NCAA according to the website of the organization.

The above includes issues of emissions and pollution controls, and fire and safety standards, among others. Related to energy and electricity usage within the airports, though available documents for this investigation did not detail these. However, reference is made to the functions of DAAS, which include “Notifying ICAO of differences between national regulations and SARPs as contained in ICAO Annexes 2, 3, 4, 5, 9, 10, 11, 12, 14, 15, 16, and 18” (NCAA, 2020). Meanwhile, according to recent findings, the policies and regulations by NCAA are comprehensive enough and reflect good domestication of relevant international instruments, such as the Chicago Convention, to guide the industry in Nigeria and manage any challenges that may arise (Umezurike & Ganiyu, 2020).

Meanwhile, one primary recommendation by Umezurike & Ganiyu (2020) is that the organization should be given full operational and financial autonomy to effectively and efficiently discharge its responsibilities. The author here aligns with this opinion and thus assumes that the documents that contain the required provisions are most likely available somewhere in hard copy in the agency's custody. However, it is safe to keep and away from the public. Thus, the document may need to be more readily available online, going to the poor website administration familiar with websites of Nigerian government institutions, which often manifests in scanty or outright non-availability of relevant information and documents. However, as the study progresses, the researcher hopes to access more relevant information on the environmental protection aspect focusing on airport operations.

2.5.2 The Nigerian Tourism, Environmental Protection, and Energy Policies

Nigeria has enormous natural, rich cultural, and historical tourism potentials and products, but the tourism sector is still evolving. Meanwhile, extant literature abounds on empirical evidence of tourism as a sustainable economic development pathway for countries across world regions. Developing economies, in particular, have seen the transformative impact of tourism as a strategy to boost national GDP while improving the local economy in some other places (Bassey, 2015; Oloidi, 2020).

Hence, Nigeria also tried to position itself to tap from these benefits by including tourism in the national economic plan since the early 90s to diversify and transform its oil-dependent mono-economy using sustainable tourism planning and development models (Bassey, 2015). A sequel to that was the formulation of the country's National Tourism Policy in 1990, and the Nigeria Tourism Development Corporation (NTDC) was established in 1992 to fast-track tourism development in the country. Tourism Development Master Plan also began in 2005 to advance the process progressively and

sustainably (Bassey, 2015). See appendix E: Federal Airports Authority of Nigeria (FAAN), International Arrival, Energy consumption/Conservation Data, and for details on the rest of this section.

2.6 Theoretical Framework

2.6.1 Theory of Planned Behavior (TPB)

The theory of planned behavior (TPB) was propounded in 1985 by Icek Ajzen (Asih et al., 2020; Garay et al., 2019; Paul et al., 2016; Yadav & Pathak, 2017) with three main factors that influence behavioral intentions; behavioral beliefs, normative beliefs, and control beliefs. The primary assumption is that the fundamental predictors of an individual's behavioral intention include; attitude, subjective norms, and perceived behavioral control, all are a function of the three beliefs listed above. It follows that the behavioral intention of an individual or group is determined not only by self-will but also by making some rational choices (Garay et al., 2019; Paul et al., 2016).

Tracing the trajectory of TPB further, it is discovered that TPB is an extended version of the theory of reasoned action (TRA) as proposed by Fishbein and Ajzen (1975) with the primary assumption that; people naturally have control over their behavior (Armitage & Conner, 2001; Han et al., 2010; Paul et al., 2016) presumably with the capacity to apply their sense of reasoning and judgment to create an intention. However, the explanatory and predictive power of TRA to convincingly expand knowledge on individuals' behavioral intention was later identified to be limited to basic behaviors within an individual's volitional control (Armitage & Conner, 2001). Hence, the rationale for TPB with the expanded ability to explain and predict determinants of individuals' non-volitional behaviors.

Ajzen (1985) modified and expanded TRA by introducing the 'control belief' (perceived behavioral control) dimension into the model to develop TPB as an alternative and accurate prediction of people's behavioral intention as elucidated above (Asih et al., 2020; Garay et al., 2019; Yadav & Pathak, 2017). Essentially, TPB suggests that non-volitional factors such as resources, policies, and group action/processes/procedure is contributory factors and determinants of individuals' behavior (Asih et al., 2020; Garay et al., 2019; Paul et al., 2016; Yadav & Pathak, 2017). This narrative fits into the assumption that certain constraints beyond individuals' control might account for how and why people behave in the manner they do in any given context.

Suffice, 'attitude' has been described as a positive or negative belief and outcome evaluation of consequences of engaging in any target behavior by an individual. Subjective norms relate to individuals' belief and judgment of the societal pressure and expectations on them toward a particular behavior. At the same time, perceived behavioral control explains the perception of people on how easy or difficult it is for them to engage in a target behavior (Yadav & Pathak, 2017). Collectively, the three factors and the fundamental beliefs are predictors of individuals' 'intention' and, eventually, their behavior.

Studies abound, indicating that TPB has been used extensively (Armitage & Conner, 2001) in different arrays of disciplines, especially consumer behavior, tourism management research, and, lately, environmental psychology. Researchers have been deploying TPB to explain and predict individuals' human behavioral intention for decades, which affirmed the suitability of TPB to explain the fact that attitude,

subjective norms, and perceived behavioral control influence individuals' intention and behavior under varied circumstances (Garay et al., 2019; Yadav & Pathak, 2017).

For instance, in a study on customers' intention to stay in green hotels, TPB was found to have better explanatory and predictive capacity than TRA. It delineates how attitude, subjective norms, and perceived behavioral control influence customers' intention in choosing and staying in green hotels (Han et al., 2010). Price or the room rate compared to the non-green hotel. Available resources in the individual's pocket are some variables. In this case, individuals can perceive and believe as a determinant of the choices or options they have to consider and influence the decision to stay in a green hotel.

In another empirical research in India, Yadav and Pathak (2017) reaffirm that TPB has a good fit in determining customers' intention to purchase green products and, eventually, their green purchase behavior. As argued above, other factors, such as affordability, perceived benefit, and alternative options to the same product, could be a predictive variable to choose from and contribute to how individual Indians behave when it comes to the intention to purchase green products.

Similarly, and still in tourism industry research in Hong Kong, TPB was confirmed to suitably determine and explain the intention of tourists to go on cruise tours (Wu et al., 2018). Customers' subjective personal feelings and experiences, which directly link to the subjective norm element of TPB, were found to be a determinant of intention to consume cruise service. Wu and fellow researchers reiterated the fact that the experiences of customers during the tour are closely related to service quality and

significantly contribute to the intention and behavior of tourists to consume the cruise service again and to recommend it to others in their review (Wu et al., 2018).

The above instances of application of TPB with the findings are consistent with and closely linked to the assumption that the feelings invoked by the eco-design of airport buildings in airport users, their experiences during their stay inside terminal buildings, and their overall green experience at the airport are all determining factors of airport users' eco-friendly behavior. This assumption is further connected to their biospheric value. It is likely to determine their perception of the green performance of the airport in question, hence the motivation to probe this using TPB but focusing on the extended version.

Suffice it; the evidence is growing in the literature on the need and shift towards extending and also breaking down TPB by incorporating additional determinants that are context specific to strengthen its application and to expand its explanatory capability (Chen & Hung, 2016; Garay et al., 2019; Paul et al., 2016; Yadav & Pathak, 2017). These other variables or determinants earlier suggested can be categorized in environmental context to include; environmental consciousness, environmental ethics and belief, and social impression (Chen & Hung, 2016; Han et al., 2010).

2.6.1.1 Extended Theory of Planned Behavior (E-TPB)

The extended theory of planned behavior, 'E-TPB' (Chen & Hung, 2016; Paul et al., 2016; Yadav & Pathak, 2017), is in response to calls in previous studies for additional indicators to expand the explanatory potentials of TPB. For example, a meta-analysis of 185 studies on behavior and intention concludes that TPB needs further expansion to strengthen the predictive capacity and deepen our understanding of individuals' intentions and behavior (Armitage & Conner, 2001). Hence the infusion of social

impression (SI), environmental consciousness (EC), and environmental ethics and belief (EEB) into the TPB's predictive factors (Chen & Hung, 2016) in specific contexts of environmental psychology research and other relevant fields. Chen and Hung suggest that SI, EC, and EEB play a significant role in pro-environmental behaviors by individuals.

In another instance, Yadav & Pathak (2017) on their part, included two other factors of perceived value and willingness to pay a premium into the primary factors in TPB assumptions. Perceived value, according to the definition by Zeithmal (1988) in Yadav & Pathak (2017), speaks to an 'individual's overall assessment of the utility of a product based on the perception of what is received as against what is given.' Whereas willingness to pay, on the other hand, elucidates the fact that individuals with respect for the conservation of the environment, who also favors the environment more than life convenience, are more willing to pay higher prices for green products and services, unlike individuals with the opposite those values (Yadav & Pathak, 2017).

The link between this and the current study is that the application of E-TPB with the inclusion of the environmental-related variables (SI, EC, and EEB) into TPB corresponds with the immediate environment and sustainability-centered constructs that are being investigated in this research, i.e., eco-design of airport buildings (EAB), biospheric value (BV), green management intransigence (GMI), green airport reputation (GAR) and perceived green performance (PGP).

In line with extended TPB, Paul et al. (2016) added 'environmental concern' into the variables while demonstrating and validating the extension of TPB. Findings from the study reiterated the increased predictive capacity of E-TPB to strengthen its

explanation of determinants of an individual's green purchase behavioral intention, which has a better fit than TPB and TRA (Paul et al., 2016). In Catalonia, Spain, (Garay et al., 2019) introduced second-order variables, i.e., pro-technology and cognitive attitude, to individuals' three significant predictors of behavioral intention. Their findings and analysis of sustainability-oriented innovation corroborated the superior explanatory capacity of decomposed/extended TPB in forecasting motivating factors for managers to engage in sustainability innovative practices in their accommodation businesses compared to the standard TPB or TRA.

Congruence to the above, it can be argued that the decision to engage in responsible and pro-environmental behavior and practices such as eco-design of airport buildings, energy conservation, appreciation and protection of natural and green spaces, recycling, among others, is often and first of all a function of the cognitive and psychographic disposition of management. They primarily base their attitude on acquiring more knowledge and relevant technological innovations in their industry. Normative pressure from societal expectations and the perceived ease or difficulty of engaging in the behavior, which is also determined by individuals' belief control relating to factors beyond their control (such as resources, government policies, income level, or purchase capacity), add to this.

Furthermore, Shurrab, Hussain, & Khan (2019), while investigating green and sustainability practices in the construction industry, the authors applied TPB to make assumptions about customer awareness and behavior concerning green construction in the construction industry. Consistently, other scholars have applied the same theory about environmental psychology to delineate customers' environmental behavior. Conversely, based on the same TPB, findings suggest customers' pro-environmental

behavior also influences organizations' decisions to adopt environmental-friendly behavior and practices. At the same time, Stern (2005) and Koger & Winter (2010) discovered that positive normative belief is responsible for environmentally friendly behavior and actions in many individuals.

In environmental activism (Fielding et al., 2008), the authors added to TPB the identity constructs of environmental group membership and self-identity as an environmental activist. Findings revealed that greater membership involvement, a stronger sense of self-identity as an environmental activist, and a positive attitude and solid normative belief towards the environment are strong predictors of intention to participate in activism.

In the energy sector, energy conservation behavior (Clement et al., 2014) problem awareness variables, i.e., knowledge and beliefs about global warming and environmental concern, were added to TPB's main variables to extend its predictability of four energy conservation behaviors. The results indirectly impact energy conservation behaviors through TPB, while TPB's main variables mediate the added awareness variables. All these outcomes are consistent with previous studies to suggest that adding other context-specific constructs to TPB often produced better and more accurate predictions. Essentially, this example resonates with the current study's constructs and supports and motivates the decision to premise this current study on E-TPB.

From the eco-friendly restaurants' perspective (Kim et al., 2013) emotional construct of 'anticipated regret' was incorporated to augment TPB in predicting the impact of emotion on customers' behavior in choosing eco-friendly restaurants. The findings

also support and provide justification and evidence for extending TPB. Other studies with TPB or its extended form as the theoretical foundation includes; green purchasing behavior (Chen & Hung, 2016; Paul et al., 2016; Synodinos & Bevan-Dye, 2014; Yadav & Pathak, 2017), green hotel choice (Han et al., 2010), airline ticket purchase intention (Tarkang et al., 2020) and recycling behavior (Asih et al., 2020; Chan & Bishop, 2013) among others.

Summarily, other environmental context-specific factors that can be added to the TPB to create the E-TPB model to provide a more comprehensive understanding of the predictors of environmentally-friendly behavior among individuals or groups include the following;

-Environmental Attitudes: Attitudes toward the environment can significantly predict environmentally-friendly behavior. People with a more positive attitude towards the environment are likelier to engage in pro-environmental behaviors.

-Environmental Awareness: Environmental awareness or knowledge can influence environmentally-friendly behavior. People more aware or knowledgeable about environmental issues are more likely to engage in pro-environmental behaviors.

-Environmental Values: Environmental values refer to an individual's beliefs and attitudes toward the environment. People who value the environment more are likelier to engage in pro-environmental behaviors.

-Perceived Behavioral Control: Perceived behavioral control refers to an individual's perception of their ability to perform the behavior. In environmental behavior, perceived behavioral control can refer to the individual's perception of their ability to

carry out environmentally-friendly actions such as recycling or reducing energy consumption.

-Environmental Norms: Environmental norms refer to the perceived social pressure to perform or not perform pro-environmental behaviors. Social norms can be a significant predictor of environmentally-friendly behavior as people tend to conform to the behaviors of those around them.

-Environmental Identity: Environmental identity refers to an individual's sense of self relating to the environment. People strongly identifying with environmentalism are more likely to engage in pro-environmental behaviors.

The Theory of Planned Behavior (TPB) and the Extended Theory of Planned Behavior (E-TPB) are models that explain and predict human behavior based on an individual's attitudes, beliefs, and intentions. Therefore, the difference between the two is in the additional context-specific predictors in E-TPB, as explained above. Thus, the E-TPB is more suitable for the current study because it provides a more comprehensive and nuanced understanding of the factors influencing behavior.

Congruence to the above, the point of departure for this study theoretically is the extended theory of planned behavior (E-TPB). The theory is relevant to this study since all the constructs in this current investigation are considered ‘planned behavior’ influenced by antecedents elaborated in the main TPB but strengthened by extending it with some of the earlier discussed environmental context-specific factors. In the last segments, the author adopts E-TPB and the theory in the next section to explain and

link the different constructs and variables in this study and postulate some hypotheses this investigation tried to validate.

2.6.2 Triple Bottom Line Theory/Sustainable Economic Development Theory (TBL/SED)

John Elkington formulated the triple-bottom-line (TBL) in the 1990s (Hammer & Pivo, 2017). TBL or SED theory state that as ‘’programs, policies, or activities designed to create or retain jobs and wealth in ways that contribute to environmental, social, and economic well-being over time’’ (Hammer & Pivo, 2017; Hopwood et al., 2005; Shi et al., 2019). Interestingly, studies revealed that one key priority of the proponents of the extended theory of perceived behavior delineated above is to achieve and sustain the principle of the triple bottom line as enshrined in the sustainable development agenda, leading to the theorization of TBL/SED theory (Paul et al., 2016).

Essentially, TBL/SED advocates that individuals, institutions, and policy-makers should factor in the long-term implications of any and every development activity and project at all levels from the perspectives of three key indicators; social, economic, and environmental effects, impact or contributions to human and ecological well-being (Hammer & Pivo, 2017).

However, an extensive review of extant literature reveals that TBL and SED theoretical concepts either need to be better understood or adequately applied to decision-making by organizations. This cut across theory and practice, i.e., in different academic fields and industries such as economics and tourism. This situation is the reality despite TBL/SED being an indispensable guide to sustainable development practices as envisioned and endorsed by global, national, and local political and

economic actors and institutions (Hammer & Pivo, 2017; Hopwood et al., 2005; Shakir et al., 2019; Shi et al., 2019).

Similarly, there needs to be more clarity about intra-generational and inter-generational justice, which heightens the debate between solid and weak sustainable development paths in theory and practice (Shi et al., 2019). The focal point of sustainable development is to ensure prudent and equitable use of natural resources to meet the present needs of today's generation without compromising the same opportunity for future generations to come and enjoy the same resources to meet their needs.

A very typical example is 'green building' practices, which contribute to the environmental aspect of the bottom line by conserving energy and reducing dangerous emissions of C02 and greenhouse gas (GHG) emissions., Simultaneously, the same green building practices will also contribute to the social dimension of the bottom line by reducing the devastating health implications of pollution while concerning the economic bottom line of the equation, there will be a significant reduction in operating costs among other benefits (Hammer & Pivo, 2017).

In essence, TBL/SED theory highlights the environmental dimension of the three focal points of sustainable development theory (SD), i.e., economic, social, and environmental pillars, and also emphasizes the need for environmental policy integration in every sector (Jordan & Lenschow, 2010; Lafferty & Hovden, 2003; Nilsson & Persson, 2003; Persson, 2004). According to Shi et al. (2019), capital can be classified into four categories, i.e., human, natural, manufactured, and social capital. These are pivotal and fundamental but require synergy among these four variables for

any meaningful economic development to occur ‘sustainably’ across sectors, energy, tourism, and airport inclusive.

Consequently, and as earlier noted, the above line of thought perfectly aligns with the sustainable development practices that focus on; economic viability, operational efficiency, natural resource conservation, and social responsibility (EONS). The approach is premised on TBL/SED theory. However, according to Airport Council International (ACI) (Martin-Nagle & Klauber, 2015; Prather, 2016), it includes the fourth pillar, ' ' operational efficiency.' Thus, the motivation to adopt this two-in-one theory to support the E-TPB as the theoretical foundation for this study is informed by the above narrative and the need to contribute to the emerging debate on sustainable practices and green performance in the context of airports.

2.7 Hypotheses Development

2.7.1 Eco-Design of Airport Buildings and Perceived Green Performance

Essentially, environmentally friendly or green design is called eco-design or ecological design. It is an approach to product or process designing that considers, from the onset, the impacts of a product or process throughout its whole life cycle on the environment, which also apply to airport buildings (Al Sarrah et al., 2020; Ferrulli, 2016a; Han et al., 2020; ICAO, 2019; Rau et al., 2021). Thus, eco-design of airport buildings refers to the ‘greening’ and eco-people-friendliness of shape, facilities, material, ambiance, green décor, and green spaces of airport buildings. It stimulates and contributes to stakeholders’ emotional and cognitive evaluation and perception of the green performance of an airport and promotes pro-environmental (Han et al., 2020).

Meanwhile, there is a growing awareness and concern by the general public, consumers, manufacturers, and even institutions at various levels about the environmental challenges of climate change and global warming, among others. This awareness is currently receiving attention in the literature alongside the need for more sustainable paths to doing business and producing goods and services (Lee et al., 2010; Naim et al., 2017; Rau et al., 2021). (Doszhanov, & Ahmad, 2015; Sky, 2018). It is consistent with the earlier findings and assumption by Hopwood, Mellor, & O'Brien (2005) that challenges of environment and equity will eventually force sustainable development issues to the top burner in political agenda at all levels.

The evidence further suggests a corresponding escalation in attitudinal change and behavioral shift towards patronizing, consuming, and appreciating green products and performance in various institutions and companies. It is, however, manifesting under different terms and tags such as natural, responsible, organic, and holistic rather than green (Bieak & Joseph-Mathews, 2009). Consequently, the eco-design of airport buildings is one of the several pointers to green performance at airports. It highlights the shift towards green practices and implicitly reflects the implementation of environmental policy integration into the aviation sector and, by implication, the tourism sector.

Fundamentally, International Civil Aviation Organization (ICAO) is responsible for giving guidance on specific standard materials for all airport buildings and structures across the globe as contained in various manuals that specifically focus on safety and functionality (ICAO, 2020). However, initial scrutiny of the websites of ICAO and Nigeria’s aviation regulatory body, NCAA, suggests little information is available in the public domain when it comes to ecological design or environmental aspects of

airport buildings, except for the environmental impact of aircraft and flights that centers on oil leakages and air pollution (ICAO Annex 16).

Nevertheless, in recent findings, the 'Eco Airport Toolkit,' an e-publication by ICAO, detailed several critical environmental factors that must be considered, particularly in the design of terminal buildings. The manual focused on construction material, operational functionality, green management, and maintenance throughout the lifespan of such buildings (ICAO, 2019; ICAO, 2017).

The main target is environmental protection and human health and satisfaction, using environment-friendly material and physical or structural components such as transparent glass external walls and roofs (Bieak & Joseph-Mathews, 2009; Kimmet Mphil, 2009). The glass wall, for instance, is for energy conservation and efficiency by allowing natural light from the sun to penetrate through the glass walls into the building during the day, and apparently for warmth during colder seasons, thereby reducing energy consumption from lighting, heating, and cooling depending on regional context.

A green roof is another typical example and component of the ecological design of buildings that can be included in the eco-design of airport buildings. Conversely to glass walls, 'green roofs' is a green practice in which green plants are planted on large roof areas to absorb direct heat from the sun, thereby reducing heat inside the building. This feature makes it more suitable for airports in the tropics but also beneficial during summer in temperate regions where ironically, the adoption is extensive(Getter & Rowe, 2006; Grant & Lane, 2006; Jim & Tsang, 2011; Niu et al., 2010; Spolek, 2008; Zhang et al., 2012).

Other features of airport buildings that are eco-friendly in their design include; green rest areas, green interior, and external decors, waste sorting disposal system for ease of recycling, use of energy conservation and efficiency products, and particularly the use of renewable energy generation for electricity to the buildings (Ferrulli, 2016; Han et al., 2020; Rau et al., 2021; Sreenath et al., 2019).

Moreover, the adoption of renewable energy (RE) technology micro-grids for airports, i.e., solar PV canopies and solar panel rooftops, are easily noticeable on airport buildings or canopy walkways or parking, thereby generating impressive emotional and psychological feelings of satisfaction of an eco-friendly atmosphere in the minds of airport users. All the above directly and indirectly portend how the airport is performing in terms of environmental and sustainable practices and profoundly contribute to customers' perception of the green performance of the airport. It, however, depends on the biospheric value of individual stakeholders, i.e., passengers.

Occasionally though, according to Pozzo (2017) on Italy, he discovered that peoples' perceptions might not necessarily tally with the actual green performance of a country, sector, or organization. Of course, this argument is premised on the fact that some aspects of the green practices are not tangible and are contextual, visible only to limited numbers of people working or directly associated with the setting Example of this could be the sorting that takes place at recycling plants and waste-water treatment.

An airport is a public place and a destination on its own, consisting of a wide range of buildings and many other fascinating structures that are visible and appealing to the eyes with cognitive, psychological, and affective impact on stakeholders and users (Nghiêm-Phú & Suter, 2018). Some of such are terminal buildings, and parking,

among others, accessible to the public. Hence, the design, shape, and some physical components such as lighting, electrical fitting and fixtures, décor, chairs/seats, waste and water facilities, heating, ventilation, and air conditioning (HVAC) systems/equipment are tangible and accessible by stakeholders. These stakeholders include staff, customers, and concessionaires who can perceive the airport's green performance based on their assessment of such building components.

Some components of the eco-design of airport buildings are only noticeable but are not directly accessible, i.e., renewable energy (solar PV panels). Eco-design chairs/seats (Rusli & Mohamed, 2017) within eco-friendly airport buildings are tangible and accessible. Nevertheless, only some people possess the cognitive capacity to recognize and differentiate between attributes of eco-friendly airport seats or decipher those that are not. Thus, the perception of such facility as part of green performance within the airport's eco-design may vary per user.

Notably, 'green' products are made from partially or entirely recyclable or renewable materials and resources such as wood, glass, and paper products against plastic. In contrast, sustainability is often from the perspective of products' origin and lifecycle (Bieak & Joseph-Mathews, 2009; Chen & Hung, 2016; Chen & Chang, 2013; Hopwood et al., 2005). Electricity generation from renewable energy sources such as the sun, wind, water, and biomass, rather than fossil fuels such as coal, gas, and diesel, can be classified as green and sustainable products.

Interestingly, with the surge in public awareness of environmental issues, negative impacts of global warming and climate change, and sustainability, studies on stakeholders', especially customers' views or perceptions of response to the eco-

friendliness, pro-environmental nature, green management practices and performance of different sectors in the tourism value-chain are also spontaneously emerging in tourism literature.

For instance, Lee et al. (2010) examined the view of customers on the green image of hotels, while Han et al. (2020) probed customers' behavior and response to the eco-design of airport buildings. Rusli & Mohamed (2017) in their study discovered some factors that inform the perception of customers about the eco-design of airport chairs in Malaysia's KLIA, including the physical characteristics of the chairs, such as how recyclable and reusable or eco-friendly the material is, environmental impact, and cost-effectiveness. Other features are attraction feelings in terms of color and design and sensational feelings, including usability and impact on users' physical and mental health.

Sequel to the above, it is safe to assume that TPB and TBL/SED theories, which delineate the nexus between behavioral influences and sustainable or green practices, are directly linked to the eco-design of airport buildings. Thus, the author predicts that factors such as subjective norms, social impression, and perceived behavioral control, as well as individuals' environmental ethics and environmental consciousness and belief (Chen & Hung, 2016; Han et al., 2010), contribute immensely to how individuals connect the green nature of airport buildings with their assessment and perception of the green achievement of an airport. Hence, the first assumption this study intends to validate is as follows;

Hypothesis 1: Eco-design of airport buildings positively affects perceived green performance.

2.7.2 Eco-design of Airport Buildings and Biospheric Values of Stakeholders

Eco-design of airport buildings also indicates how eco-conscious airport management is, which is a function of the level of their awareness of the devastating environmental challenges of our time, i.e., climate change and global warming. It is also a reflection of their environmental concern and preparedness to mitigate them with 'green management' (Lee et al. (2010) within the airport space and by applying environmental management system (EMS) (Kimmet Mphil, 2009), which ensures that environmental issues are factored into daily routines of airport management, operations and services within airport buildings.

Essentially, the above speaks directly to the values or importance that both management and other stakeholders, including staff and customers, placed on nature or the biosphere, the natural environment of the airport. Moreover, the deliberate decision by management, as one of the key airport stakeholders, to have their airport buildings designed in an eco-friendly outlook is analogous to their cognitive understanding/awareness of the above environmental variables (Garay et al., 2019).

Moreover, the TPB and TBL/SED conceptual framework delineates those factors such as self-will, attitude, subjective norm, and perceived behavioral control, as well as environmental ethics, environmental consciousness, and social impression (Chen & Hung, 2016; Choi et al., 2020; Han et al., 2010; Shurrab et al., 2019) all play a determinant role in individuals' and organizational behavior. In this instance, management's actions and attitudes towards pro-environmental behavior, such as decisions on the eco-design of airport buildings and the values placed on the natural environment of an airport by different stakeholders.

From the TBL/SED assumption perspective, ability and understanding of the long-run social benefits and contributions to the aesthetic, health, and physical comfort of passengers and staff, cleaner air, with the cost-effectiveness of green practices such as EAB by airport management is linked to their BV. While the degree to which staff and passengers alike feel, understand, and appreciate the socio-economic and environmental impact of EAB on their individual and societal well-being also interacts with their BV. Sequel to the above argument, the following hypothesis is proposed;

Hypothesis 2: Eco-design of airport buildings has a positive effect on the biospheric values of airport stakeholders**.**

2.7.3 Eco-design of Airport Buildings and Green Management Intransigence

Similarly, the availability or not of airport buildings that are eco-friendly in their design is a function of whether or not airport management is resistant to change (intransigence). Refusal to embrace change in management decisions to adopt and adapt green and innovative pro-environment and pro-sustainability planning and failure to implement green policies such as eco-design of new airport buildings in their development plans or remodeling of existing ones is regarded as 'green management intransigent.'

Several elements of eco-design of airport buildings come from and are related to green products that are sustainably sourced; TPB perspectives connote that management's decision to go or not to go for the green and sustainable project might not be connected to the attitude (behavioral beliefs) or political will of management, and subjective norms (normative beliefs) alone. It is often based on the need to make a rational choice between other factors such as funding, policy, and time constraints, to mention but a few; (control beliefs). The consideration for funding, policy, and time constraint factors, among others., also align with the TBL/SED explanation and the bottom lines

of social, economic, and environmental dynamics. Hence, it fits into the debate. Nevertheless, the focus here is on the assumption that irrespective of circumstances or those other factors that influence green management intransigence, the eco-design of airport buildings is negatively affected by green management intransigence. Thus, hypothesis number three below is to test this assumption;

Hypothesis 3: Eco-design of airport buildings negatively affects green management intransigence.

2.7.4 Eco-design of Airport Building and Green Airport Reputation

From the TBL/SED perspective (Ferrulli, 2016b; Shi et al., 2019), there is growing criticism of the tourism industry as a significant emission-emitting industry, leading to a persistent call for a reset button targeting a sustainable development approach. Again, the overall reputation of an airport as environmentally-friendly airport is directly linked to how eco-friendly the buildings appear to be in the eyes of users from outside to the inside (Bongo & Ocampo, 2017; Han et al., 2020; Pishdar et al., 2019). Similarly, the eco-design of airport buildings impacts the efficient use of resources such as energy/electricity. It reduces energy consumption, cuts carbon emissions, and improves the serviceability of facilities and equipment such as heating, ventilation, and AC (HVAC), contributing to the air quality within airport buildings (Al Sarrah et al., 2020; Foresty, 2017; ICAO, 2019).

In earlier findings, Lee et al. (2010) uncovered the fact that the green image of a hotel contributes to its reputation and inadvertently influences customers' behavioral intentions, including an intention to revisit, willingness to pay more for a green environment, and to recommend the hotel to others. Thus, in the context of this current study, it is not just about airport reputation but about green airport reputation.

Advancement in technological development and diffusion has helped to escalate the speed and the extent to which positive or negative online reviews and word-of-mouth can impact an organization's image. Thus, all these forms parts of the social dimensions, interpretation, and impact, as well as economic implications on/for organizations such as the airports and individuals, and the environment as posited by the TBL/SED. Hence, in line with the above findings, the author intends to test the following hypothesis about the eco-design of airport buildings and green airport reputation.

Hypothesis 4: Eco-design of the airport positively affects the green airport reputation**.**

2.7.5 Biospheric Value of Airport Stakeholders and Green Management Intransigence

According to findings, the trajectory of biospheric value can be traced to environmental psychology. It is defined as a value inclination or tendency in which "people judge phenomena based on costs or benefits to ecosystems or the biosphere," which in turn influence their environmental behavior (Bouman et al., 2020; de Groot & Steg, 2008; Martin & Czellar, 2017; Stern & Dietz, 1994; Torres-Moraga et al., 2021; Van der Werff et al., 2013).

Biospheric value also links to individuals' or organizations' fundamental and robust value for nature, self-nature connections, awareness, consciousness, concerns, and preference for the natural environment/space where human beings relate and interact (Bouman et al., 2020; Ruepert et al., 2017a). These values invariably influence positive or negative behavior toward production, provision, and consumption of environmentally friendly or green products and services (Alamsyah et al., 2020; Bouman et al., 2020; de Groot & Steg, 2008; Han et al., 2017; Martin & Czellar, 2017;

Moon et al., 2016; Moser, 2016; Nguyen et al., 2016; Perlaviciute & Steg, 2015; Ruepert et al., 2017a; Schwartz, 1992).

In another debate, biospheric value is described as the value individuals or organizations attribute to product and service environment 'servicescape' (Bitner, 1992), that is less damaging or green-oriented, which in turn psychologically inspires and motivates patronage (Moon et al., 2016). The above is consistent with introducing environmental factors into TPB, which reflects its relevance to this study and motivates the adoption of extended TPB or E-TPB, as delineated above.

As earlier noted, the body of evidence suggests an escalation in awareness about environmental challenges and contributions of organizations to global warming and green management. It simultaneously uncovers increased deliberate decisions toward environmental protection practices such as the eco-design of airport buildings (Han et al., 2020; ICAO, 2019; Lee et al., 2010) and the eco-design of airport chairs (Rusli & Mohamed, 2017). Mitigation strategies involve adopting renewable energy, recycling, and adequate water and waste management. Green management essentially can be aided and simplified with the application of environmental/energy management systems (EMS), EONS, and EPI (Kimmet Mphil, 2009; Persson, 2004; Runhaar et al., 2014; Vincent & Yusuf, 2014).

Management intransigence depicts situations where management generally resists change and prefers maintaining the status quo. It indicates a total absence or partial incorporation of EMS into management practices; worst still, implementation sometimes needs to be addressed. Management may be aware of their responsibilities to the environment. However, they reject and resist every call for a shift towards eco-

friendly decisions or green management, which signifies green management intransigence.

However, this is a pointer to the values such management placed on the biosphere, the natural environment of the organization, which, according to Han, Hwang, & Lee (2017), affects their ability to make conscious decisions and deliberate efforts toward green practices such as the eco-design of the airport building. The above is consistent with other findings on corporate environmental responsibility (CER), which focuses on pro-environmental practices, procedures, and the process of an organization, which in turn mediates environmental consciousness and friendly behavior among staff members (Ruepert et al., 2017).

Rupert et al. (2017), in their main findings, suggest that the pro-environmental behavior of an organization and individual staff depends on the extent of the biospheric values of both management and staff. Bouman et al. (2020) also alluded to this assertion, which opined that a solid collective or corporate biospheric value of any group or workplace to which an individual belongs, such as organization, institutions, and companies. It tends to motivate and increase individuals' pro-environmental actions and behavior. It is also consistent with findings on the influence of biospheric values on the intention to patronize green hotels (Torres-Moraga et al., 2021).

Consequently, and in line with TPB and TBL/SED theories, values placed on the airport's natural environment and sustainable use of natural resources, such as water and energy, by airport stakeholders such as members of staff and management, concessionaires, and as well as passengers is a direct indication of the attitudes of management as a group to CEM. It highlights the need to adopt environmentally

friendly practices and procedures such as EMS. Therefore, the following hypothesis is proposed;

Hypothesis 5: Biospheric values of airport users negatively affect green management intransigence.

2.7.6 Biospheric Values of Airport Stakeholders and Green Airport Reputation

Furthermore, Nigeria's international airport users, passengers, and staff are among the growing numbers of individuals with increased awareness and consciousness about global warming, climate change, droughts, and flood, among other devastating consequences. Many are also assumed to genuinely desire to make necessary attitudinal changes toward environmental protection and green product consumption (Bieak & Joseph-Mathews, 2009; Lee et al., 2010). They also have concerns and solid stands for the natural environment of the products and services they consume. Similarly, people are paying more attention to the natural atmosphere of the airport, including; the type of décor, availability of green rest places, and air quality within and around the airport terminal buildings, to mention but few.

In this instance, the air quality implicitly relates to the nature of the design of the buildings, whether it is eco-friendly in terms of adequate ventilation, energy efficiency, and consumption, and reduction in carbon and greenhouse gas (GHG) emission. (Han et al., 2020; ICAO, 2019). Thus, findings on popular airport rating website, for instance, indicates most complaints resulting in abysmal rating in most of the reviews centered on air quality, heat, and non-serviceability of AC, and escalators, to mention a few. in many international airports across the globe, and Nigeria is not an exception (Lee & Yu, 2018; Nwaogbe, 2018; Park & Park, 2018; Torres-Moraga et al., 2021).

Thus, it directly affects the airport's reputation in general and the green airport's reputation in particular. This factor has driven Singapore Changi Airport's consistent reputation as the best airport in the world for almost a decade (https://www.sleepinginairports.net/survey/best-airports-2019.htm). In other words, the ever-increasing reputation of Singapore Airport is hinged on the airport's biosphere and the users' biospheric values, in tandem with the consistent improvement in green practices at the airport. Hence, and again inconsistent with TPB and TBL/SED as explained above, the following hypothesis is proposed.

Hypothesis 6: Biospheric values of airport stakeholders positively affect green airport reputation.

2.7.7 Mediating Effect of Biospheric Values of Airport Stakeholders on The Relationship Between Eco-Design of Airport Buildings and Perceived Green Performance

Biospheric values link to individuals' or organizations' fundamental and robust value for nature, self-nature connections, awareness, consciousness, concerns, and preference for the natural environment/space where human beings relate and interact (Bouman et al., 2020; Ruepert et al., 2017a). These values invariably influence positive or negative behavior toward the production, provision, and consumption of environmentally friendly or green products and services (Alamsyah et al., 2020; Bouman et al., 2020; de Groot & Steg, 2008; Han et al., 2017; Martin & Czellar, 2017; Moon et al., 2016; Moser, 2016; Nguyen et al., 2016; Perlaviciute & Steg, 2015; Ruepert et al., 2017a; Schwartz, 1992).

In another debate, biospheric value is described as the value individuals or organization's attitude to a product and service environment 'servicescape' (Bitner,

1992), that is less damaging or green-oriented, which in turn psychologically inspires and motivates patronage (Moon et al., 2016). This concept is consistent with introducing environmental factors into TPB, further reflecting its relevance to this study. It motivates the adoption of extended TPB or E-TPB, as delineated above. Rupert et al. (2017) suggest that the pro-environmental behavior of the organization and the individual staff depends on the extent of the biospheric values of both management and staff. Bouman et al. (2020) also alluded to this argument, which suggests a solid collective or corporate biospheric value of people in the workplace to which individuals belong an institution or company. The BV tends to motivate and sustain individuals' pro-environmental actions and behavior. The above finding corroborates the impact of biospheric values on customers' intention to patronize green hotels (Torres-Moraga et al., 2021).

Emerging evidence suggests that the biospheric value of airport stakeholders (in this case, management and non-management staff) plays a mediating role in the interaction between the eco-design of airport buildings and perceived green performance (Ferrulli, 2016; Han et al., 2020). The TPB and SED assumptions are also in line with the above evidence, which implies that the extent of the values ascribed by airport management and non-management employees to the natural environment is also a determinant factor in their view, perception, and assessment of the eco-design and functionality of airport buildings. Subsequently, it influences their perception of how well an airport is fairing in terms of resilience, green achievement, and overall sustainability of the airport, its structures, and environment, which summarily is the perceived green performance of the airport. Therefore, the authors proposed the following hypothesis.

Hypothesis 7: The biospheric values of airport stakeholders significantly mediate the relationship between the eco-design of airport buildings and perceived green performance.

2.7.8 Mediating Effect of Green Management Intransigence on the Relationship Between Eco-Design of Airport Buildings and Perceived Green Performance

Essentially, management in many organizations could be more flexible and resistant to change (Hannevik et al., 2014). In other words, management or organizational intransigence can be described as the unfavorable disposition of management to change in any organization (Charoensukmongkol & Phungsoonthorn, 2020; Hayter & Cahoy, 2018; Kimmet Mphil, 2009; Rezer & Nevsky 2021; Skaggs & Ehrlich, 1980). It is a behavioral tendency to hold on to the status quo and reluctance to embrace environmental-friendly innovative ideas and technology in running their organization. Though they recognize the need for change, they believe it can be a manageable adjustment in their decision-making (Hopwood et al., 2005). It is particularly true with organizations or institutions in the developing world, especially in Africa.

Furthermore, in line with TPB, besides personal attitude or belief, other factors such as policy frameworks and strategies, absence or non-implementation of environmental policy integration EPI, environmental management system EMS, and inadequate funding for capital projects could reinforce and sustain green management intransigence and impact on green performance.

By and large, this study assumes that green management intransigence is disturbingly evident in Nigerian airports from the designs of structures and buildings, facilities, equipment, and general operations and management style of airports in the country until recently with the construction of new terminal buildings at the four international

airports. Congruence to the above, other stakeholders, i.e., staff, customers, and concessionaires, are all affected by this counter-productive rigid disposition of airport management to green and environmentally friendly practices.

One significant area where management intransigence is prevalent is in resistance to sustainable operational practices, particularly the shift towards renewable energy RE, i.e., solar PV micro-grids for airports, whereas the practice is gaining momentum in other climes, as extensively discussed earlier; hence, the term green management intransigence (Banda et al., 2019; Greer et al., 2020; ICAO, 2019; A Focus on the production of renewable energy at the Airport site, 2020; ICAO), 2017; S. Sreenath et al., 2019; Sukumaran Sreenath et al., 2020).

The embarrassing and abysmally low energy consumption rate and, consequently, the prevalent energy poverty in Nigeria are well documented in the literature, as discussed earlier in this study. The appalling situation is also mirrored in the grossly inadequate airport energy supply from inefficiently run public utilities despite the so-called unbundling and privatization of the sector in the country in 2005 and the use of fossil-fuel electricity generators as backup.

Despite the remodeling and building of new international terminal buildings in all international airports in Nigeria in recent years, and the commissioning and operation of the ones in Port-Harcourt, Abuja, and very recently Lagos airport, it is not straightforward if there is any significant change in this regard. This situation is because, despite the new buildings having glass walls, there is no evidence of green décor, green rest areas, and collection points for recycling waste, especially plastic

water bottles, or integration of solar PV technology or other clean energy sources into the energy-mix of these international airports.

The author, therefore, opined that green management intransigence is a function of the level of cognitive awareness of environmental challenges possessed by management, which tallies with their level of environmental concern and care for nature as depicted E-TPB (Armitage & Conner, 2001; Clement et al., 2014; ICAO, 2017) as it relates to the airport environment. Again, it is evidence that the biospheric value of the airport users plays a mediating role in the interaction between the eco-design of airport buildings and perceived green performance (Ferrulli, 2016; Han et al., 2020). The assumption is also in tandem with E-TPB as well as SED; the extent of the values ascribed by airport staff, management, and passengers to the natural environment can be a determinant factor in their view, perception, and assessment of the eco-design and functionality of airport buildings. Subsequently, it influences their perception of the generality of green airport performance in terms of resilience, green achievement, socio-economic viability, and overall sustainability of the airport structures, operations, and environment. Thus, premised on those theoretical assumptions, the following hypothesis is developed;

Hypothesis 8: Green management intransigence significantly mediates the relationship between the eco-design of airport buildings and perceived green performance.

2.7.9 Mediating Effect of Green Airport Reputation on the Relationship Between Eco-Design of the Airport and Perceived Green Performance

Perceived Green Performance is a growing argument that consumers are increasingly discerning and are more conscious of how and when organizations are performing well or not in terms of environmentally friendly or green practices in the production and

delivery of services and products (Chen et al., 2015; Muisyo & Qin, 2021; Nyilasy et al., n.d.; Tiong et al., 2021). A key determinant or indicator of green performance is in the environmental management practices (EMPs) an organization employs. Various policies, procedures, and techniques organizations use to monitor, control, and mitigate the environmental impact of their operations are regarded as the organization's EMPs (Montabon et al., 2007). Regulatory policies and market dynamics are some factors that often impact on firm's EMPs. However, a proactive approach to EMPs is argued to be more beneficial to organizations rather than reactive measures (Montabon et al., 2007; Weng et al., 2015).

The PGP of an airport is permeable in the ecological design of airport buildings, energy sources, and usage in the terminal and other buildings where customers and other stakeholders, such as staff, regularly interact (Han et al., 2020). These include office spaces, arrival and departure halls, lounges, restaurants, shopping areas, and rest areas. Therefore, the availability of green plants and décor alongside the perceived reliability and efficiency of airport energy-dependent facilities and equipment, particularly heating, ventilation, and air-conditioning (HVAC), is crucial. This outcome is contingent on a regular and adequate supply of clean energy to airport buildings as a pointer to the green performance of the airport with the capacity to impact passengers' subjective well-being and satisfaction at the airport.

Consequently, their view, perception, and ultimately, online and offline review and sharing of their airport's experiences can be explained to have links to some of the predictive factors outlined by E-TPB and TBL/SED theories. The same condition applies to the airport employees who spent hours daily in various service windows, processing passengers within and around the terminal buildings. The ecological nature

of the airport buildings and its impact on their socio-economic well-being will impact how they will personally view the green reputation of the airport and, subsequently, the degree of their perception of the green performance of the airport. So far, no study has focused on the green airport reputation from employees' perspective. Thus, this study investigates the mediating role of a green airport reputation on the perceived green performance of the airport by stakeholders, including employees, management, and passengers.

According to E-TPB, since individuals' behavior is both a function of self-will and sometimes involuntary factors, the overall perception of stakeholders, i.e., staff and passengers, concerning the green performance of an airport and the eco-design nature of airport buildings is a function of their BV, which will as well impact on the green reputation of the airports. In turn, this depends on customers' cognitive understanding of what constitutes harmful practices to the environment and pro-environmental behavior to mitigate the negative trend. Also, the content of stakeholders' reviews and the extent to share their values, reviews, and recommendations could play significant roles in green airport reputation, as findings revealed in the case of green hotels (Chuah et al., 2020; Gupta et al., 2020).

Similarly, an organization's reputation is critical in customers' intention to purchase or consume products and services of such a company or organization. A positive reputation of a company thus means a high probability of customers' decision to purchase products and services of the company (Gupta et al., 2020; Han et al., 2019, 2020; He et al., 2018; Lee et al., 2020; Lee et al., 2010; Pishdar et al., 2019; Wattanacharoensil et al., 2016; Wu et al., 2018) Apparently, the reputation of an airport has a direct link with passengers' satisfaction of the service scape of the airport.

Unfortunately, as earlier revealed, many airports the world over are infamously reputed for their poor environment, terminal facilities, and service quality, according to findings from the popular online airport dating site (https://www.sleepinginairports.net/survey/worst-airports-2019.htm). A common denominator for complaints by reviewers rests on incessant power cuts, leading to non-serviceable electrical and electronic gadgets, machines, and facilities such as HVAC systems, screening machines, baggage carousels, and others., in airport buildings resulting in poor air quality, heat in the terminal buildings, and delays at check-in counters and in baggage claim among others. All these are directly and indirectly linked to unreliable electricity generation and supply in many developing countries, as well as poor EMS and EPI practices. The poor electricity supply in Nigeria and to the airports, in particular, is more worrisome since managements rely almost exclusively on public utility and fossil-fuel-powered generators for this essential component of airport operation. Nevertheless, there is an abundance of renewable energy sources to tap into in the country.

Consequently, Nigeria's poor green airport reputation is directly connected with the country's poor tourism performance. Nevertheless, the country has excellent tourism potential (Ekpo & Bassey, 2016; Olatumile, 2019). Subsequently, TPB and TBL/SED explain this phenomenon which determines the green reputation of the airports. According to TPB, since individuals' behavior is both a function of self-will and sometimes involuntary factors, the overall perception of stakeholders, i.e., staff and passengers, including the management staff, concerning the green performance of an airport and the eco-design nature of buildings in an airport will depend on, and affect the green reputation of the airport. In turn, this depends on individuals' cognitive understanding of what constitutes harmful practices to the environment and pro-

environmental behavior to mitigate the negative trend. Also, how customers share their values, reviews, and recommendations could play significant roles in green airport's reputation and people's perception of its green performance, as evidence reveals in green hotels (Chuah et al., 2020; Gupta et al., 2020). Hence, the following hypothesis.

Hypothesis 9: Green airport reputation significantly mediates the relationship between the eco-design of the airport and perceived green performance.

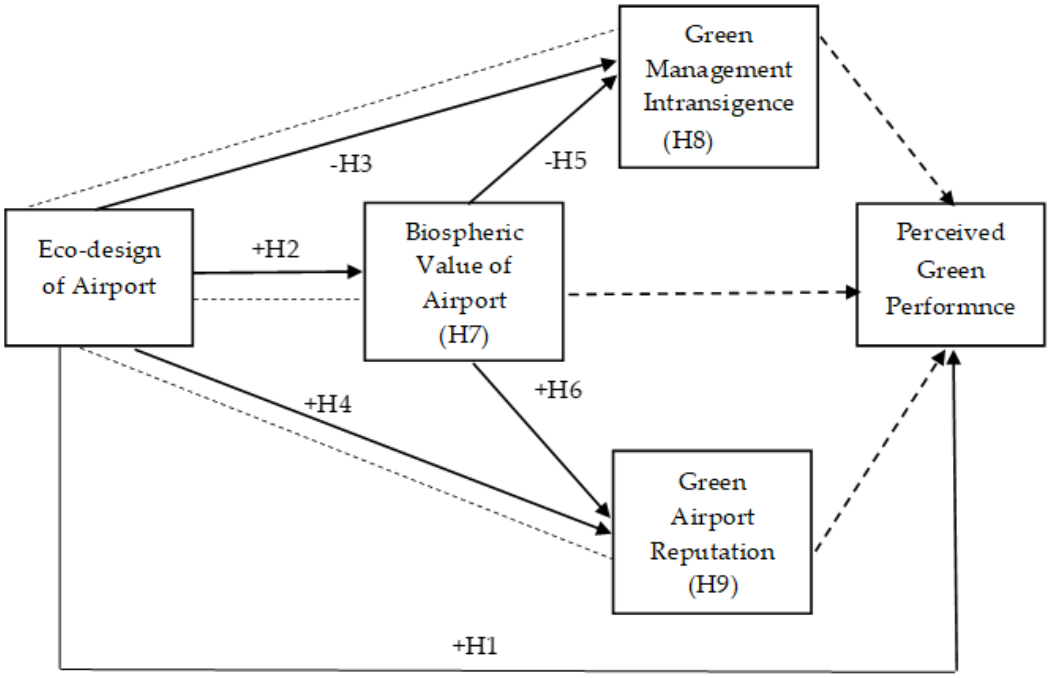

Figure 1: Research Model

Chapter 3

RESEARCH METHODOLOGY

This chapter presents specific information about the research context of this empirical investigation, the philosophical undertone of the research, and the study approach. It also contains the sampling technique and method of collecting data, the measures, scales, questionnaire design, and the analytical techniques deployed in this study.

3.1 Research Philosophy

According to Ramiz (2016), philosophy is defined as a constellation of activities in which individuals or groups can get involved while seeking fundamental truth or knowledge about the world, people, events, or phenomena around them and the interrelationship among these phenomena. Ryan (2018) also described philosophy as a moral or ethical principle or a fundamental point of view covering basic ideas related to specific disciplines, fields, and areas of interest, such as educational philosophy, government philosophy, and research philosophy. The different branches or categorizations of philosophy scholars identified include logic, metaphysics, epistemology, ethics, and aesthetics (Ramiz, 2016).

The main philosophical paradigms are "positivism" or "realism" and "post-positivism, commonly referred to as phenomenology, interpretivism, "hermeneutic research," and sometimes constructivism." Other terms for post-positivism are transformative, emancipatory, critical, pragmatism and deconstructivism, "nominalist," among others (Alharahsheh & Pius, 2020; Altinay et al., 2015; Boland Jr, 1985; Kaplan & Maxwell,

2005; Mackenzie, & Knipe, 2006; Ryan, 2018). This study aims to briefly explain the choice of 'positivism' upon which this current investigation is premised from the ontological and epistemological perspectives.

Positivism is a philosophical paradigm that emphasizes the use of empirical methods, including observation and experimentation, to study and understand the natural world or social world from the social science perspective (Alharahsheh & Pius, 2020; Mackenzie & Knipe, 2006; Ryan, 2018). Positivism is a research philosophy that uses scientific methods to uncover objective, universal truths about the social world. It assumes that the social world is objective and can be studied using methods similar to natural science. Positivism is best suited for research questions that require collecting empirical data through systematic observation and measurement, aiming to test hypotheses and develop generalizations, as is the case in this study.

On the other hand, Interpretivism emphasizes the importance of subjective meanings and interpretations of social phenomena. It assumes that the social world is complex and cannot be studied using the same methods as the natural sciences. Interpretivism is best suited for research questions that require understanding the meanings and perspectives of individuals or groups, which aim to explore and describe the social world from the perspectives of those being studied.

The positivist view holds that knowledge can only be gained through direct observation and experience and must be based on measurable and objective data. Positivism originated in the early 19th century and was developed by the French philosopher Auguste Comte. He argued that society had undergone three stages of intellectual development: the theological, the metaphysical, and the positive. Comte

said the positive stage was characterized by a scientific approach to knowledge that rejected speculation, superstition, and metaphysics (Altinay et al., 2015; Boland Jr, 1985; Kaplan & Maxwell, 2005).

Positivism has influenced many fields, including the natural sciences, social sciences, and humanities. In the social sciences, positivism has been associated with developing methods for studying social phenomena similar to those used in the natural sciences. These methods include statistical analysis, experimentation, and data collection through surveys, questionnaires, and other quantitative methods (Altinay et al., 2015; Boland Jr, 1985; Kaplan & Maxwell, 2005). Critics of positivism argue that it oversimplifies the complexity of human experience and reduces it to measurable data, ignoring the role of subjective factors such as values, beliefs, and emotions. They also argue that positivism assumes a value-free stance, which is impossible since the values and assumptions of the researcher directly or indirectly influence all research.

Sequel to the above, the justification for adopting the positivist philosophical foundation for this study is that the researcher, in line with positivism, strongly believes in the use of scientific methods similar to those being used in the natural sciences. The methods are measurable and objective, i.e., systematic observations using questionnaires to collect empirical data, development and testing of hypothesis, and statistical analysis while investigating social events.

Hence, the researcher's philosophical belief underpins this study and informs the overall strategies adopted for this investigation. This is coupled with positivism's strength, objectivity, generalizability, cost-effectiveness, and timeliness, which add to its popularity among social science researchers. This narrative contrasts with

interpretivism, which assumes that the social world is complex and cannot be studied using the same methods as the natural sciences. It is subjective, time-consuming, costly to execute, and lacks generalizability.

3.1.1 Deductive Approach

The general perspective or orientation which the researcher takes towards this investigation is that of a deductive approach. As earlier stated, the philosophical assumption underpinning this current thesis is that of positivism, and the deductive approach perfectly aligns with the positivist paradigm (Lin Chih, 1998). According to Neuman and Kreuger (2003), the "deductive approach to research entails a systematic investigation of constructs starting with an abstract, examination of logical relationships among the constructs, and then empirical evaluation and analysis of evidence.

A deductive approach is well-suited for the positivist paradigm. It is adopted by the author for the current study because it is appropriate for this quantitative research question. It allows for the systematic and rigorous testing of the specific theoretical framework or hypothesis in this study using measurable and objective empirical data, which is essential for ensuring the validity and reliability of the research findings. It is, in fact, more efficient and effective when the research question is well-defined, and the variables are identified, as it is in this study. Using the deductive approach, this study will provide clear and definitive answers to the research question, which will help advance the existing knowledge in the field.

The author aligns with the positivist assumption that the real world is out there to be discovered quantitatively and objectively using the frequency of occurrence of the phenomena we seek to uncover in the real world rather than the meaning of the

phenomena (Bowen, 2001; Lee, 1991). Hence, the researcher assumes that the reality is out there about the nature of eco-design of airport buildings and other variables, how this affects customers' experience and satisfaction as well as reluctant attitude towards change, mainly green/sustainable innovative approaches to management, and it can be unveiled with a positivism paradigm.

Essentially, deductive research or approach refers to any investigation that starts with theoretical underpinnings, progresses with the generation of hypotheses, and culminates in testing the hypotheses, which then leads to the development of empirical models. The explanation is supported by Altinay and Paraskevas (2008), who asserted that researchers adopting a deductive approach start with a clear conclusion and work through the study to prove whether the conclusion is valid, sustained, or otherwise.

In terms of data collection and analysis, the deductive approach based on the positivist paradigm favors and follows a well-structured, formal, and detailed process involving the use of a questionnaire rather than a longitudinal approach over an extended period using participant observation or ethnography, as in phenomenology interpretivism philosophical assumption (Bowen, 2001; Scotland, 2012).

An airport is a service sector with a built environment or servicescape consisting of the airside, terminal building, and the airside. These physical variables are actual, obviously visible, and tangible. For example, airport buildings, especially terminal ones, are an elaborate servicescape (Bitner, 1992). Terminal buildings are accessible to stakeholders such as airport employees, concessionaires, passengers, and relevant government agencies. Similarly, the physical features, fixtures, fittings, and facilities, in and around airport buildings can be seen, felt, and assessed by stakeholders. For

instance, solar installations for electricity supply can be easily noticed where available in the design of airport buildings or around the buildings.

Other factors, such as biospheric values, green management intransigence, and airport reputation, are intangible. However, they are still measurable using tested and proven measures in a well-structured single or cross-sectional survey with many people to collect data for analysis on all the constructs. The realist or realism paradigm emphasizes the objective existence of reality. It further indicates that the facts about the relationships among different variables can also be established and tested. The same goes for the 'causality' or understanding how the various factors or variables interact and influence each other. Hence, the effects of the relationships between other variables in this study on the green performance of airports can similarly be investigated.

Some advantages of adopting this approach as against interpretivism philosophical assumption and qualitative/inductive approach are that it is assumed to be objective rather than subjective, less expensive, and time-saving, unlike inductive. Furthermore, the researcher does not need to be physically present on the ground. Hence there is little or no interaction between the researcher and the settings with no influence on research objects/subjects/participants. Thus, there is no distortion or issues of subjectivity, which in turn increases the validity, credibility, and generalization of the findings.

3.2 Study Context

The study context and sites are selected because all the airports in Nigeria are run and operated under the same management and administrative system under the Federal

Airports Authority of Nigeria (FAAN). Moreover, Murtala Mohammed International Airport (MMA) is the 'biggest' and busiest airport and the first gateway to the country. Nnamdi Azikiwe International Airport (NAIA) is the second busiest airport and the second gateway to Nigeria. In terms of locations, MMA is located in the commercial capital city of Lagos in the Southwestern part of Nigeria. At the same time, NAIA is situated in Abuja, Federal Capital Territory (FCT), the administrative cum political capital city of the country, respectively. By the design and composition, i.e., International, domestic, GAT, and Cargo Terminals, including a presidential wing, both airports represent cluster samples for the rest of the airports in the country and in the West African region in almost everything, technically and operationally, thus useful for a fair generalization.

Suffice, the two airports receive the highest number of international arrivals (IA) and international departures than any other international airports in the country. For instance 2019, MMA recorded 1,578,452 while NAIA recorded 506,844 international arrivals. See Table 1 and Figure 1 in Appendix E for IA data for the two airports for six consecutive years. The data vividly reflects the negative impact of Covid-19 travel restrictions on the travel and tourism industry in 2020 and 2021.

3.3 Data Collection

3.3.1 Procedure

The research sample is drawn from the research population of the employees of the Federal Airports Authority of Nigeria (FAAN) at both Murtala Muhammed International Airport (MMA), Lagos, and Nnamdi Azikiwe International Airport (NAIA), Abuja. FAAN is chosen being the manager and operator of all the civil airports in Nigeria; it is also the largest of all organizations at the airport and with the

largest airport employee population. As earlier noted, the two airports are also selected as the most prominent, busiest, and most commonly used of all the international airports by passengers as a point of entry and exit to and from Nigeria.

Official permission was obtained from the top management of FAAN before conducting the survey and distributing the questionnaires. Each questionnaire used in the survey contains a cover page with information regarding the study and a consent form with statements such as "There were no right or wrong answers to the questionnaires," "confidentiality, anonymity, and data protection statement," and "participation is voluntary," Twenty questionnaires were used as a sample for the pilot study, which was done to make sure the questions were concise and thorough (Cop et al., 2021). After the pilot study, the questionnaire did not require significant changes; hence the questionnaires were distributed to management and non-management, and 220 surveys were returned. This figure is slightly below the initially estimated sample size of 250 based on the target population. The researchers verified the validity and completeness of each survey. After comparing them, no information was found missing.

To avoid or minimize common method bias, Podsakoff, MacKenzie, Lee, & Podsakoff (2003) recommend using a time-lag design for soliciting data from multiple sources. Thus, for this employee survey, 350 survey questionnaires were administered in Time-I of a two time-lag of two weeks apart to collect the cross-sectional data. First, demographic data of participants and data on Eco-design of airport buildings (ECB) and biospheric values (BV) were collected in Time I, and 260 were returned. After two weeks, data were gathered in Time II for Green Management Intransigence (GMI), Green Airport Reputation (GRA), and Perceived Green Performance (PGP) using the

260 questionnaires that were returned in Time-I, 220 were returned, representing 70%. Data analysis was done using SMART-PLS software. This software was deployed to test the reliability and validity of the construct. Then the model structure was also validated using Partial Least Square-Structural Equation Modelling (PLS-SEM) and Importance-Performance Matrix Analysis (IPMA). Bootstrapping analysis was used to affirm the mediating effect on the model.

3.3.2 Sampling

This section briefly describes the population, sampling technique, and sample size adopted for this study to achieve adequate statistical power. As a preamble, the population refers to the group of individuals or entities a researcher wants to survey. The population can be defined in various ways, such as geographical location, age group, gender, socio-economic status, education, income level, or other relevant characteristics. The population must be clearly defined at the outset of any research to ensure that the study represents the group being studied.

The sampling technique refers to the process of selecting participants from the population (Bryman, 2016; Neuman, 2013; Trochim, 2006). Several sampling techniques include random, stratified, cluster, and convenience. Each method has its advantages and disadvantages, and the choice of sampling technique is usually based on the research question, the size of the population, the availability of resources, and other relevant factors (Etikan, Musa, & Alkassim, 2016; Levy, & Lemeshow, 2013; Lohr, 2010; Sharma, 2017; Trochim, 2006).

Convenient sampling is a non-probability sampling technique that involves selecting participants based on their accessibility and willingness to participate. As such, the sample may not necessarily represent the target population, and the precision of the

data may be complex. However, a larger sample size generally provides greater precision in estimating population parameters and is commonly used in empirical investigations (Bryman, 2016; Neuman, 2013; Trochim, 2006). Probability sampling, on the other hand, is a type of sampling technique where each member of the population has an equal and known chance of being selected for the sample (Dillman et al., 2014; Levy & Lemeshow, 1999). This type of sampling provides a representative sample of the population, which allows researchers to generalize their findings to the entire population.

Sequel to the above, the sampling technique used in this study is convenient sampling, which is a non-probability sampling method that involves selecting participants who are easily accessible and available to participate in the study. The convenient sampling technique was chosen because it allows for selecting readily available participants and is cost-effective and time-efficient. The participants for this study were selected based on their availability and willingness to participate in the study. Therefore, the convenience sampling approach was used, inconsistent with comparable recent empirical research (Olorunsola et al., 2022). Though with some drawbacks, convenience sampling provides the benefit of receiving a rapid answer compared to probability sampling.

The estimated sample size is 250 employees based on the total employee population of less than 20,000 in all the airports in Nigeria. This sample size was calculated based on the assumption that a sample size of 250 would sufficiently represent the target population and allow for meaningful statistical analysis. The sample size was also determined based on the practical constraints of the study, such as time and budget limitations. Consequently, and as stated earlier in 3.3.1, the target population for this

case study consists of only the management and non-management employees of the Federal Airports Authority of Nigeria (FAAN). However, it is imperative to note here that airport stakeholders include staff of other aviation agencies at the airport, such as Nigerian Airspace Management Agency (NAMA) and Nigerian Civil Aviation Agency (NCAA), among others, concessionaires and other businesses within the airport community, as well as air passengers.

Generally, the study population is heterogeneous since the age, gender, socio-economic status, nationalities, and ethnicities of airport stakeholders are different by default, but also homogenous since they all have a connection with the airport as stakeholders/users, either as passengers or staff (Alvi, 2016; Barreiro, 2001; Singh & Masuku, 2013). However, as representative of the population, the sample was finally drawn from employees of FAAN, the largest stakeholder organization at the airport, that is responsible for managing all the airports in Nigeria, and with the largest number of employees that have access to every area of the airports, unlike others with restricted access to some areas.

3.4 Measurement

All the research instruments deployed for these studies were adopted and or adapted from existing literature relevant to this investigation. The scales have been used extensively, tested, and validated in various settings. See Appendix D for the complete survey instrument.

3.4.1 Measure of Eco-design of Airport Buildings

Eco-design of Airport buildings was measured as a single dimension construct, using seven factors/items that were adopted from Han et al. (2020) on a five-point scale (“1 = strongly disagree”, “5 = strongly agree”). The different dimensions were adopted

from extant literature (Bitner, 1992; Moon et al., 2016; Tiong et al., 2021). Sample items of the construct include “Natural light is widely visible via glass windows, walls, and roofs at this airport (natural light).” and “A range of green interior decorations (eco-friendly décor) are seen at this airport.”

3.4.2 Measure of Biospheric Value

Biospheric value was measured using four items from Groot & Steg, 2008; Han et al., 2020. A seven-point scale (“1 = not important”, “7 = very important”) was used to measure the construct. A sample item of Biospheric value is “I respect biodiversity in the environment (respecting the earth).”

3.4.3 Measure of Green Management Intransigence

Green Management Intransigence was evaluated using four items adapted from Patterson et al. (2005) that were rated on a seven-point scale (“1 = I strongly disagree”, “7 = I strongly agree”). Sample items of the GMI are “Senior management of the airport like to keep to established, traditional ways of handling related environmental issues” and “management is not interested in trying out new environmentally-friendly related ideas.”

3.4.4 Measure of Green Airport Reputation

This construct was evaluated using four items adapted from Lee et al. (2010) on a five-point scale (“1 =false”, “5 true”) as the bases of measurement. Sample items include; “Compared to other airports, this airport has a good green reputation” and “Overall, I consider that the green reputation of this airport is favorable enough such that I would consider using this airport again.”

3.4.5 Measure of Perceived Green Performance

Finally, perceived green performance was assessed with ten items adapted from (Montabon et al., 2007; Muisyo & Qin, 2021). Sample items used are “green

operations enable the airport to reduce total operational cost," "Green operations enable the airport to reduce fuel costs and greenhouse gas emissions," "green operations enable the airport to reduce water and electricity consumption," and "green operations can help the airport to reduce the risk of accidents and legal difficulties."

3.5 Methods of Statistical Analyses

3.5.1 Common Method Bias and Non-Response Tests

According to Podsakoff et al. (2003), Common Method Bias (CMB) is a potential problem in research where the same method is used to measure both the independent and dependent variables. It can lead to an inflated relationship between the variables and result in erroneous conclusions. In the case of the research example given above, common method bias could arise if the same survey instrument is used to collect data from both the employees and passengers (supposing passengers were included), as this would be a single method of data collection used to measure both the independent and dependent variables.

To avoid common method bias in research, researchers can implement a variety of procedures, including: Using multiple methods of data collection, separating the administration of the survey instrument, i.e., two-time lag, including statements of anonymity and confidentiality, and pretesting of the survey instrument, i.e., conducting a pilot study. By implementing these procedures, researchers can ensure that the measurement of the independent and dependent variables is not influenced by a single data collection method; thereby, they can improve the validity of their findings (Conway & Lance, 2010; Spector, 2006).

For the current study, several measures were taken to avoid common method bias (CMB). First, a two-time lag of two weeks apart was used to collect data from the employees. This approach helps ensure that a single source data collection does not influence the measurement of the independent and dependent variables, as the data is collected from both management and non-management staff at two different points in time. In addition, a cover letter providing confidentiality and anonymity statement was attached to the survey instrument. This measure helps to ensure that participants feel comfortable providing honest and accurate responses without fear of repercussions. Social desirability bias is minimized by ensuring anonymous and confidential participant responses.

Another measure taken to avoid CMB is using a mixture of online and face-to-face data collection methods. Given the ongoing Covid-19 pandemic, this critical approach made face-to-face data collection complex and potentially risky. By using online data collection methods, the researcher was able to reach a wider pool of participants and collect data more efficiently. The use of face-to-face/online data collection methods when online/face-to-face response rates were low also ensured that participants who may not have had access to an internet connection given the Nigerian context, where even at work, there is no public internet access at the airports, or those who might felt uncomfortable using online survey tools were still able to participate in the study. Finally, the researcher pretested the survey instrument by conducting a pilot study with 20 samples (10 employees each from both airports) to identify potential sources of common method bias and necessary adjustments was made to the survey instrument. This approach ensures that the survey instrument accurately measures the intended constructs and reduces the likelihood of common method bias.

Furthermore, assessing common method variance (CMV) is crucial for cross-sectional surveys. Hence, using the Harman-single factor test, the most considerable variance explained was 32.99% (<40% threshold) (Hair et al., 2017). Thus, CMV does not pose any significant problem. Further, an independent sample t-test was conducted to compare the responses of the first and last 50 respondents. Results revealed no significant difference ($p>0.05$) between the mean values of the two groups of respondents, i.e., management and non-management employees. Hence, non-response bias is not a problem in this study.

Chapter 4

RESULTS OF STUDY

This chapter provides a comprehensive overview of the empirical findings from the analysis of the findings conducted on the data gathered from the employees of the case airports. It also contains the demographic characteristics of the respondents, the measurement model, and the results of the hypotheses tests conducted on the data.

4.1 Data Screening and Pre-Analysis

The study's data was assessed for missing values, outliers, normality, and demographic characteristics. Missing values from 3 cases were treated using the recommended mean replacement approach built in the Smart-PLS (Hair et al., 2017). This approach is preferred because, unlike pairwise and list-wise deletion, our sample size is not altered, and the mean values of the variables equally remain unchanged (Hair et al., 2017). 52.3% of the respondents are from the Lagos airport, the busiest airport in the West African subregion (The Africa Logistics, 2019), while 47.3% are from the airport located at Abuja, the nation's capital. The details of the respondents' demographics are presented in Table 1.

4.1.1 Analysis of the Demographics Data

4.1.1.1 Profile of the Study's Respondents

The demographic characteristics of the respondents are shown in Table 1 below; these include; age, gender, marital status, education, and organizational tenure. The sample reveals more males constitute the respondent (57.3%) compared to (42.7%) female gender. Almost a quarter (23.2%) of the respondents were middle-aged between 48

and 57 years, 31.4% were aged between 38 and 47, and another 29.1% were aged between 28 and 37. Young people comprised only 9.5% of the respondents, while only 6.8% were 58 years and above. This result indicates that the airport workforce was older and more mature individuals.

Regarding educational background, the results suggest that most of the respondents are educated, with 48.2% having Bachelor's degrees. This educational level might not be unconnected to the technical nature of airport operations, as another 37.7% are Masters's holders. Vocational school certificate holders constitute just 7.7%, while 6.6% have Secondary school education. Concerning years of experience, only 9.1% of the respondents have been on the job for 20 years and over, while the majority are relatively new, with only five years or less experience on the job.

Table 1: Demographic

Variables		Frequency	Percent
Age			
	18-27 years	21	9.5
	28-37 years	64	29.1
	38-47 years	69	31.4
	48-57	51	23.2
	58 and over	15	6.8
Gender			
	Male	126	57.3
	Female	94	42.7
Education			
	Secondary School	14	6.4
	Vocational school (2 years)	17	7.7
	Bachelor’s degree	106	48.2
	Master’s degree	83	37.7
Tenure			
	Under 1 year	16	7.3
	1-5 years	67	30.5
	6-10 years	47	21.4
	11-15 years	34	15.5
	16-20 years	36	16.4
	More than 20 years	20	9.1

4.2 Measurement Model

The constructs of the study's data were assessed for internal consistency, convergent validity, and discriminant validity. As shown in Table 2, the internal consistency of constructs using composite reliability (CR) was adequate, with values >0.7 (Gefen et al., 2000). In addition, the Cronbach alpha values of the seven constructs demonstrate strong reliability at >0.7. Further, all reflective indicator loadings were significant. Likewise, variables achieved adequate convergent reliability with values > 0.5 (Fornell & Larcker, 1981).

Table 2: Measurement Model

Variables	Items	Outer loading	Cronbach's alpha	Rho-A	Composite reliability	AVE
Biospheric Value			0.948	0.949	0.963	0.866
	BV1	0.917				
	BV2	0.963				
	BV3	0.882				
	BV4	0.957				
Eco-design of airport			0.945	0.949	0.955	0.752
	EAB1	0.868				
	EAB2	0.836				
	EAB3	0.814				
	EAB4	0.887				
	EAB5	0.873				
	EAB6	0.893				
	EAB7	0.897				
Green airport reputation			0.935	0.935	0.954	0.838
	GAR1	0.897				
	GAR2	0.886				
	GAR3	0.939				
	GAR4	0.937				
Green mgt intransigence			0.817	0.82	0.88	0.649
	GMI1	0.708				
	GMI2	0.854				
	GMI3	0.778				
	GMI4	0.873				
Perceived Green Perf.			0.957	0.959	0.962	0.719
	GOP1	0.825				
	GOP2	0.837				

GOP3	0.836
GOP4	0.864
GOP5	0.826
GOP6	0.827
GOP7	0.871
GOP8	0.857
GOP9	0.878
GOP10	0.856

Table 3: Validity

Variables	1	2	3	4	5
Biospheric Value	0.93				
Eco-design of airport	0.425	0.867			
Green Airport Reputation	0.446	0.46	0.915		
Green Management Intransigence	0.219	-0.072	0.067	0.806	
Perceived Green Performance	0.296	0.132	0.248	0.315	0.848

Note: Square roots of AVEs in bold on the diagonal

4.2.1 Structural Equation Model

As presented in Table 4, a bootstrapping technique with 5,000 resamples was employed to test the study's hypotheses. After this, PLS prediction analysis was also conducted to evaluate the model's predictive power (Shmueli et al., 2019). The Q2 predict values exceed zero, and the RMSE values are lower for the PLS-SEM model than for the linear model (see Appendix A). Together, these results show that the study's PLS path model possesses a high predictive power (Hair et al., 2021). Furthermore, the location of the airport, age, education, and tenure was controlled for in the assessment of the SEM as they could influence green and workplace perceptions.

Table 4: Hypotheses Testing

	Hypotheses	β	Decision
H1	Eco-design of airport buildings positively affects perceived green performance.	0.117ns	Not supported
H2	Eco-design of airport buildings has a positive effect on the biospheric values of airport stakeholders.	0.311***	Supported
H3	Eco-design of airport negatively affect green management intransigence.	-0.268***	Supported
H4	Eco-design of the airport positively affects the green airport reputation.	0.508***	Supported
H5	Biospheric values negatively affect green management intransigence.	0.099ns	Not supported
H6	Biospheric values has a positive effect on green airport reputation	0.358***	Supported
H7	The biospheric values of airport stakeholders significantly mediate the relationship between the eco-design of airport buildings and perceived green performance.	0.116***	Supported
H8	Green management intransigence significantly mediates the relationship between the eco-design of airport buildings and perceived green performance.	-0.058**	Supported
H9	Green airport reputation significantly mediates the relationship between the eco-design of the airport and perceived green performance	0.157***	Supported

Post hoc, an Importance–performance matrix analysis (IPMA) was conducted to extend the PLS-SEM results by considering each construct's performance (measured on a scale from 0 to 100). For a specific outcome construct, the IPMA contrasts the average values of the latent variable scores (performance) and the structural model total effects (importance) to underscore areas that require significant attention (Ogunmokun et al., 2020). Thus, IPMA allows managers to improve their management strategies by pointing out critical factors needing immediate response (Ringle & Sarstedt, 2016). The decision to apply this technique is supported by its usefulness within the context of the study, as evident in previous studies (see Table 6). Further, a group-specific IPMA is conducted between two significant groups of respondents—management-level and nonmanagement-level employees. This outcome is due to a potential lack of alignment between these two groups of respondents regarding their knowledge, experience, and perceptions of management policies and practices (Gfrerer et al., 2021). Remarkably, these groups of respondents vary in their

experience and perceptions of green management intransigent, and this might affect their responses which could better help us understand the criterion being investigated. The IPMA results revealed apparent differences in group-specific performance (Table 6). Though total adverse effects were unexpected, our results (Table 6 and Appendix C), in some instances, show such outcomes. However, negative signs only occur for total effects that are not significantly different from zero.

Table 5: Airport/Airlines-Related IPMA Studies

Authors	Principal findings	Country
Yuan et al. (2021)	The IPMA helped reveal that three categories of passengers in the Air-rail integration services have noticeable differences in psychological-behavioral relationships. However, they are similar in their perception of the quality of service received.	Shijiazhuang Zhengding International Airport, China
Manosuthi et al. (2021)	IPMA revealed that service innovation and memorable experiences are most crucial for airline passengers' customer influence value.	Thailand
Paraschi et al. (2019)	IPMA reveals that employee results are the most critical success factor for airport excellence, followed by leadership and operational results	Multinational (143 airports)
Farooq et al. (2018)	IPMA revealed that airlines should focus on service quality, focusing on personnel services, and image to enhance customer satisfaction.	Malaysia Airlines
Chen & Chang (2005)	IPMA demonstrated that passengers attributed importance to responsiveness and assurance that airline frontline staff	A domestic airline in Taiwan
Wang et al. (2010)	IPMA is used to construct a service attribute evaluation map for determining resource allocation to improve service quality	Taiwan
This study		Int'l Airports

Source: Scopus & Web of science databases

Table 6: IPMA Results

Criterion: Perceived green performance	Total Effect	Performance
Nonmanagement employees		
Biospheric value	0.422	77.391
Eco-design of airport	0.133	59.835
Green Airport Reputation	-0.297	71.682

Green Management Intransigence	0.306	53.435
Management employees		
Biospheric value	0.206	79.056
Eco-design of airport	0.145	57.659
Green Airport Reputation	0.480	69.403
Green Management Intransigence	0.263	55.322

Note: Total effects > 0.10 are significant at <0.10. (Hair et al., 2012). See Appendices B and C for visual depictions

Chapter 5

DISCUSSION AND CONCLUSION

5.1 Discussion

This dissertation developed an original conceptual model and established evidence of the relationship among biospheric value, eco-design of airport buildings, green management intransigent, and green airport reputation, which impact perceived green performance. This finding is significant, as it indicates the vital role which the knowledge base, concern, value, care, and importance individual employees attached to the natural ambiance of a workplace (biospheric value), can play on the pro-environmental belief, attitude, and behavior geared towards improving green practices at the airports. This outcome aligns with findings relating to green human resource management in the health sector by (Sabokro et al., 2021), which reveals that green training as part of green human resource management (GHRM) has multiple effects directly and indirectly on hotel employees' pro-environmental behavior and job satisfaction.

Straight to the results, the SEM analysis indicates little connection between employees' perception of the green performance of the airport and the ecological design of the airport buildings; hence, Hypothesis 1 is rejected. Nevertheless, the importance-performance matrix analysis (IPMA) result uncovers group-specific differences in the total effects (importance) of some of the constructs among the non-management and management employees of the case airports. Surprisingly, the IPMA

result reveals that the eco-design of airport buildings scored low on importance and performance among the two groups and hence had little influence on their behavior and perception of the green performance of the airports. The result might be due to the context of the study being in Nigeria, where even the existing airport structures are poorly maintained. The management staff is aging folks corroborating previous studies, including Wanke et al. (2016).

However, SEM analysis indicates that Hypothesis 2 is supported by the findings of this study (Table 4). This result is crucial because it reveals positive interaction between the ecologically designed airport buildings and employees' values, care, and environmental concerns. Similarly, the IPMA (Table 6) indicates high importance and performance of biospheric value of nonmanagement employees, with little importance but higher performance in the case of management employees. This result obviously can be hinged on the differences in age, knowledge, and awareness of this group, who are much younger with more access to information, including awareness of climate change and global warming, compared to the much older management staff.

The above finding is consistent with prior studies, which posit that a lack of awareness about sustainable practices among airport management and staff can hinder the adoption. Furthermore, insufficient funding can limit the implementation of sustainable practices. At the same time, the lack of technical expertise can hinder the effective implementation of sustainable practices (Cao et al., 2020; Lee & Kim, 2017). The management group often needs to gain more awareness of environmental challenges. It tends to be satisfied with the status quo. Hence the IPMA indicates the biospheric value has a little total effect but, surprisingly, higher performance in the case of management staff. Therefore, this calls for further probing by other scholars.

Further, according to the SEM analysis, Hypotheses 3 and 4 are sustained; hence, the eco-design of the airport has a negative connection with green management intransigence and a positive effect on green airport reputation. The IPMA similarly reports the relative importance of green management intransigence. However, low performance in the nonmanagement group is less important to the management group, but with a small quantity of performance to that group as well compared to the nonmanagement employees' group. The significance of this is that it uncovers the areas in which management and nonmanagement need to make attitudinal and behavioral adjustments to improve the green reputation of the airports in the country.

Hypothesis 5 is rejected; that is, little value or concern for the environment on the part of management does not translate to resistance to change towards pro-environmental policies and decisions on the part of airport management. This finding is unexpected and does not align with the concept of biospheric-value, also known as ecological or environmental value, which refers to an individual's perceived worth or importance of the natural environment and its ecosystems, including its intrinsic and instrumental values (Gifford, 2014). It is also in variance to previous findings by Schultz & Zelezny (1998), who assert that BV is an essential factor in promoting sustainable behavior, as people who have a strong sense of biospheric-value are more likely to engage in pro-environmental actions and support environmental policies.

On another note, Hypothesis 6 is accepted in the SEM analysis, meaning that when employees have value, care, and concerns for the natural environment, they are more likely to engage in environmentally friendly behavior, earning the airport a positive green airport reputation. In this instance, this result is in tandem with the findings by Gifford (2014) and Schultz & Zelezny (1998). However, the IPMA results indicate a

total negative effect but high performance for green airport reputation among nonmanagement employees.

In contrast, it has higher importance but lower performance for management employees. This result is significant because if management is satisfied with the current reputation of the airport, as the results indicate, they are likely to avoid making any significant changes to their behavior and decision on green practices. The care and concerns of nonmanagement employees for the environment will not likely translate into improvement in the green reputation of the international airports in Nigeria compared to other airport users, which is not too good for sustainable tourism development in the country. This outcome is because, since nonmanagement staff are not in positions to make decisions in the organization, they have little influence on its policies and practices.

Furthermore, PLS-SEM analysis revealed that Hypotheses 7, 8, and 9 are all supported. Biospheric values, green management intransigence, and green airport reputation significantly mediate the relationship between airport buildings' eco-design and the airports' perceived green performance. In other words, the results of this research (table 4) reveal that according to Hypothesis 7, the more/less, or the higher/lower the biospheric values of airport employees (non-management and management), the higher or lower their perception of the green performance of the airport.

In the same vein, from the results of Hypothesis 8, the extent to which the non-management employees can sense reluctance in the attitude and behaviors of management towards the adoption of pro-environmental practices such as eco-design or remodeling of the airport buildings, the more or less the non-management

employees will also view the green performance of the airport. The results imply that the level of reluctance or readiness to adopt pro-environmental practices and behavior by airport management will determine the level at which non-management employees will perceive green performance at the airport. Lastly, from Hypothesis 9, the findings of this study suggest that the higher the green reputation of the airport as viewed by the employees, the higher or lower their perception of the green performance of the airport.

Findings from the current study expand knowledge on the importance of management behavior and attitudes in leading change and motivating or demotivating other employees in embracing pro-environmental behaviors and practices in the workplace, especially at airports. Previous works focused more on green human resource management and positive behavior and attitude toward environmentally friendly practices by human resources managers. The available evidence is silence on the negative attitudes and behavior of the general management team, especially in the aviation or airport sector, particularly in developing countries like Nigeria. Hence, the current study fills that gap.

5.2 Contribution to Literature

Primarily, the current study expands the literature on eco-design and green management in the workplace, the tourism industry, and the aviation sector (Ferrulli, 2016b; Han et al., 2020; Karatepe et al., 2022a, Kucukvar et al., 2021). Specifically, the study extends searchlight on constructs such as eco-design of airport buildings (EAB), biospheric-value (BV), and green management intransigence (GMI) that have yet to receive much attention in the extant literature. It provides evidence of positive connections and impacts, for instance, between EAB and BV and the negative link

between EAB and GMI. Our findings shed light on how the care, value, and concern individual employees have for nature and the natural environment in the workplace could make them appreciate ecologically designed airport buildings which can spore them towards more environmentally friendly behavior in such workplaces.

Previous related studies on airports focused more on customer behavior and responses and technical tools and methods (Greer et al., 2020; Han et al., 2020; Wattanacharoensil et al., 2016), while the perspectives of ecologically designed airport buildings and employees' behavior received little attention. This study is contributing to narrowing that gap in the literature. The study further contributes to understanding the concept of green management intransigence. The result expands the emerging literature linking green management intransigence and its implications on adopting and effectively implementing sustainability practices in airport ground operations and the tourism industry.

In addition, the implication of the findings of this investigation to theory is that it provides evidence, particularly from the developing world context, about the tendency to hold on to the status quo and the knowledge gap prevalence among airport management in African settings as against available literature on developed economies. Similarly, sustainable tourism literature is almost silent on how green management intransigence impacts non-management employees' behavior towards green practices and perceived green performance. Therefore, this investigation enriches sustainable tourism literature with evidence from a developing country context to support this impact and connection and the possible conflicts with stakeholders, including employees and passengers, which supports the findings by Senge et al. (2007).

Furthermore, this study extends knowledge that the relevance of biospheric value extends beyond individuals to airport stakeholders such as management, passengers, employees, airlines, and local communities. The study underscores the role of biospheric value in promoting sustainable behavior among airport stakeholders, especially in the context of green airport operations and sustainable tourism development; it contributes to available literature in the field. The research further expands knowledge by emphasizing the importance of eco-design in achieving green airport performance. Similarly, the findings highlight the importance of airport reputation in promoting and stimulating sustainable behavior among management. Non-management employees of airports, to improve the perception of green performance among them on the journey of achieving green airport performance.

In addition, this study contributes significantly to theory by expanding and highlighting the relevance and explanatory power of the Extended Theory of Planned Behavior (E-TPB) in general, especially in the aviation sector where it is scarcely used. Adopting and delineating the extended version of TPB to explain the rationale for the behavioral choices made by airport managers and non-management cadre level employees, as well as the divergence of the results between the two groups, is a critical contribution to the broaden our understanding of the theory. This study explains the linkage between the biospheric values of management-level employees and their resistance to change, with the impact it produces on their behavior towards green practices, especially the adoption of renewable energy sources and energy management practices, among others. Overall, it contributes to establishing the relevance of the E-TPB across the board in the tourism value chain beyond just explaining consumer purchasing behavior in the hotel and restaurant sectors.

Similarly, the current research contributes to the literature by highlighting the relevance of the Triple-Bottom-Line Theory even in the aviation sector and airport operations. The study indicates and explains the necessity for airport management to always consider the environmental implications of their decisions as it will not only impact the economic and social status of the airports, i.e., the airport reputation, but it will also affect the perception of the environmental-friendliness of the airports. Essentially, the theory contributes to explain that adopting green practices in airport operations has tripartite benefits to the organization vis-à-vis; cost reduction and increased economic impact, social impact in terms of the green reputation of the airports, and also a reduction in carbon footprints of the airport and boosting the perception of the green performance of the airport as far as passengers and non-management employees are a concern. Few studies in recent times have adopted this TBL in the aviation and tourism sector. Hence, the novelty of this study.

Lastly, this cross-sectional study contributes by expanding the literature on importance-performance matrix analysis (IPMA) studies (Ogunmokun et al., 2020; Paraschi et al., 2019; Yuan et al., 2021) by conducting IPMA to examine the performance and importance of each construct to boost the PLS-SEM analysis result. The IPMA result from this study reveals the differences in the outcome between management and nonmanagement staff on all the constructs investigated, with biospheric value as the most crucial factor influencing nonmanagement staff's pro-environmental behavior, compared to green airport reputation, which is most important to management staff. This insight is fascinating and crucial for understanding the drivers of behavioral change factors for airport employees. This IPMA analysis results that reveal the differences in what is important to nonmanagement and management employees is an innovation and is also a significant contribution to literature premised

on the fact that this is the only study in this context that helps in concluding two dimensions from a single study, that is made possible only by this relatively new analytical tool. Extant literature contains mainly analysis, results, and conclusions based solely on SEM and, lately, PLS-SEM. This innovation of combining the two analyses expands and strengthens the literature on sustainability, the tourism and aviation industry, specifically from airport management perspectives, particularly on the Global South and the African context.

5.3 Contribution to Practice

With particular reference to green practices and green management at airports, this study reveals specific areas where management needs to make deliberate changes. It implies that, by embracing various green management practices such as renewable energy adoption, energy saving/conservation measures, and water/waste management measures, airport managers can motivate and encourage nonmanagement employees to follow suit, as the shift is already fast emerging in the hospitality sector. As indicated above, the IPMA result uncovers that the biospheric value of nonmanagement employees is more critical to their pro-environmental behavior in the workplace.

In contrast, the airport's reputation is the most crucial factor driving management staff to embrace green practices in daily operations. The implication of this is that if management can lead by the way, by adopting green practices, as mentioned earlier, it is most likely that nonmanagement employees will come on board quickly since they already possess positive attitudes or care, concern, and value for the environment; Consequently, there is a likelihood of a speedy improvement in the green reputation of the airports, leading to a win-win situation for all and good news for overall sustainable tourism development, from the aviation perspective.

Similarly, findings from this study are essential for airport managers in Nigeria and Africa as a whole to understand and identify other specific areas where a deliberate change of attitude and behavior is required in management's decisions to gravitate towards environmentally-friendly practices, including ecological design of new airport buildings or remodeling of existing structures, energy saving practices, renewable energy adoption such as solar mini-grids for the airport for constant, adequate, reliable, cleaner and efficient electricity supply to the airports.

Moreover, nonmanagement employees' belief about management's care, concern, and value for nature, and management's attitude to change towards environmentally friendly decisions is the next most critical factor to influence employees' attitude and behavior, as well as how they perceive the performance and the positive reputation of the airport as environmental-friendly airport owing to management employees' attitude and actions. This interaction and the mediating impact of the biospheric values, green management intransigence, and green airport reputation have overall implications on the perceived green performance of the airports in Nigeria and sustainable tourism development in the country in general.

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implications on the perceived green performance of the airports in Nigeria and sustainable tourism development in the country in general.

Furthermore, in terms of practical implications of this study, findings in this study alluded to the practicability and the fact that airport-based renewable energy technologies offer numerous benefits, including reducing the carbon footprint of airports, increasing the sustainability of the environment by reducing air and land pollution, lowering electricity bills, and enhancing energy security. The study further unveils the evidence that solar PV, wind turbines, and biomass are among the most commonly adopted renewable energy technologies by airport management worldwide. However, adopting renewable energy technologies at airports is challenging, including the initial high capital costs, technical challenges, policy inconsistency, and regulatory barriers.

Despite these challenges, several airports worldwide have successfully implemented renewable energy technologies (Barret, 2020; ICAO, 2017). The case airports highlighted in this article demonstrate the potential for renewable energy technologies to transform airports into sustainable and resilient infrastructure. However, more airports must adopt these technologies to reduce their carbon footprint and raise their green performance, particularly in Sub-Saharan Africa (SSA) and Nigeria. This suggestion is crucial since the little efforts towards renewable energy adoption in the case study airports are limited to airfield lighting. In contrast, by its geographical location, the nation is well endowed with natural irradiation potentials to generate 100% of its energy from solar, but this is contingent on the political will of the airport management and other stakeholders.

Suffice it, airport-based renewable energy technologies are crucial for reducing the carbon footprint of airports and improving the green performance of the airports, the aviation sector in general, and the tourism industry as a whole. As earlier reiterated, the most commonly used and adopted renewable energy technologies in airports worldwide includes; Solar PV, wind turbine generators, and biomass gasifiers, among others. Several airports have successfully installed and inaugurated one or a combination of the above-mentioned renewable energy technologies. Thus, it demonstrates the potential for airports to become sustainable and resilient infrastructural facilities and essential contributors and partners in the fight against global warming and climate change. However, more airports need to adopt renewable energy technologies to realize the full potential of renewable energy in the aviation sector and the global tourism industry.

Another practical implication of this study is that since the energy consumption of airport operations is very significant, the implementation of various measures highlighted in this study can help to reduce energy consumption, lower carbon emissions, and increase the sustainability of airport operations if adopted by the studied airports and others in the SSA. For instance, eco-building measures that focus on reducing the energy consumption of airport buildings can be achieved by using energy-efficient HVAC systems, high-efficiency lighting, and using renewable energy sources such as solar PVs and wind turbines. These measures can be implemented through collaboration between airport management, employees, airlines, and other stakeholders. They can significantly improve airport operations' energy efficiency. All these will ultimately contribute immensely to improving the green performance of international airports.

Moreover, the quality of the airports can have a significant impact on passengers' travel experience. Modern airports are designed to provide a seamless passenger experience, with state-of-the-art facilities, comfortable lounges, and a range of shopping and dining options. This study has practical implications in this regard. Implementing sustainable practices can help airport managers improve passengers' perception of the green performance of the airports. Adopting green practices and measures can also improve the studied airport's green reputation compared to its current status.

5.4 Limitations and Future Research Directions

One major limitation of most academic investigations is funding, which is not different for this current study. The second limitation is the apathy of Nigerian airport employees' participation and response to the questionnaire for personal, official, and poor internet connectivity reasons. This made it challenging, frustrating, and costlier to gather enough responses from the two airports resulting in a relatively small sample size contrary to the initial estimate. Another limitation is the generalization of the findings because employees from only two airports were surveyed in this study for several reasons mentioned earlier, including the heightened insecurity in Nigeria and the global Covid-19 pandemic. However, these challenges were reasonably overcome and now form a basis for our suggestions for future research.

Similarly, though this research benefited from partial funding from the university; yet, due to time and financial constraints, the sampling technique adopted in this study is convenience sampling. It is a non-probability sampling technique in which participants are selected based on their availability and willingness to participate in the study. This method is typically used in studies with limited resources or time constraints, as it is relatively more straightforward, faster, and less expensive to implement.

Convenience sampling is also often used when the population of interest is difficult to access or has low response rates. Despite the advantages enumerated, convenience sampling has several limitations that should be considered in future research. Etikan et al., 2016; Groves et al., 2009; Levy, & Lemeshow, 20131999; Lohr, 2010; Sharma, 2017; Trochim, 2006). 1) It may result in a biased sample, as participants who are willing to participate may not correctly represent the population of interest. 2) It may not provide a statistically significant sample size, which can affect the generalizability of the study findings. 3) It may result in a self-selection bias, as participants who are more motivated or have a particular interest in the topic may be more likely to participate.

Further research is recommended to adopt other sampling techniques that could enhance the findings' representation and generalization potentials. Future research should involve more airports in Nigeria and other major airports from other parts of Africa to create room for cross-border comparison and more room for generalization. Such studies will expand the sample size and opportunities for greater participation of people from diverse backgrounds, exposure, and experiences, further enriching the robustness of the findings and generalization.

Finally, the model could be expanded by adding a range of new constructs to be investigated to enhance the research novelty, significance, and contributions to knowledge theoretically and in practice. Moreover, this current study is cross-sectional, so it is challenging to establish causality between the different constructs. Hence, we probe the links between the constructs alongside the effects and mediating roles of one construct on the relationship between others; this can be taken care of with a longitudinal approach and path analysis in future investigations.

We recommend future research to explore other theoretical foundations, such as the value-belief-norm theory (VBN). This is because other theories, like VBN theory, are also helpful in explaining constructs such as biospheric value as an environmentally oriented variable that has much to do with individual and societal values, beliefs, and norms.

5.5 Conclusion

Conclusively, this study documents evidence of connections between the eco-design of airport buildings, biospheric value, green airport reputation, perceived green performance, and management intransigent in airport settings in Africa and specifically in the Nigerian context. Findings indicate that younger employees with better access to information and higher consciousness of climate change, global warming, and other environmental phenomenon are more well-disposed to change towards pro-environmental behavior at work. This finding is apparent, provided the older management team can embrace change and adopt green practices in their management decisions. In this study's context, the results have implications for improving the airports' green reputation and performance, enhancing Nigeria's image as a destination, and increasing tourism demand.

Explicitly speaking, evidence that emerged from this study helped to answer the two questions this investigation set out to answer in line with the purpose and objectives of the study. For example, the findings indicate different ways the interplay between green management intransigence, eco-design of airport buildings, the biospheric value of airport management/employees, and green airport reputation can affect perceived green performance. First, contrary to our expectation, the overall results from the PLS-SEM reveal that the ecologically designed airport buildings have little effect or

importance on how non-management and management employees perceive the airports' green performance, which is problematic and will need further validation in future research. However, the IPMA results are slightly different.

On the contrary, however, but in tandem with our assumption, the IPMA results reveal that the non-management employees have better biospheric values, which also positively impact the importance they attached to the ecological nature of the airport buildings, unlike the management employees. Similarly, the results indicate that where management is not receptive or reluctant to embrace change, they attach little or no importance to ecologically designed airport buildings, which is compatible with our expectations from the interaction. The results further indicate that non-management employees attach more importance to the green reputation of the airport, and they recognize the impact of eco-design of airport buildings and the significance of their attitude and behavior on that reputation. Although the management employees are interested in a green airport reputation, more is needed to influence their behavior positively towards the eco-design of airports.

To the other objectives of the study, the results reveal that the higher or lower the biospheric value of airports' management/non-employees, the green airport reputation, and green management intransigence, the more significant their positive or negative impact or mediating effect on the relationship between eco-design of airports and perceived green performance.

Similarly, the study revealed the importance and relevance of the extended theory of planned behavior (E-TPB) and the triple-bottom-line theory (TBL) in explaining the

behaviors of management and nonmanagement employees concerning adopting environmentally-friendly behavior.

Thus, this study is a right step in the right direction in the search for practical measures which individuals and corporate bodies, through green management, can take to significantly contribute their quota to mitigate the adverse effects of climate change and global warming. Personal choices can reduce reliance on fossil fuel energy sources, reduce carbon footprints at individual and corporate levels, reduce cost, and improve environmental quality, to achieve sustainability across the tourism value chain. The above will go a long way in improving the reputation of the tourism and aviation industry as a notorious emitter of CO2 and a significant contributor to environmental pollution and degradation. It will further gravitate the industry towards meeting the various target in the context of tourism and aviation as enshrined in Goals 6, 7, 9, 11, 12, and 13 of the Global Agenda 2023, also known as the SDG Goals.

It is hoped that future research will look into the directions suggested here and expand the investigations further with larger samples, broader and salient constructs that could drive knowledge, and expand the literature on this crucial sector of the tourism industry, to realize the social, economic and environmental impact of the industry globally, and in the Global South in particular.

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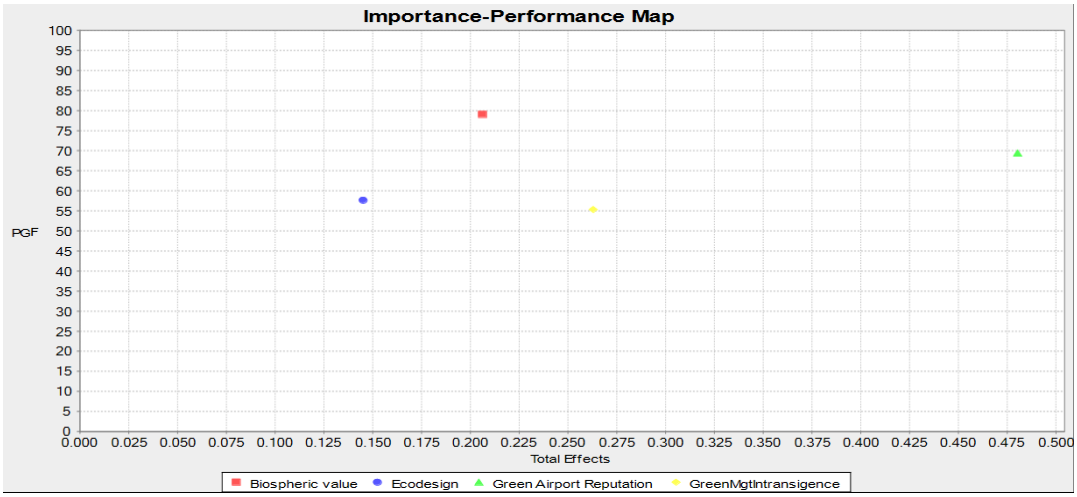
APPENDICES

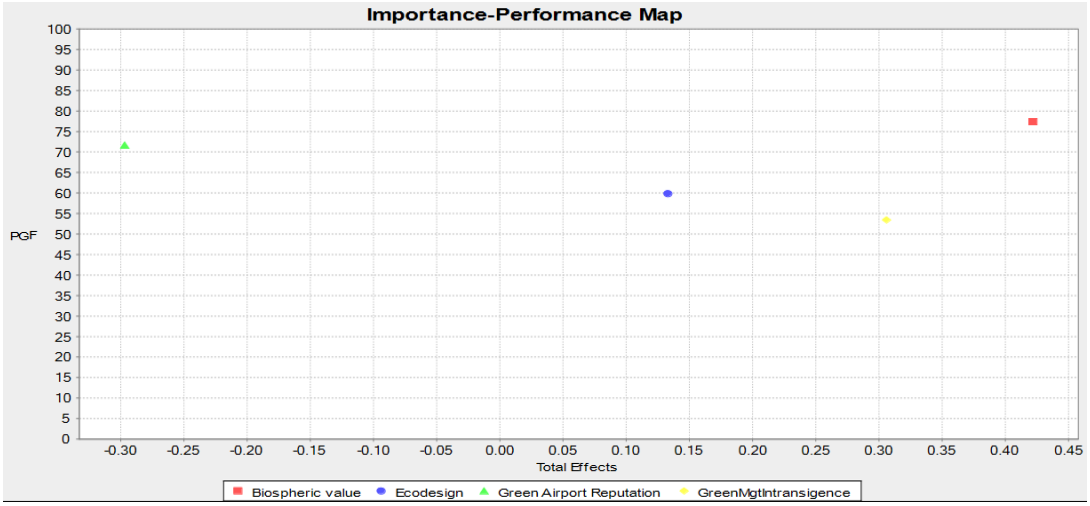
Appendix A: PLS Predict

Items	RMSE	
	PLS model	Linear model
BV1	1.513	1.604
BV2	1.405	1.443
BV3	1.514	1.491
BV4	1.487	1.522
GAR1	1.049	1.123
GAR2	1.057	1.129
GAR3	0.927	0.963
GAR4	0.975	1.045
GMI1	1.780	1.794
GMI2	1.686	1.736
GMI3	1.913	2.015
GMI4	1.813	1.895
PGP1	1.892	1.964
PGP2	1.595	1.721
PGP3	1.714	1.825
PGP4	1.864	1.913
PGP5	1.725	1.797
PGP6	1.594	1.688
PGP7	1.673	1.666
PGP8	1.486	1.562
PGP9	1.672	1.696
PGP10	1.728	1.871

Appendix B: IPMA Results Management Level Employees and The Criterion Perceived Green Performance



Appendix C: IPMA Results Nonmanagement Level Employees and The Criterion Perceived Green Performance



Appendix D: Questionnaire

A FIELD STUDY ON HOW TO IMPROVE GREEN PERFORMANCE IN INTERNATIONAL AIRPORT OPERATIONS

Dear Respondent,

This research aims to understand better how sustainable practices can improve green performance in international airport operations. We kindly request that you self-administer this questionnaire.

There are no right or wrong answers in this questionnaire. Any information collected during our research will be kept confidential. We very much appreciate your time and participation in our research.

If you have any questions about our research, please do not hesitate to contact .....Bamidele, R. Oluyemi----- through her e-mail address: ------- rumikdaneme@gmail.com--------

Thank you for your kind cooperation.

Research Team:

SUPERVISOR NAME and SIGNATURE: Prof. Dr. Ali Ozturen

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Address:
Faculty of Tourism
Eastern Mediterranean University
Gazimagusa, TRNC
Via Mersin 10, Turkey

1. Please indicate which of the two international airports below you are currently working

   Check all that apply

   ☐ LOS

   ☐ ABV

Section One

Please indicate your disagreement or agreement with each statement about the airport by crossing the number using the following five-point scale:

(1) Not at all
(2) Not really
(3) Undecided
(4) Somewhat
(5) Very much

01. Environmentally friendly spaces are readily available at this airport (eco spaces)	1	2	3	4	5
02. Rest areas at this airport are designed in a green way (green rest areas).	1	2	3	4	5
03. Diverse flowers/trees and potted plants are located in many places (e.g., cafés, restaurants, shopping places) at this airport (plants)	1	2	3	4	5
04. A variety of green interior decorations are easily observable at this airport (eco-friendly décor).	1	2	3	4	5
05. Natural light through glass windows, walls, and roofs are easily observable at this airport (natural light).	1	2	3	4	5
06. Air quality inside the terminal building of this airport (e.g., temperature, circulation, humidity, natural scent, and ventilation) is fresh and comfortable (air freshness)	1	2	3	4	5
07. Overall physical environment of this airport is designed in an eco-friendly way (eco-friendly physical environment)	1	2	3	4	5

Section Two

Please indicate to what extent the followings are important as a guiding principle in your life by crossing the number using the following Seven-point scale:

(1) Not important
(2) Not really important
(3) Somewhat not important
(4) Undecided

(5) Somewhat important
(6) Important
(7) Very important

01. I hold strong values as regards preventing pollution; (preventing environmental pollution)	1	2	3	4	5	6	7
02. I respect biodiversity in the environment; (respecting the earth)	1	2	3	4	5	6	7
03. All things should fit into nature (unity with nature)	1	2	3	4	5	6	7
04. I actively protect the environment; (protecting the environment)	1	2	3	4	5	6	7

Section Three

Please indicate how true or false is each statement about the airport by crossing the number using the following five-point scale:

(1) False
(2) Slightly false
(3) Neutral
(4) Slightly true
(5) True

01. Compared to other airports, this airport has a good green reputation	1	2	3	4	5
02. In general, the reputation of this airport is good	1	2	3	4	5
03. Overall, I consider that the green reputation of this airport is favourable enough such that I would consider using this airport again	1	2	3	4	5
04. The green reputation of this airport is good that I can recommend it to families and friends	1	2	3	4	5

Section Four

Please indicate your disagreement or agreement with each statement by crossing the number using the following Seven-point scale:

(1) I strongly disagree
(2) I disagree
(3) Somewhat agree
(4) Undecided
(5) Somewhat I agree
(6) I agree
(7) I strongly disagree

01. Senior management of the airport like to keep to established, traditional ways of handling environmental related issues	1	2	3	4	5	6	7
02. The way this Airport handles environmental related issues has never changed very much	1	2	3	4	5	6	7
03. Management is not interested in trying out new environment-friendly related ideas	1	2	3	4	5	6	7
04. Changes in relation to environment-friendly practices in this airport have happened very slowly	1	2	3	4	5	6	7

Section Five

Please indicate your disagreement or agreement with each statement by crossing the number using the following Five-point scale:

(1) I strongly disagree
(2) I disagree
(3) Undecided
(4) I agree
(5) I strongly agree

01. Green operations enable the airport to reduce the total cost of operation	1	2	3	4	5
02. Green operations can help the airport achieve green port with lower operation cost	1	2	3	4	5
03. Green operations can help the airport reduce fuel cost and greenhouse gas emission	1	2	3	4	5
04. Green operations can help the airport reduce water and electricity consumption	1	2	3	4	5
05. Green operations can help the airport win support from the public and government for green-port operations.	1	2	3	4	5
06. Green operations can help the airport differentiate itself from competitors	1	2	3	4	5
07. Green operations can help the airport reduce the risk of accidents and legal difficulties	1	2	3	4	5
08. Green operations can help the airport improve business profitability	1	2	3	4	5
09. Green operations can help the airport attract new clients and retain the existing ones	1	2	3	4	5
10. Green operations can help enhance airport's reputation and reduce marketing costs.	1	2	3	4	5

Section Six

Please indicate your answer by clicking the appropriate alternative

17. How old are you*

Mark only one oval.

- ◯ 18-27
- ◯ 28-37
- ◯ 38-47
- ◯ 48-57
- ◯ 58 and over

18. What is your gender *

Mark only one oval

- ◯ Male
- ◯ Female

19. What is the highest level of education you

Mark only one oval.

- ◯ Primary School
- ◯ Secondary School
- ◯ Vocational school 2 years
- ◯ University first degree
- ◯ Master Degree
- ◯ Ph.D. Degree

20. How long have you been working in this organization?

Mark only one oval.

- ◯ Under 1 year
- ◯ 1-5 years

- ⬭ 6-10 years
- ⬭ 11-15 years
- ⬭ 16-20 years
- ⬭ More than 20 years

21. What is your marital status?

Mark only one oval

- ⬭ Single
- ⬭ Married
- ⬭ Widowed

22. What is your position in this organization? *

Mark only one oval.

- ⬭ Top Management
- ⬭ Middle level
- ⬭ Non-management staff

Thank you for your participation

Appendix E: Federal Airports Authority of Nigeria (FAAN), International Arrival, Energy consumption/Conservation Data

The Federal Airports Authority of Nigeria (FAAN) is the statutory federal government agency or parastatal that is saddled with the responsibility of managing all the Airports in the country. Interestingly, unlike what is obtainable in Europe and America, for example, 99% of Nigeria's commercial airports are owned and run by the Federal government through FAAN and under the Federal Ministry of Aviation. The regulatory body for the sector and other sister agencies, which are mostly airport-based, are the NCAA, Nigerian Airspace Management Agency (NAMA), Nigeria Metrological Agency (NIMET), and Accident and Investigation Bureau (AIB).

Nonetheless, FAAN, with its corporate headquarters in Lagos, is the landlord and administrative/technical (to some extent) and security manager of the airport structures and facilities across the country. The vision of the organization is “to be among the best airport groups in the world,” while its mission statement is “to develop and profitably manage customer-centric facilities, for safe, secure and efficient carriage of passengers and goods at world-class standard (FAAN https://www.faan.gov.ng/) Similarly, on its business policy, the agency declares that “FAAN welcomes the private sector to partner with it in various areas of its statutory mandate to provide adequate infrastructure and facilities for efficient service delivery to support the Nigerian aviation industry” (FAAN https://www.faan.gov.ng/).

Technically, there are 17 airports in Nigeria, excluding military airports and private (company-owned) air-stripes. Six are designated international airports; the remaining

11 are domestic, while one is state-government-owned (Akwa-Ibom State). However, effectively the four significant hubs and international airports are the Lagos-based Murtala Mohamed International Airport (MMA), the busiest and main gateway to the country; the Nnamdi Azikiwe International Airport (NAIA) Abuja in the Federal Capital Territory (FCT); the second gateway, Mallam Aminu Kano International Airport (MAKIA) Kano, and the Port-Harcourt International Airport (PHIA) Port-Harcourt (Nwaogbe, 2018; Stephen, Mobolaji. S; & Ukpere, 2011) (Nwaogbe, 2018; Stephens, & Ukpere, 2011). Figure 1 depicts the data on international arrivals at MMA and NAIA from 2015 to 2020. MMA received the highest 1,578,452 international arrivals in 2019, almost three times more than 506,844 in the same period at NAIA. The figure represents a portion of the country's tiny share of the record-breaking data of 1.5 billion global international arrivals in 2019.

The coordination of all airports' electricity and electrical functioning and maintenance is under the Directorate of Engineering Services, with a director and a GM electrical, among others, at the headquarters and heads of electrical departments in each of the airports in Nigeria. This directorate and department are, therefore, very crucial to this study and form one of the central populations for sampling in data collection. The poor maintenance culture and inadequate funding had made even the no one airport in Nigeria, MMA be rated as one of the worst in the world in 2019 (Nwaogbe, 2018; SleepinginAirports, 2021), which is a disservice to the tourism sector in the country.

INTERNATIONAL FLIGHTS FOR MURTALA MUHAMMED AIRPORT AND NNAMDI AZIKIWE INT'L AIRPORT (2015 -2020)

AIRPORT		MMA	NAIA
FLIGHT TYPES		INTERNATIONAL	INTERNATIONAL
2015	ARRIVAL	1,534,047	471,923
	DEPARTURE	1,558,620	468,226
	GRAND TOTAL	3,092,667	940,149
2016	ARRIVAL	1,444,218	441,085
	DEPARTURE	1,501,696	444,841
	GRAND TOTAL	2,945,914	885,926
2017	ARRIVAL	1,411,435	365,149
	DEPARTURE	1,457,664	369,360
	GRAND TOTAL	2,869,099	734,509
2018	ARRIVAL	1,495,548	500,968
	DEPARTURE	1,549,835	515,015
	GRAND TOTAL	3,045,383	1,015,983
2019	ARRIVAL	1,578,452	506,844
	DEPARTURE	1,624,385	531,876
	GRAND TOTAL	3,202,837	1,038,720
2020	ARRIVAL	502,242	250,296
	DEPARTURE	544,326	222,712
	GRAND TOTAL	1,046,568	473,008

Table 1: International Arrival and Departure

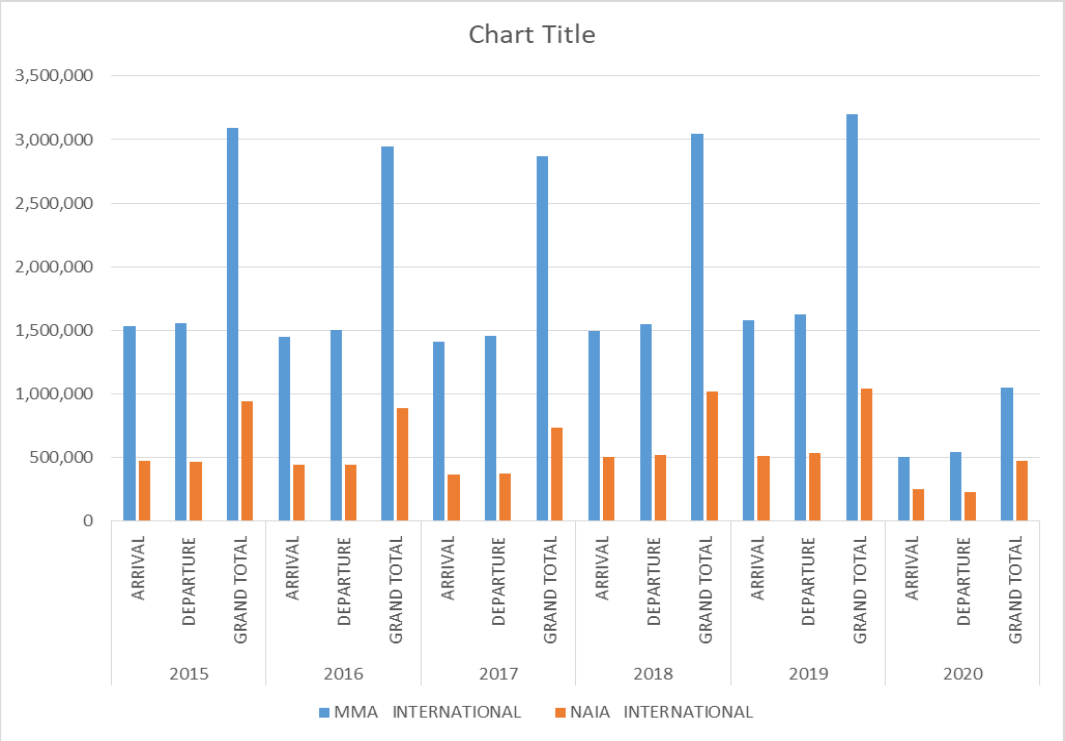

Figure 1: International Arrival and Departure

Source: Federal Airport Authority of Nigeria (FAAN) 2021

Energy efficiency, saving and conservation at international airports

The significant components of air transportation consist of aircraft, airlines, airports, and air navigation. Using the data on energy consumption rate and expenses at the two case study airports as examples, airport operations (excluding energy consumption by flights during actual flights) are indeed highly energy dependent. Some of the airport operational procedures with massive energy usage include; ground operations at departure and arrivals, taxi-out, take-off and climbs, cruise, descent, and approach management, as well as landing and taxi-in (Benito & Alonso, G., 2018 Energy Efficiency in Air Transportation).

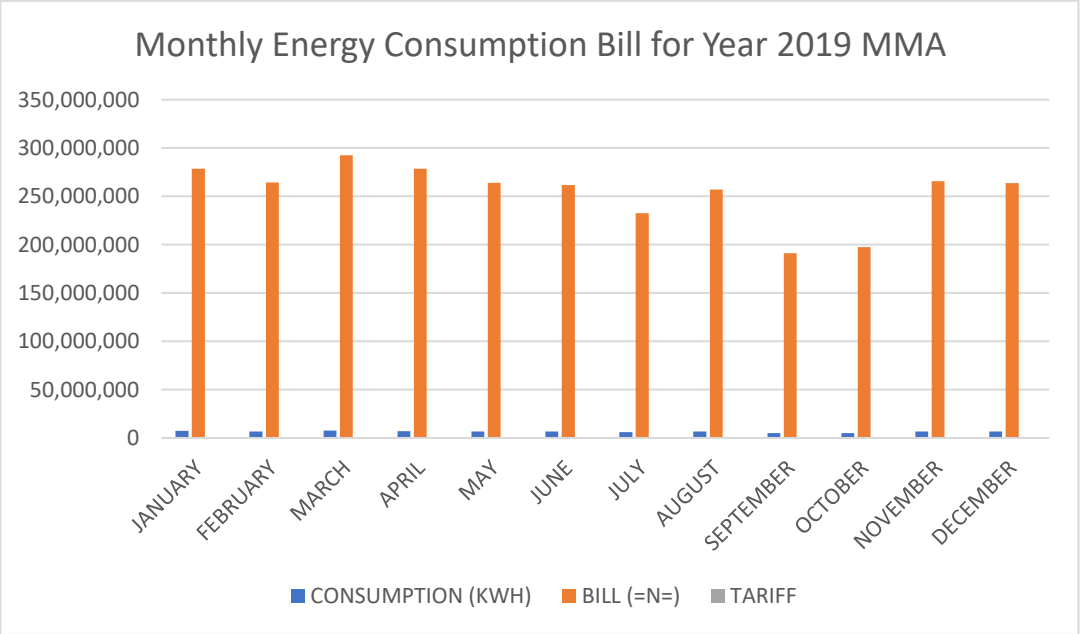

Figure 2: Energy Consumption (2019) MMA

Source: Federal Airport Authority of Nigeria (FAAN)

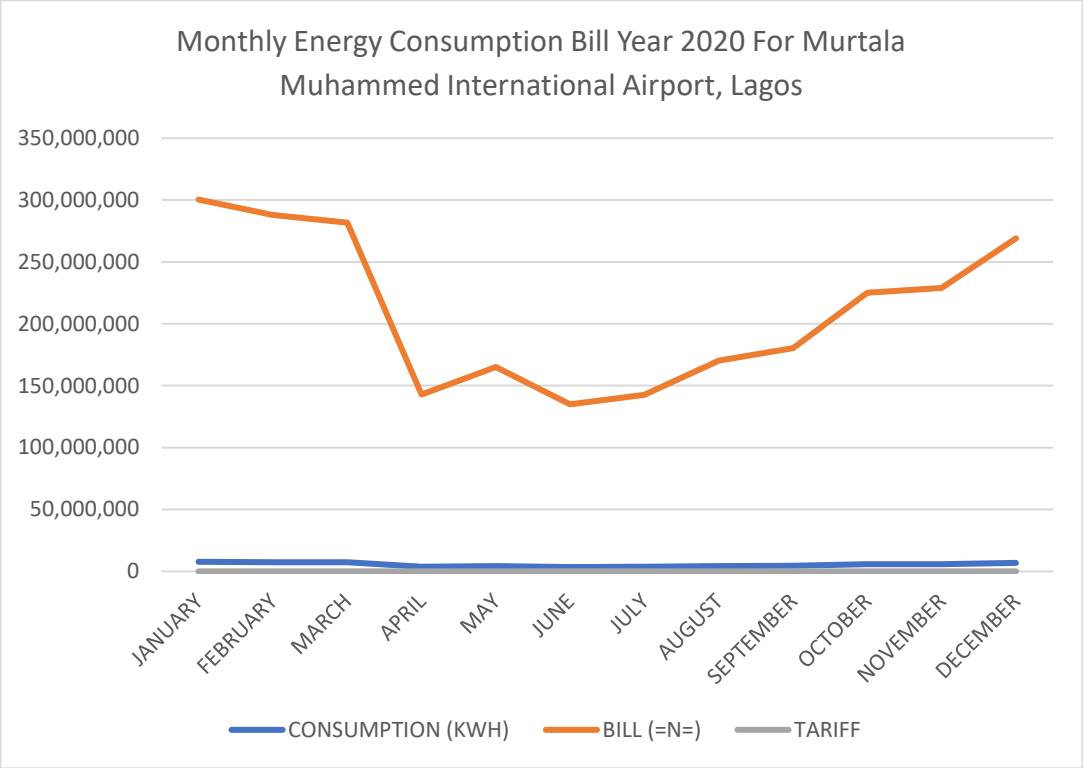

Figure 3: Energy Consumption (2020) MMA

Source: Federal Airport Authority of Nigeria (FAAN)

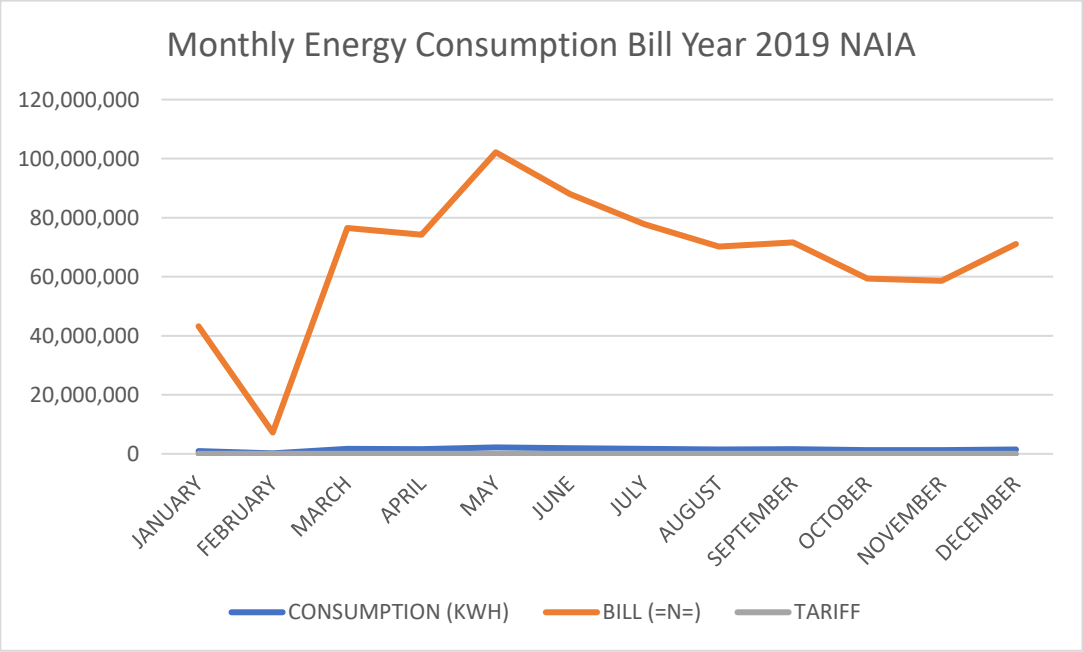

Figure 4: Energy Consumption (2019) NAIA

Source: Federal Airport Authority of Nigeria (FAAN)

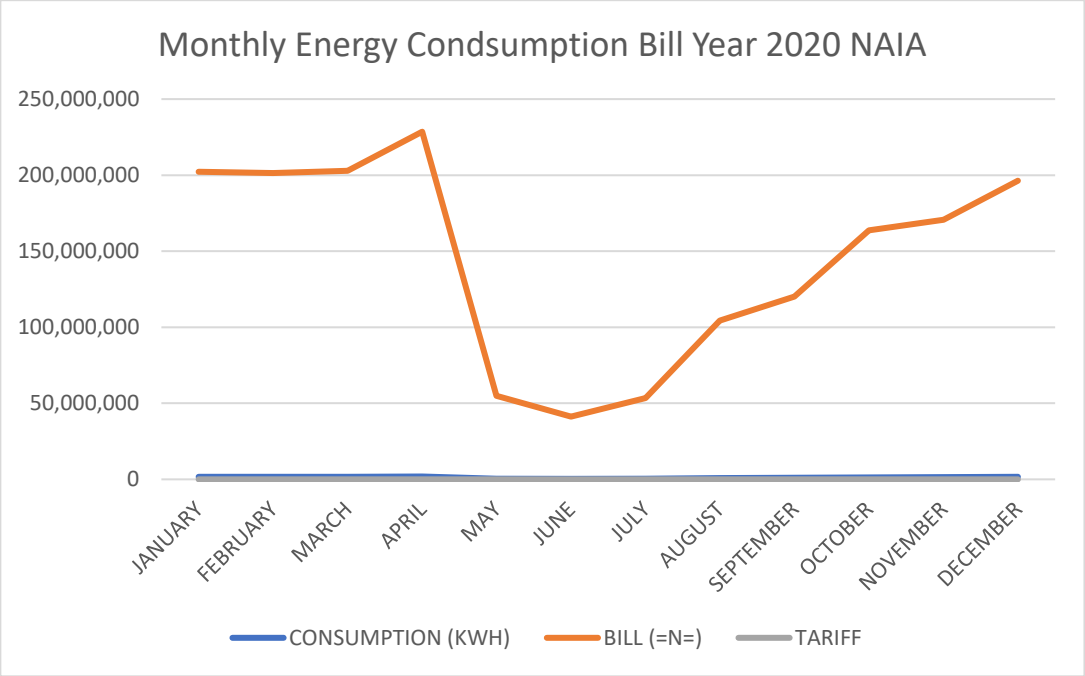

Figure 5: Energy Consumption (2020) MMA

Source: Federal Airport Authority of Nigeria (FAAN)

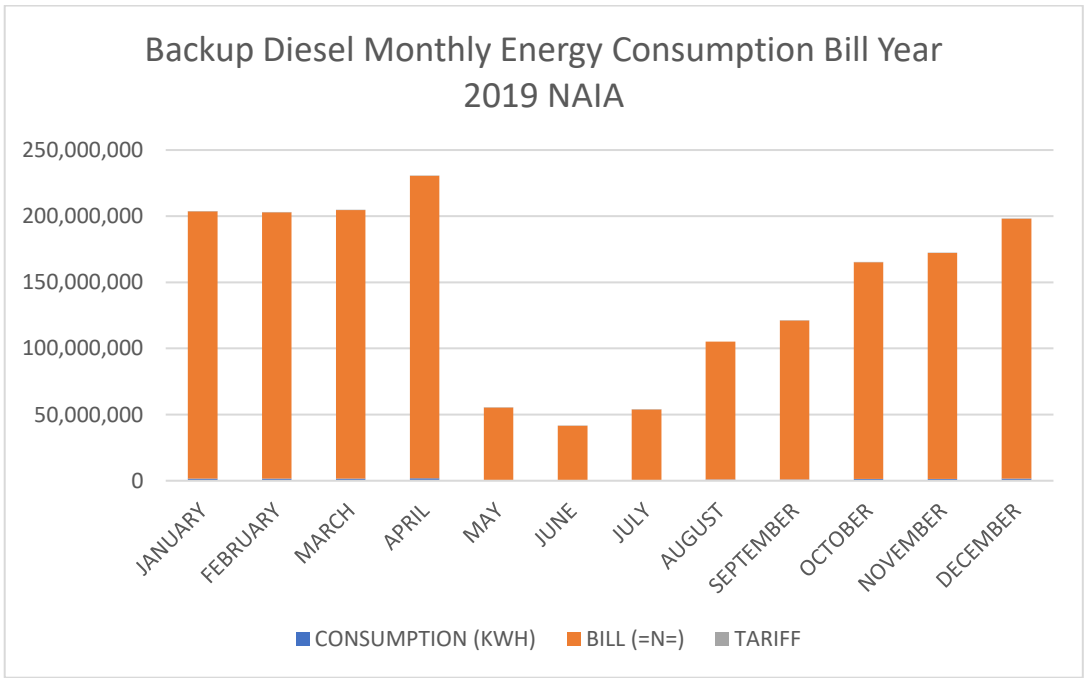

Figure 6: Energy Consumption (2019) MMA

Source: Federal Airport Authority of Nigeria (FAAN)

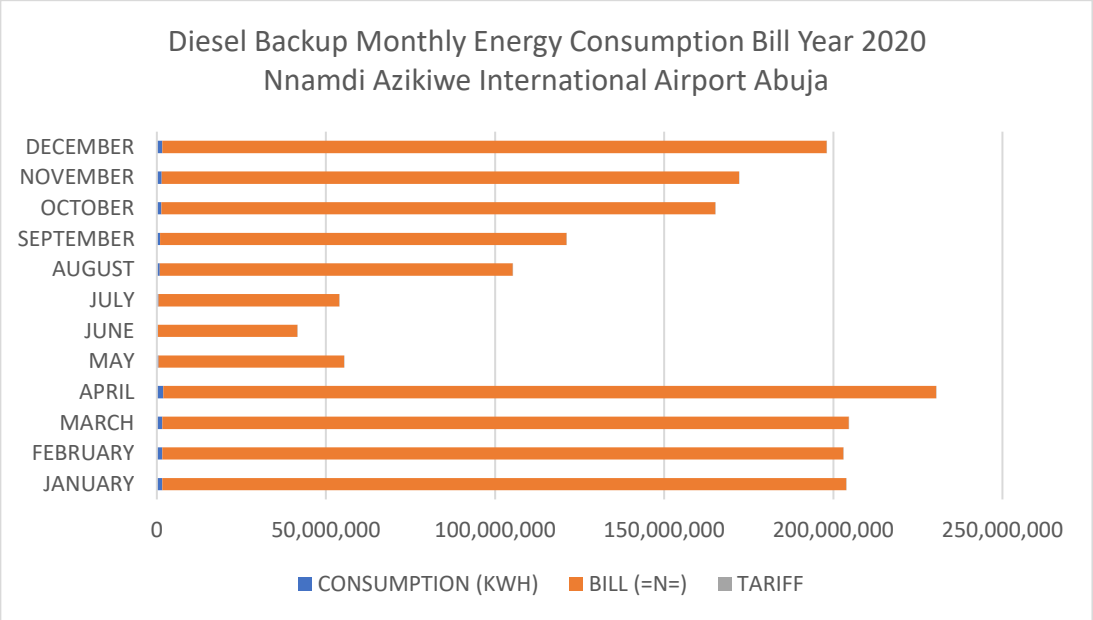

Figure 7: Energy Consumption (2019) MMA

Source: Federal Airport Authority of Nigeria (FAAN)

The Nigerian Tourism Policy

The tourism sector in Nigeria is still evolving, despite being endowed with enormous natural, rich cultural, and historical tourism potentials and products. Meanwhile, extant literature abounds on empirical evidence of tourism as a sustainable economic development pathway for countries across world regions. Developing economies, in particular, have seen the transformative impact of tourism as a strategy to boost national GDP while improving the local economy in some other places (Bassey, 2015; Oloidi, 2020).

Hence, Nigeria also tried to position itself to tap from these benefits by including tourism in the national economic plan since the early 90s to diversify and transform its oil-dependent mono-economy using sustainable tourism planning and development models (Bassey, 2015). A sequel to that was the formulation of the country's National

Tourism Policy in 1990, and the Nigeria Tourism Development Corporation (NTDC) was established in 1992 to fast-track tourism development in the country. Tourism Development Master Plan also began in 2005 to advance the process progressively and sustainably (Bassey, 2015).

The main objectives of the National Tourism Policy include the following. A) To protect and promote Nigeria's cultural heritage as a resource for homegrown socio-economic development. B) To encourage community and public partnerships in tourism development. C) To generate foreign exchange, enhance income redistribution, alleviate poverty, and create employment. D) To promote Nigeria as a desirable tourism destination within Africa's cultural renaissance. E) To promote geopolitical integration, healthy international cooperation, and understanding. F) To ensure environmental sustainability in developing tourism resources (Bassey & Egon, 2016).

To date, the set goals and objectives still need to be attainable. However, steady growth was recorded in the country from a total of 1,035,000 international tourist arrivals in 1995 to the highest of 6,113,000 in 2010. It has since dropped to 5,265,000 tourist arrivals in 2016, according to the World Bank databank (UNWTO, 2019; World Bank, 2019). Moreover, tourism still contributes less than 1% to the national GDP (Bassey, 2015). The above is not unconnected to the general dysfunctional governance system, leadership failure, and mismanagement coupled with corruption, lack of proper planning and implementation, poor funding, and insecurity that has bedeviled the country for decades coupled with gross infrastructural deficiencies that hamper and stagnate social-economic growth and development of the country (Bassey, 2015; Bassey & Egon, 2016; Oloidi, 2020).

While expanding the debate, Oloidi (2019) further emphasized that some of the more fundamental factors responsible for the sluggish growth of the tourism sector in Nigeria include a need for more stakeholders and community involvement. It also excludes professional tourism planners and experts in the policy formulations and planning process, leading to weak policy, defective planning, poor implementation, zero monitoring and evaluation of the whole process, and lack of capacity-building (Oloidi, 2020). The tourism policy in Nigeria needs to go back to the drawing board to accommodate environmental policy integration for a more sustainable future in the sector.

Environmental protection and Climate change Policy

The central policy for addressing climate change in Nigeria as a signatory to many international instruments on climate change is referred to as National Policy on Climate Change (NPCC) 2013 or Climate Change Policy Response and Strategy 2013, developed by the Department of Climate Change (DCC) in the Federal Ministry of Environment Nigeria (FGN, 2015; UNFCC, 2021). The main objective of the policy is to mitigate climate change under the Paris Agreement by reducing GHG emissions by over 60% from the energy sector alone (Federal Ministry of Environment, 2015; Yetano Roche et al., 2020). While the strategic goal is to "foster low-carbon, high-growth economic development and build a climate-resilient society through the attainment of set objectives."

These objectives include; implementing mitigation measures that will promote low carbon as well as sustainable and high economic growth; enhancing national capacity to adapt to climate change; raising climate change-related science, technology, and R&D to a new level that will enable the country to better participate in international

scientific and technological cooperation on climate change. Also, it is to significantly increase public awareness and involve private sector participation in addressing the challenges of climate change, strengthen national institutions and mechanisms (policy, legislative and economic) to establish a suitable and functional framework for climate change governance" (FGN, 2015).

The response strategy that came into effect in 2012 identifies the adoption and implementation of specific policies explicitly in the following areas; changing activity, energy efficiency, renewables, nuclear or CCS, or fuel switch non-energy5. It is consistent with the renewable energy policy of the country, which demonstrates the harmony between the RE policy and climate change policy. What remains is how this is integrated into the aviation and tourism policy implementation to achieve overall sustainability in the two sectors.

Energy, renewable energy, and Electricity Policies in Nigeria

As far as Nigeria is concerned, some key policy documents relating to energy, RE, and electricity in Nigeria are; the Electric Power Sector Reform (EPSR) Act of 2005, the Power Reform Act of 2005, the Renewable Energy Master Plan (REMP) 2006, and the Nigerian Renewable Energy and Energy Efficiency Policy (NREEEP). The overarching aim of all these policies is to combat the nation's perennial energy poverty by migrating from fossil fuel-based energy systems towards a clean, reliable, efficient, safe, secure, and competitive energy supply (Akorede et al., 2017). (Akorede, et al., 2017; ECN, 2005).

One of the objectives is to liberalize the electricity sector to enhance private sector participation and investment in energy generation, transmission, and distribution to catalyze to achieve vision-20-2020 agenda. (ECN, 2005). Subsequently, these policies

lead to the unbundling of the underperforming, inefficient, corruption-ridding government utility called PHCN. The upshot of this produces 6 generation companies (GenCos), one transmission company (TransCo), and 11 distribution companies (DisCos) across the six geopolitical zones of the country, as well as a program termed National integrated power project (NIPP) (Monyei et al., 2018).

Specifically, the REMP and NREEEP aim to reduce the estimated energy consumption by 20% and meet 20% of the country's electricity needs with renewable energy sources by 2020 (Akorede et al., 2017). Furthermore, by 2030, it intends to have 13.8GW (45%) of the projected 30GW of electricity from renewables through grid transmission (Yetano Roche et al., 2020). Hence, the Energy Commission of Nigeria (ECN) and Nigerian Electricity Regulatory Commission (NERC) were created to supervise and regulate the energy and electricity sectors to achieve the above-stated aims and objectives alongside Vision 20-2020 (Akorede et al., 2017) (ECN, 2005). The Vision aimed to position the country among the 20 largest economies in the world by the year 2020, unfortunately, the year has come and gone, but the Vision remains a mirage due to a lack of political will and commitment to the basic things such as power security (Abdullahi et al., 2017; Alao & Awodele, 2018).

Electricity deficit in Nigeria and RE potentials and solar PV status

Nigeria, because of its location on the wealthiest continent in the world in terms of human, natural, and mineral resources, is highly blessed with virtually all the renewable energy resources necessary to develop its energy potential to the fullest (Dayo, 2008). Not only will this make the country self-reliant and have energy security, but Nigeria would also be a net exporter of energy, especially clean electricity, to neighboring countries to diversify her economy and boost her GDP. Moreover, the

country lies between latitude 4°N and 14°N along the equator, conveniently positioned in the solar belt with an annual average daily sunshine of roughly 6.5 hours, but ranges from 4 hours at the coastal regions to 9 hours in the far north of the country, equivalent to an average of 5.5 kWh-2 days-1 degrees of solar radiation throughout the year (Abdullahi et al., 2017; Akorede et al., 2017; Monyei et al., 2018; Ozoegwu et al., 2017)

Similarly, Nigeria is endowed with large bodies of water that can generate vast megawatts of electricity beyond the current level, though it contributes 32% of total electricity generation (Akorede et al., 2017; Hanif, 2018). Other RE sources in the country include wind, small lakes and rivers, tidal waves from the ocean, biomass from vast arable land virgin wood, energy crops, huge agricultural and animal wastes, sawmill residues, fuelwood, and household solid wastes, to generate biofuel, biogas, heat energy (Akorede et al., 2017; Vincent & Yusuf, 2014). Despite these enormous endowments, over 80 million Nigerians, 52% of the population, are without electricity connection. The country has one of the lowest energy consumption per capita in the world, amounting to barely 0.721 toe/per capita as of 2011, compared with 1.253 toe/capita obtained in Gabon, 2.186 toe/capita in Libya, and 2.795 toe/capita in South Africa for the same year (Akorede et al., 2017; Alao & Awodele, 2018; Yetano Roche et al., 2020; Lohse, U. et al., 2005).

Put in another way, when compared with some other SSA countries, the figure is like this; for instance, the generation peak for Nigeria is 4,500MW while for South Africa, it is 51GW, 145kWh/capital for Nigeria, 351kWh for Ghana, 275kWh for Côte d'Ivoire, 312kWh for Angola, 164kWh for Kenya, and 4198kWh for South Africa (Roy et al., 2020; FGN 2013).

The above is in tandem with findings by Monyei et al. (2018), who reiterated that Nigeria's energy poverty is statistically more worrisome than portrayed and is the least in Africa. Regrettably, this is further deepened by the margin between the installed capacity of the existing generating plants and their capacity utilization in terms of actual generation, which in turn straddles the entire value chain, i.e., generation, transmission, and distribution (Hanif, 2018; Monyei et al., 2018; Roy, 2020; Vincent & Yusuf, 2014).

Moreover, concerning the percentage of households connected to the grid, the figure is even more worrisome, with 0–33% in Nigeria, 34–74% in Ghana, 34–74% in Cote d'evoire, 34–74% in Senegal, 0–33% in Sierra Leone, and 75–80% in South Africa (Roy et al., 2020). Thus, despite every administration's claim of substantial financial commitment to provide sustainable electricity in the country, a massive gap exists between electricity needs and electricity production and supply (Abdullahi et al., 2017; Hanif, 2018).

Consequently, most Nigerians who can afford at least the smallest diesel/petrol-powered electricity-generating set have resorted to self-generation, which conservatively has been estimated at a minimum value of 6000 MW according to a report (Monyei et al., 2018). Unfortunately, the negative impact of the extra cost of this fossil-based self-generation on small and medium enterprises in the country is daunting and often strangulates the life out of many SMEs in the country (A. Scott et al., 2014; Yetano Roche et al., 2020) with a spiral effect on unemployment, and the GDP of the country.

However, big public organizations and private companies, including airports, spend equivalents of millions of dollars yearly to run and maintain gigantic diesel-powered electricity generators to argue the poor supply from the national grid to stay afloat (Yetano Roche et al., 2020). Moreover, to cap it all, the environmental impact in terms of CO2 and GHG emission, noise pollution with devastating consequences on the health and well-being of the populace, and ultimately on global warming and climate change is also a cause for concern (Nnaji et al., 2013).

Therefore, with such deficits, it is no surprise that the poverty level in the country is one of the highest compared to nations in its contemporary, such that it is regarded as the poverty capital of the world despite its abundant natural, mineral, and human resources endowment. This assertion is corroborated by Abdullahi et al. (2017) and Ozoegwu, Mgbemene, & Ozor (2017) when they argued that the entire power sector in Nigeria is grossly incapacitated for adequate generation, transmission, and distribution of clean, efficient, and affordable energy to support sustainable economic development and growth. This is also corroborated by Hanif (2018) and Monyei et al. (2018).

However, scholars have consistently argued and sustained the fact that with the untapped RE resources in the country, going renewables with environmental friendliness is the far better practical, realistic, and cheaper option to up-scale clean electricity generation and resolving the menace of energy poverty, insecurity, recurrent power outages, and blackouts the ordinary citizens and business are suffering in the country (Abdullahi et al., 2017; Akorede et al., 2017; Hanif, 2018; Monyei et al., 2018; Vincent & Yusuf, 2014; Yetano Roche et al., 2020).

It has been established that by constructing a solar PV farm on as little as one percent (1%) of Nigeria's available landmass, the country can conveniently generate enough cheap and environmentally friendly electricity to meet the current electricity need of her population (Abdullahi et al., 2017; Vincent & Yusuf, 2014; Yetano Roche et al., 2020). It will be far above the government projected solar PV contribution in the small, medium, and long term of 5, 120, and 500MW, respectively, translating to 13% of the total installed capacity of 16 000 MW and 20% by 2020 going by the REMP 2006 provisions (Monyei et al., 2018). Regrettably, 2020 has come and gone; this did not happen. Ordinarily, this would have positioned the country to meet several of the sustainable development goals (SDGs), for which solar energy has emerged to be a strategic component for achieving that purpose, including poverty reduction, energy access, education, gender equality, and mitigating climate change, among others. Fortunately, with the portability and versatility of solar PV technology and other renewables, they are excellent for microgrid generation and distribution, which makes them more cost-effective and time-saving.

Unfortunately, to date, solar energy technology contributes a tiny fraction, estimated at less than 1%, to power or electricity generation in Nigeria, notwithstanding the advancement in solar PV technologies and a consistent drop in the cost of up to 50% in recent years. Thus, the few solar PV generation initiatives that are available in the country are primarily for solar-powered water pumps for a borehole to water supply and keeping vaccines at the right temperature to sustain child immunization programs at clinics and healthcare facilities in the rural communities (Abdullahi et al., 2017; Akorede et al., 2017; Hanif, 2018).

A combination of factors is responsible for this deplorable state of energy, especially electricity supply in Nigeria. These range from the fundamental issue of bad governance/leadership, the hydra-headed monster of corruption that has eaten deep into the fabric of the society, especially the morally bankrupt elite and political class and public office holders in the country, to incompetency or educationally misfit individuals in charge of the energy sector (Roy, 2020; Roy et al., 2020). Other factors include no or poor implementation of existing renewable energy and electricity policies by successive governments to laxity in terms of focus and funding for research and development (R&D) on RE (Abdullahi et al., 2017; Akorede et al., 2017; Ozoegwu et al., 2017).

Nevertheless, contrary to widespread assumption, Nigeria is also blessed with abundant human capital and the intellectual and technical capacity to develop and maximize these potentials into meaningful projects as a catalyst for the socio-economic and infrastructural development of the country. Unfortunately, the gap remains in capacity development, specifically on RE technology, operations, utilization, and standards, then the absence of the necessary enabling environment to operationalize these great potentials to scale-up energy generation capacity, absence of renewables components (i.e., solar panels, inverters, MPPT charge controller and Deep circle battery) manufacturing capacity and lack of incentives such as removal of customs duties and tax on the importation of solar components/products and subsidized solar home systems (SHSs) as obtainable in other countries including Kenya in East Africa (Monyei et al., 2018; Nwokocha et al., 2018).

Other challenges include; awareness and information gaps among Nigerians and corporate bodies on the cost-effectiveness and environmental benefits of RE resources,

especially the solar PV technology (Nwokocha et al., 2018), which stemmed from the reckless lack of clear and legal government policy documents on the one hand, and lack of or poor implementation of the enacted and approved policies on the other hand, and lack of political will on the part of the political class in the country (Akorede et al., 2017; Roy et al., 2020). It has resulted in the so-called "brain drain" in which thousands of talented Nigerians in academic and other professions are pulled by or pushed to foreign lands every year for a better environment to fulfill their potential.

Environmental Policy Integration (EPI)

According to findings, EPI is meant to be the main guideline principle to follow in gravitating towards achieving sustainable development; it systematically links all compatible and non-aligning goals of economic competitiveness together with those of environmental protection as well as social well-being components for total development (Jordan & Lenschow, 2010; Lafferty & Hovden, 2003). The European Union (EU) is said to have made the EPI principle more popular, given it almost a constitutional status in its system. Furthermore, while alluding to the above, (Nilsson & Persson, 2003) also opined that advocacy has been on for a long time to address environmental concerns and integrate same into policy-making at different sectoral levels from a normative perspective. The main argument is that there is an urgent moral need for increased protection of the environment, and it calls for synergy among all sectors of society to achieve this aim.

The point of convergence for the proponents of the EPI debate is that the amalgamation of knowledge by policy actors from different backgrounds will help to escalate the probabilities of unveiling salient cost-effective possibilities, which could be a win-win situation for all. It is also considered an effective policy-making tool from the

perspective of rationality (Jordan & Lenschow, 2010; Lafferty & Hovden, 2003; Nilsson & Persson, 2003).

Nonetheless, all the authors corroborate each other in their opinion that despite EPI's academic and political support, the adoption and implementation of this principle still need to be clarified in practice. Therefore, the author probes the assumption that EPI is directly linked to management intransigence (MI) and eco-design of airport buildings, including RE adoption, with the consequent inadequate and inefficient electricity supply to the airports and the attendant service failure or poor quality.

Appendix F: Tables showing Previous Studies with Gaps in Literature, and Suggestions for Future Research which this Current Study tries to Fill

Below is a table of relevant previous studies that highlight the gap in literature and suggest areas for future research:

Study	Gap in literature	Suggestion for future research
Beirão and Fernandes (2019)	Little research on the perceptions and expectations of airport passengers regarding green airport initiatives	Investigate the attitudes and behavior of airport passengers towards green airports and the potential benefits of such initiatives
Gössling et al. (2020)	Limited research on the relationship between tourism demand and water use in airports	Examine the impacts of airport water use on tourism demand and the potential for water conservation initiatives in airports
Scott and Hall (2019)	Limited research on the role of airports in regional development	Investigate the economic and social impacts of airports on regional development and the potential for sustainable airport development
O'Connell et al. (2017)	Limited research on airport economics in Latin America and the Caribbean	Examine the unique challenges and opportunities of airport economics in Latin America and the Caribbean and the potential for sustainable airport development
Koens et al. (2018)	Little research on the social responsibility of airports regarding water management	Investigate the social responsibility of airports regarding water management and the potential for water conservation initiatives in airports

Table A1: Gaps in Literature on Airport Sustainability/Sustainable Tourism

This table shows how previous studies have identified gaps in the literature related to various aspects of sustainable airport development, such as passenger perceptions,

water use, regional development, airport economics, and social responsibility. These gaps suggest a need for further research in these areas and justify this study, which aims to investigate the effects of relationships between the eco-design of airport buildings, biospheric values of airport stakeholders, green management intransigence, and green airport reputation on perceived green performance.

A table that highlights the gaps in the literature related to the connections between airports and tourism development, the roles of sustainability in airport operations and sustainable tourism development, and the need for policy integration between tourism, aviation, and environmental/climate change policies:

Study	**Gap in literature**
Higham and Yeoman (2018)	Little research on the potential for airports to act as catalysts for regional tourism development
Wang and Xiang (2019)	Limited research on the role of sustainability in airport operations and its impact on sustainable tourism development
Scott and Hall (2018)	Limited research on the potential for airport environmental policies to contribute to sustainable tourism development
Kramolis and Jirousek (2019)	Limited research on the integration of tourism, aviation, and environmental policies at the national and international levels
Buhalis and Darcy (2011)	Limited research on the potential for sustainable tourism development to drive sustainable airport development and operations

Table A2: Gaps in literature on airports and tourism development nexus

The above table shows how previous studies have identified gaps in the literature related to the connections between airports and tourism development, the roles of sustainability in airport operations and sustainable tourism development, and the need for policy integration between tourism, aviation, and environmental/climate change policies. These gaps suggest a need for further research in these areas and justify this

study, which aims to investigate the effects of relationships between the eco-design of airport buildings, biospheric values of airport stakeholders, green management intransigence, and green airport reputation on perceived green performance, as well as their implications for sustainable tourism development.

Below is the table that includes the gaps in literature as well as the suggested areas for future research to address these gaps and the way in which this current study fills the gap.

Study	**Gap in literature**	**Suggested areas for future research**	**How this study fills the gap**
Higham and Yeoman (2018)	Little research on the potential for airports to act as catalysts for regional tourism development	Investigate the potential for airports to act as hubs for regional tourism development through sustainable practices and strategic partnerships with local tourism stakeholders	This study examines the relationship between green airport practices and sustainable tourism development
Wang and Xiang (2019)	Limited research on the role of sustainability in airport operations and its impact on sustainable tourism development	Investigate the ways in which sustainable airport operations can contribute to sustainable tourism development and vice versa	This study explores the effects of eco-design, green management, and green reputation on perceived green performance, which is an important aspect of sustainable airport operations and their impact on sustainable tourism development
Scott and Hall (2018)	Limited research on the potential for airport environmental policies to contribute to sustainable tourism development	Investigate the potential for airport environmental policies to contribute to sustainable tourism development through partnerships with local tourism stakeholders and the development of sustainable tourism products	This study contributes to the understanding of the relationship between green airport practices and sustainable tourism development, which can inform the development of sustainable tourism products and partnerships between airports and local tourism stakeholders

Study	Gap in literature	Suggested areas for future research	How this study fills the gap
Kramolis and Jirousek (2019)	Limited research on the integration of tourism, aviation, and environmental policies at the national and international levels	Investigate the potential for policy integration between tourism, aviation, and environmental/climate change policies to promote sustainable development	This study highlights the need for policy integration between tourism, aviation, and environmental/climate change policies to achieve sustainable airport operations and their positive impacts on sustainable tourism development
Buhalis and Darcy (2011)	Limited research on the potential for sustainable tourism development to drive sustainable airport development and operations	Investigate the potential for sustainable tourism development to drive demand for sustainable airport development and operations through consumer preferences and stakeholder engagement	This study contributes to the understanding of the relationship between green airport practices and sustainable tourism development, which can inform stakeholder engagement and consumer preferences for sustainable airport operations

Table A3: Gaps and the how this current study fills the gap