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Exploring Geospatial Distribution and Visitor Patronage of Tourism Attractions in Calabar, Nigeria

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Abstract

This study examined the geographical distribution, classification, and visitor patronage patterns of tourist attractions in Calabar, Nigeria. Additionally, the study utilised both primary and secondary data sources. The research employed descriptive, inferential, and spatial analytical techniques to interpret the collected data. Results

underscored a prevalent clustering of attractions along major transit routes. The attractions were categorized based on distinct attributes, and key determinants such as safety, interests, experiences, accessibility, and affordability were found to influence visitor choices significantly. In light of these findings, the study advocates for developing integrated tourist routes, diversifying attractions, exploring untapped markets, and enhancing safety and security measures to foster sustainable tourism growth in Calabar.

Keywords: Geospatial analysis; tourism attractions; spatial patterns; visitor patronage, patronage patterns

Introduction

In recent years, there has been heightened acknowledgement of the crucial role geographic characteristics play in tourism attractions (Eneyo et al., 2022). This dimension has garnered considerable interest from scholars, researchers, and industry professionals, emphasising the influence of geographical factors on the distribution and arrangement of tourism attractions and the consequential shaping of tourists' and destinations' experiences. Simultaneously, scholarly attention to the spatial dynamics of tourism attractions has surged (Eneyo & Edward, 2018; Kim & Jang, 2020; Liang et al., 2023; Wang et al., 2022). However, numerous studies have explored the intricate relationship between spatial attributes, geographical considerations, and tourism experiences, thereby enhancing our comprehensive understanding of the field (Ayatac & Dokmeci, 2017; Eneyo et al., 2022; Eneyo & Edward, 2018; Kim & Jang, 2020; Liang et al., 2023; Wang et al., 2022; Wu & Chen, 2022; Zhao et al., 2023).

Thus, central to these studies is recognising spatial clustering patterns of attractions and their consequential effects on tourist movements (Eneyo & Edward, 2018). Hence, emphasising the importance of proximity and accessibility, these works offer invaluable insights for informed destination planning and management. However, there remains to be an oversight in some studies, which either need to present comparative analyses of visitor numbers or explicitly highlight the factors influencing attraction placements. A subset of this research has leveraged spatial autocorrelation or cluster analysis techniques to assess the dispersal of tourist attractions across various regions (Cai & McKercher, 2002; Eneyo et al., 2023; Gaki & Tsartas, 2020; Poudel & Sada, 2013; Theuns & Heynderickx, 2016). These works identified the clustering of attractions, often due to governmental strategies, zoning ordinances, and considered planning. In contrast, some scholars have turned to spatial analytical methods to pinpoint the precise locales of attractions and the broader tourism infrastructure (Chang et al., 2023; Ibenholt & Huijbens, 2009; Kozak & Kozak, 2018; Lima & Mourato, 2006; Liu et al., 2016; Santana, 2019), revealing a varied, often sporadic, distribution of such attractions.

Similarly, within the Nigerian context, spatial statistical methods have been instrumental in aiding researchers to identify spatial tendencies of tourism attractions, as well as to understand the ramifications for visitor traffic and comprehensive destination planning (Adeyeye & Olujimi, 2019; Akanwa & Nwankwo, 2020; Eneyo et al., 2017; Iwuamadi & Ikechukwu-Ifudu, 2019; Obasi & Anomohanran, 2019; Ogunbodede & Oni, 2017). These investigations, revealing a clustered pattern, pinpointed drivers such as security measures, available social amenities, governing policies, and deliberate planning as core influences behind attraction distribution. Moreover, specific spatial statistical tools, notably the nearest neighbour analysis (NNA), have informed studies focusing on multiple facets of tourism within Cross River State, Nigeria (Eneyo et al., 2023; Ohwo & Ndakara, 2023; Udonwa et al., 2022; 2017). However, there remains to be more empirical research specifically addressing the distribution of tourism attractions in Calabar.

Initial scans suggest an uneven dispersal of attractions throughout Calabar, implying certain latent factors governing this distribution. Consequently, without rigorous empirical backing, such postulations remain in the realm of conjecture. A glaring deficiency lies in the unavailability of thoroughly documented maps, adept geospatial instruments, or precise

coordinates that capture the distribution landscape of tourism attractions in Calabar, complicating visitors' navigational experiences. Geographic scholarship posits the existence of inherent governing principles that shape distribution trends. Thus, addressing these foundational geographic inquiries head-on, this study seeks to bridge the prevailing knowledge chasm that currently stymies effective strategic planning, destination management, and forward-thinking sustainable development initiatives. To this end, this research is committed to spotlighting the spatial characteristics of tourism attractions in Calabar, Nigeria, furnishing detailed statistical insights and geographically precise data while probing into these attractions' geospatial dynamics and patterns of visitor patronage.

Theoretical framework

The geospatial distribution and visitor patronage of tourism attractions in Calabar, Nigeria, as investigated in this study, are anchored in two principal theoretical frameworks: the Law of Spatial Interaction and the Location Theory, further enriched by insights derived from research on Tourist Behaviour. The Law of Spatial Interaction delves into the dynamics of movement, interaction, and flow between disparate locations. The intensity and frequency of these interactions are typically modulated by distance, accessibility, connectivity, and the inherent allure of the locations (Liu et al., 2014; Yin et al., 2017). This law finds its relevance across a range of disciplines. For instance, within the study of economic geography, it elucidates the geographic orientation of industries and regional imbalances (Hansen, 2014; Pumain, 2020). Meanwhile, urban and regional planning plays a pivotal role in understanding urban systems, growth trajectories, and the strategic allocation of amenities (Ford et al., 2015; Brussel et al., 2019).

In the context of this study, the Law of Spatial Interaction offers potential insights into the spatial intricacies of tourism attractions in Calabar, elucidating nuances related to visitor patronage and the spatial distribution of attractions. When dovetailed with insights into Tourist Behaviour, the study's secondary theoretical pillar, the Location Theory, forms a robust foundation. While the Location Theory is traditionally concerned with the spatial configuration of economic undertakings (Dubé et al., 2023; Eneyo et al., 2023), Tourist Behaviour research sheds light on determinants underpinning tourists' locational preferences (Eneyo et al., 2022; Gross et al., 2023). Collectively, they forge a comprehensive lens through which the geographical dispersal of attractions and the locational predilections of tourists within Calabar can be examined.

Through harnessing these theories, this research seeks to ascertain how variables such as accessibility, cultural resonance, security, and economic factors mould tourists' destination choices. Such an inquiry could demystify the geographic clustering tendencies of tourist attractions in Calabar and elucidate the rationale behind their specific locales. Further, a deep dive into tourist behaviour might yield a clearer understanding of visitor engagement nuances, spotlighting determinants like distance, accessibility, and inherent appeal. This study utilises the Law of Spatial Interaction, Location Theory, and the research tenets on Tourist Behaviour to decipher the geospatial distribution and patterns of visitor patronage in Calabar's tourism attractions. These theoretical frameworks serve as lenses, highlighting the interplay of spatial, economic, and behavioural factors in shaping the landscape of tourist attractions and the dynamics of their patronage.

Methodology

Calabar, nestled between latitudes 4°501'N and 4°541'N and longitudes 8°181'E and 8°, Calabar plays a pivotal role in Nigeria's burgeoning tourism industry (Ajake et al., 2022; Ukam & Udonwa, 2020; Iyam et al., 2017). The city perennially draws domestic and international

tourists due to its numerous attractions and rich history (Effiom, 2012; Ekong & Eneyo, 2018; Inah et al., 2022; Udonwa et al., 2022). Propelling the growth trajectory of Calabar's tourism sector are infrastructural enhancements and astutely directed marketing initiatives (Abua et al., 2023; Demarco & Matusitz, 2011; Offiong et al., 2022). Gaining insights into the spatial configuration of attractions, the profile of visitors, and the utilisation dynamics of sites is crucial for devising strategies that champion sustainable urban development and robust tourism progression.

This study adopted a cross-sectional survey research design to examine the spatial distribution patterns of tourism attractions within Calabar. The sample encompassed the entirety of the city's tourist attractions to ensure exhaustive representation. Field surveys, one-on-one interviews, and meticulous site inspections constituted the primary sources for data collection, yielding an all-encompassing dataset on attractions. This dataset incorporated precise geographic coordinates, as pinpointed through GPS instruments. Supplementary data from official tourism records, cartographic resources, and authoritative documents also augmented the primary dataset.

Data analysis utilised descriptive methodologies, inferential statistical tools, and spatial analytical techniques via SPSS and ArcMap software. The Average Nearest Neighbour (ANN) tool embedded within ArcMap was harnessed to decode the spatial arrangement of attractions. Geographic Information Systems (GIS) methodologies played a pivotal role in visualising and analysing these spatial dynamics. This involved mapping the distribution dataset onto Calabar's foundational map and juxtaposing this with salient road networks for a holistic understanding. Computational methodologies, including nearest-neighbour empirical probability distribution function evaluations, were paired with inferential metrics (K-function and L-function statistics) to dive deeply into attraction spatial patterns. These intricate GIS analyses were executed on the R-Program 3.0.2 and ArcGIS version 10.2 platforms, running on a Windows® operating system. Hence, to further nuance the research, the ANOVA statistical methodology was employed to investigate visitor rates across varying attractions from 2018 to 2022, examining potential differences. The hypothesis that visitor numbers exhibit no significant variation was observed using the ANOVA test in SPSS, thereby offering verification and bolstering the results. The study's findings were detailed and deliberated in the results and discussion section. Quantitative data were presented visually employing maps, tables and graphs, while qualitative data were integrated into the study discussion. The survey responses were interpreted using a thematic analytical method, as Eneyo et al., (2021) and Leedy & Ormrod (2015) suggested.

Results and discussion

Identifying and categorising various types of tourism attractions

Table 1 offers a detailed representation of the diverse attractions underpinning the tourism canvas of Calabar, Nigeria. Each attraction is meticulously mapped with its precise geographical coordinates, serving as an invaluable resource for tourists and researchers.

A notable highlight from the table is the Itiat Abasi Orok/Watt Market Effigy, situated at latitude 4.957337 and longitude 8.320276. This locale introduces visitors to the vibrant tapestry of Calabar's cultural heritage. In its vicinity, the Obong's Palace, marked at latitude 4.955125 and longitude 8.324905, stands as a testament to the region's rich historical tapestry. The strategic spatial positioning of these sites ensures that visitors experience a seamless journey through Calabar's cultural and historical chronicles. In addition, the close-knit spatial alignment of Millennium Park (latitude 4.965022, longitude 8.324895) and Marina Resort (latitude 4.966083, longitude 8.318607) presents a delightful proposition for tourists. This proximity affords an eclectic blend of tranquil natural vistas juxtaposed with lively recreational pursuits, all within a short traversal distance.

Conversely, the Drill Ranch, ensconced at latitude 4.982346 and longitude 8.343937, is slightly offset from the central congregation of attractions. Despite its peripheral setting, this conservation hub offers an entrancing window into Calabar's natural wonders. Similarly, Tinapa, marked at latitude 5.0538 and longitude 8.317623, though slightly removed from the city's core, boasts an array of entertainment options, rendering it a deserving detour for visitors. In essence, Table 1 transcends being a mere catalogue of Calabar's attractions. Instead, it meticulously captures their geospatial dynamics, offering an intricate layer of insights essential for devising a well-curated travel plan. Whether an attraction is centrally located or nestled further out, this data-rich table provides a foundation for informed decision-making, aiming to enrich every visitor's experience in Calabar.

Table 1: Spatial distribution of tourism attractions in Calabar, Nigeria

Shape/ Serial number	Tourism attractions in Calabar, Nigeria	Latitude	Longitude
Point 1	Itiat Abasi Orok/ Watt Market Effigy	4.957337	8.320276
Point 2	Army Junction Green area	5.034933	8.320196
Point 3	Obong's Palace	4.955125	8.324905
Point 4	Millenium Park	4.965022	8.324895
Point 5	Cultural Centre / SPAR Calabar Mall	4.961005	8.324286
Point 6	Carnival Route at Mary Slessor Roundabout by Calabar Road	4.961175	8.323239
Point 7	Eleven Eleven Roundabout	4.963647	8.325032
Point 8	Marina Resort	4.966083	8.318607
Point 9	Old Residency Museum	4.966083	8.318607
Point 10	U J Esuene Stadium	4.968224	8.324756
Point 11	Hope Waddell Institution	4.975208	8.325408
Point 12	Drill Ranch	4.982346	8.343937
Point 13	Cercopan	4.977061	8.332577
Point 14	Tinapa	5.0538	8.317623
Point 15	Carnival Route at MCC by Mobil Filling Station	4.987148	8.333478
Point 16	Calabar Sport Club	4.99766	8.334243
Point 17	International Convention Centre	5.0424	8.315019
Point 18	Municipality Garden	4.97412	8.341293
Point 19	Carnival Route at Effio-Ette Junction	4.993166	8.344981
Point 20	Carnival Route Rabanna Roundabout	4.963251	8.336117
Point 21	Airport Field	4.968973	8.350408
Point 22	Carnival Route at Mary Slessor Roundabout	4.956291	8.332426
Point 23	Ntoe Ika Ika Oqua II Museum	4.970772	8.331212
Point 24	Botanical Garden	4.956261	8.330045
Point 25	Efe Mgbe	4.946465	8.321775
Point 26	Aqua Vista	4.915786	8.318126

Table 2 categorises attractions in Calabar, Nigeria, based on their unique characteristics and visitors' preferences. This table provides invaluable insights into the diverse array of attractions within the area. Each attraction is assigned a serial number for easy reference and falls under one of five primary categories: Historical and Cultural Attractions, Natural and Leisure Attractions, Shopping and Entertainment Attractions, Sports and Recreational Attractions, and Event Attractions. Historical and Cultural Attractions, such as the Itiat Abasi Orok/Watt Market Effigy, Obong's Palace, Old Residency Museum, Hope Waddell Institution, and Ntoe Ika Ika Oqua II Museum, offer windows into Calabar's deep historical and cultural roots. These attractions showcase the traditions, artefacts, and stories contributing to the region's distinct identity.

Natural and Leisure Attractions encompass serene spots like the Army Junction Green area relaxation site, Millennium Park, Marina Resort, Drill Ranch, Cercopan, Botanical Garden, and Aqua Vista. These venues offer spaces for relaxation and rejuvenation, allowing visitors to immerse themselves in Calabar's breathtaking natural beauty. Visitors can wander through lush green areas, interact with local wildlife, and soak in these natural attractions'

peaceful ambience. Represented by the Cultural Centre/SPAR Calabar Mall and Tinapa, the Shopping and Entertainment Attractions present a diverse mix of shopping, entertainment, and recreational experiences. These venues cater to those looking for retail therapy, cultural exchanges, and various entertainment options.

For those with a penchant for sports and recreation, the Sports and Recreational Attractions category lists venues like the U J Esuene Stadium, Calabar Sports Club, and the Airport Field at IBB Way. These facilities are equipped to host various sporting events, facilitate fitness routines, and offer spaces for outdoor recreational activities. The Event Attractions category vividly brings to life Calabar's bustling events atmosphere, featuring locations such as the Carnival Routes at Mary Slessor Roundabout, Eleven Eleven Roundabout, MCC by Mobil Filling Station, International Convention Centre, Effio-Ette Junction, Rabanna Roundabout, and another Carnival Route at Mary Slessor Roundabout. These venues and routes host many events and celebrations, enhancing the region's lively social fabric and ensuring a spirited environment for both residents and tourists. In conclusion, Table 2 offers an exhaustive overview of the myriad of tourist attractions in Calabar. It serves as a critical tool for destination planning, marketing strategy formulation, and resource allocation, all promoting sustainable tourism development and promising a memorable experience for every visitor.

Table 2 Categorisation of attractions based on their characteristics and visitor preferences in Calabar, Nigeria

Serial number	**Categorisation of attractions based on their characteristics and visitor preferences**				
	Historical and cultural attractions	**Natural and leisure attractions**	**Shopping and entertainment attractions**	**Sports and recreational attractions**	**Event attractions**
1	Itiat Abasi Orok/Watt Market Effigy	Army Junction Green area relaxation site	Cultural Centre/SPAR Calabar Mall	U J Esuene Stadium	Carnival Route at Mary Slessor Roundabout by Calabar Road
2	Obong's Palace	Millennium Park	Tinapa	Calabar Sport Club	Eleven Eleven Roundabout
3	Old Residency Museum	Marina Resort			Carnival Route at MCC by Mobil Filling Station
4	Hope Waddell Institution	Drill Ranch			International Convention Centre
5	Ntoe Ika Ika Oqua II Museum	Cercopan			Carnival Route at Effio-Ette Junction
6	Efe Mgbe	Municipality Garden			Carnival Route Rabanna Roundabout
7		Botanical Garden			Carnival Route at Mary Slessor Roundabout
8		Aqua Vista			
9		Airport Field at IBB Way			

Distribution of tourism attractions in Calabar, Nigeria

Figure 1 shows the spatial distribution of tourism attractions within the study area, drawing its data directly from Table 1.

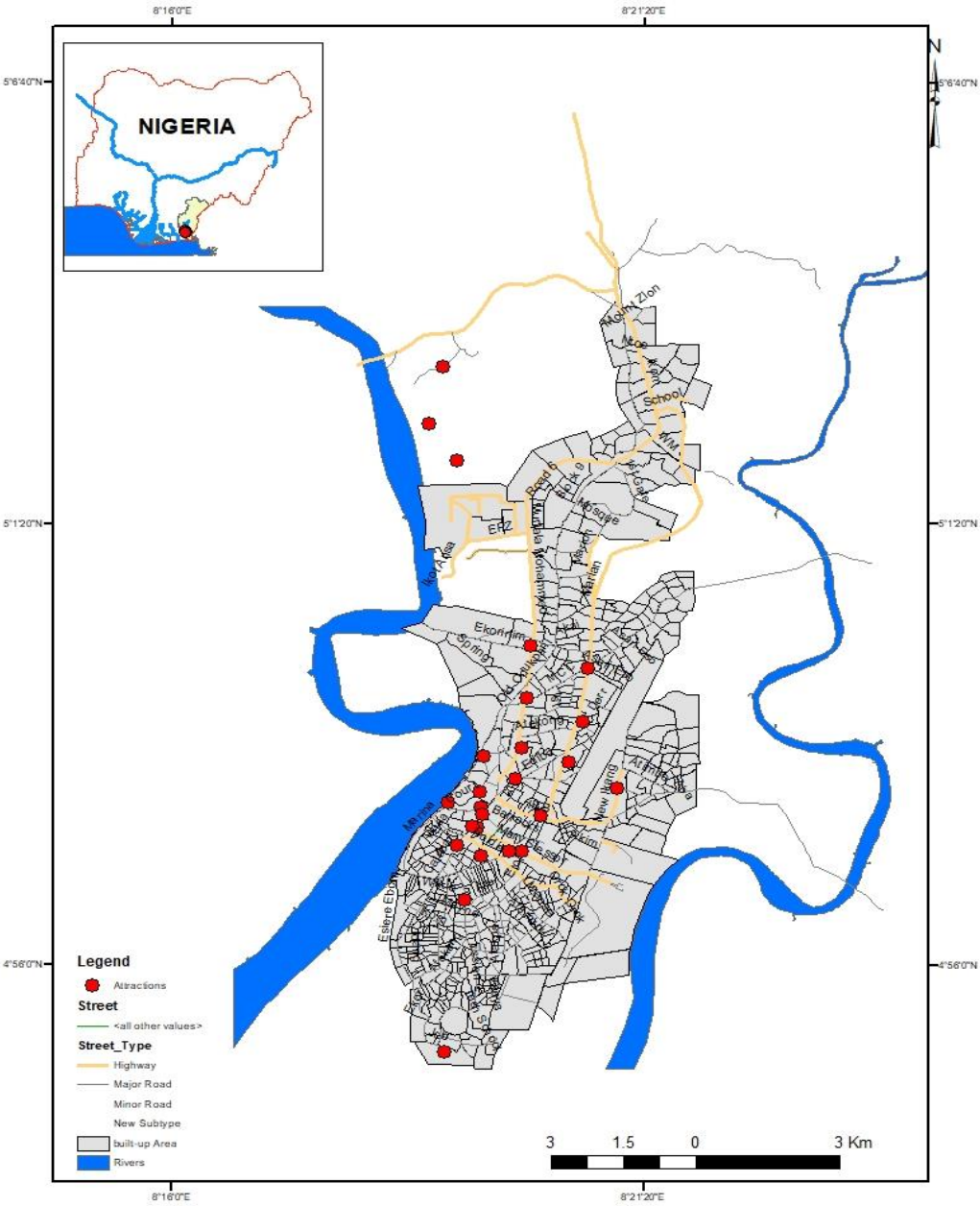

Figure 1: Spatial distribution patterns of tourism attractions in Calabar, Nigeria
Source: Authors' GIS analysis, 2023

Each attraction is pinpointed using a dot representation, demonstrating a noticeable concentration along major transportation routes. Therefore, significant road networks, proximity to transportation hubs, essential infrastructure, and threshold population have been overlaid to accentuate the data further, as displayed in Figure 1 and Figure 2. In Figure 2, buffer zones ranging from 1km to 3km illustrate the density of attractions within these areas. A clear observation from the figures is the clustering of most attractions within these buffer limits, with a minority (8) situated outside these confines. Such a strategic spatial arrangement facilitates easy visitor access, allowing them to explore many attractions within a concise period. The spatial layout and density of tourism attractions in Calabar, Nigeria, amplify visitor engagement and pave the way for focused tourism development, economic acceleration, judicious resource distribution, and sustainable tourism stewardship strategies.

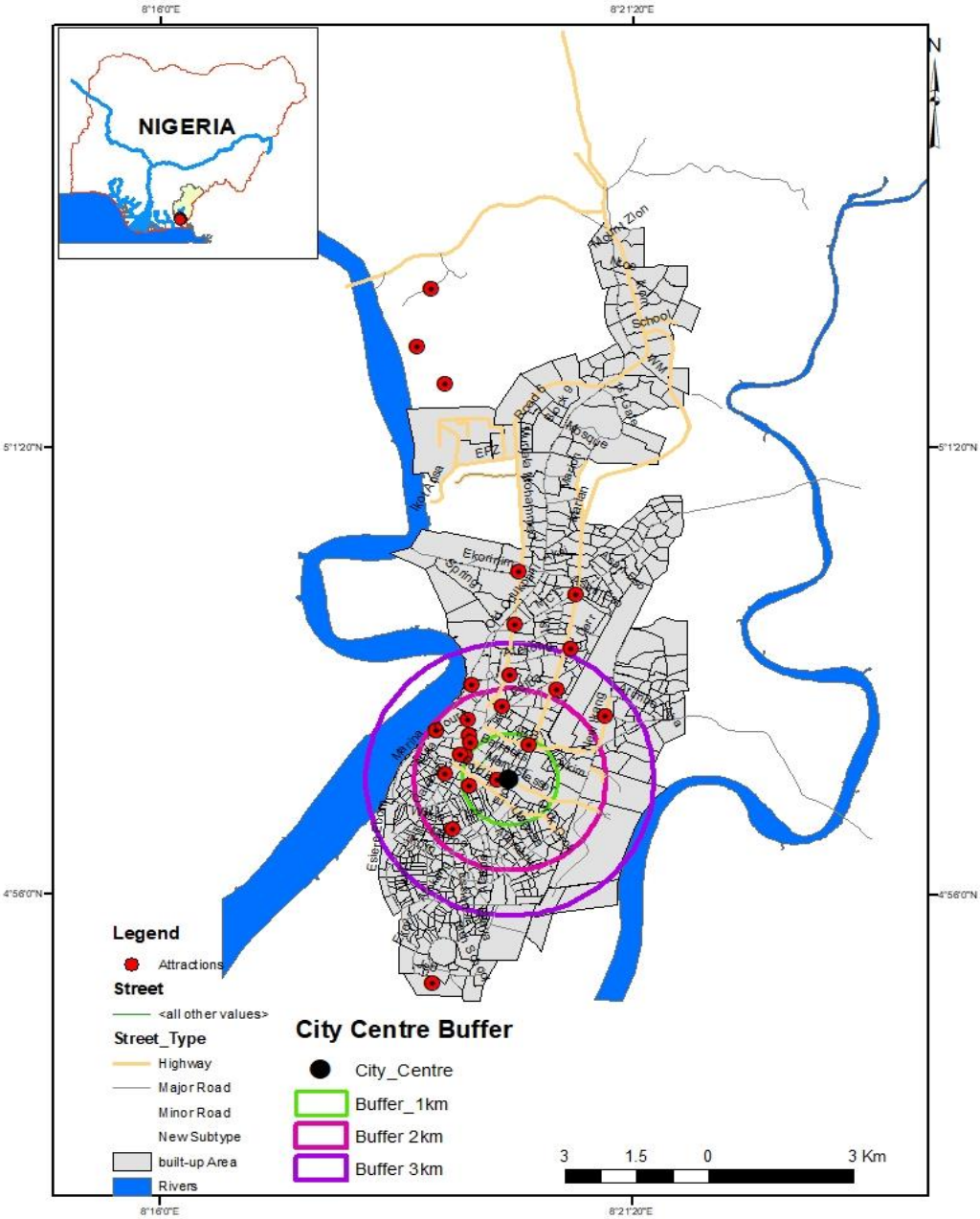

Figure 2: Distribution of tourism attractions in Calabar, Nigeria within 1km to 3km Buffers
Source: Authors' GIS analysis, 2023

Data from Table 1 serve as the basis for the analysis showcased in Table 3. Table 3 offers a lucid and detailed account of the data analysis on the distribution of attractions within the area. The table provides an in-depth geospatial assessment of attractions throughout Calabar, Nigeria, using the Average Nearest Neighbour statistical method. It highlights the Observed Mean Distance, indicating the average distance between each attraction and its nearest counterpart. The calculated result is roughly 913.541 meters, contrasting markedly with the Expected Mean Distance of 1147.944 meters. The latter metric estimates the distance if the attractions were distributed randomly across the city.

A key point of interest in Table 3 is the Nearest Neighbour Ratio (NNR). With a value of 0.796, which falls below 1, this ratio indicates that attractions are more clustered than

randomly distributed. This interpretation is further reinforced by a Z-score of -1.992, which indicates a clear shift from a random spatial pattern to a more clustered arrangement. The P-value, recorded as 0.046 in Table 3, supports these conclusions. With a value less than 0.05, it statistically suggests that the observed spatial clustering pattern among the attractions in Calabar is not due to random chance. The data from the results further confirm the clustering tendency of attractions in Calabar (see Table 3).

Table 3: Spatial patterns of attractions in Calabar, Nigeria, with average nearest neighbour

Results	**Meters**
Observed mean distance:	913.541 meters
Expected mean distance:	1147.944 meters
Nearest neighbour ratio:	0.796
Z- score:	-1.992
P- value:	0.046

Source: Authors statistical analysis

This research employed the K-function and L-function statistics to examine further the spatial distribution of tourist attractions in Calabar, Nigeria (as illustrated in Figure 3 and Figure 4).

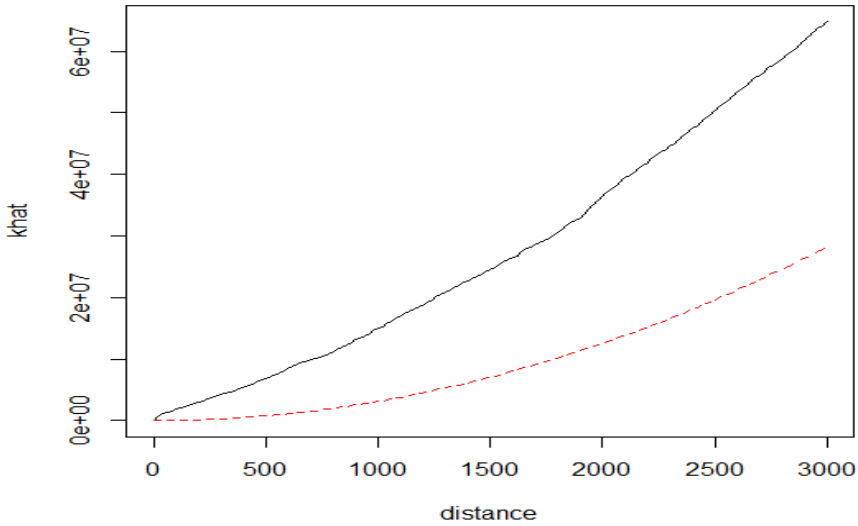

Figure 3: K-function analysis of tourism attractions distribution in Calabar, Nigeria Compared to CSR Model
Source: Authors' GIS analysis, 2023

These statistical tools provide a deeper exploration than the average nearest neighbour metric and serve as standard methods to corroborate observed spatial distribution trends. The K-function analysis consistently depicted positive deviations from the Complete Spatial Randomness (CSR) model across varying distances, even at proximities as short as 50.1 metres, hinting at a pronounced clustering trend. On the other hand, when juxtaposed with the simulation envelope, the L-function invariably registered values above 0.1 across all measured distances. This suggests an intensity of occurrence surpassing the expectations set by the CSR model. Further reinforcing this observation, the simulation envelope traced a consistent ascension, amplifying the argument for spatial clustering. Additionally, examining distances ranging from 10.1 meters to a more expansive 3000.1 meters, the observed spatial trend indicated a heightened clustering relative to what the CSR model would predict. Both the K-function and L-function analyses unambiguously affirm a clustered disposition in the geographical arrangement of tourist sites. The analyses reveal that specific non-random determinants are pivotal in this observed distribution.

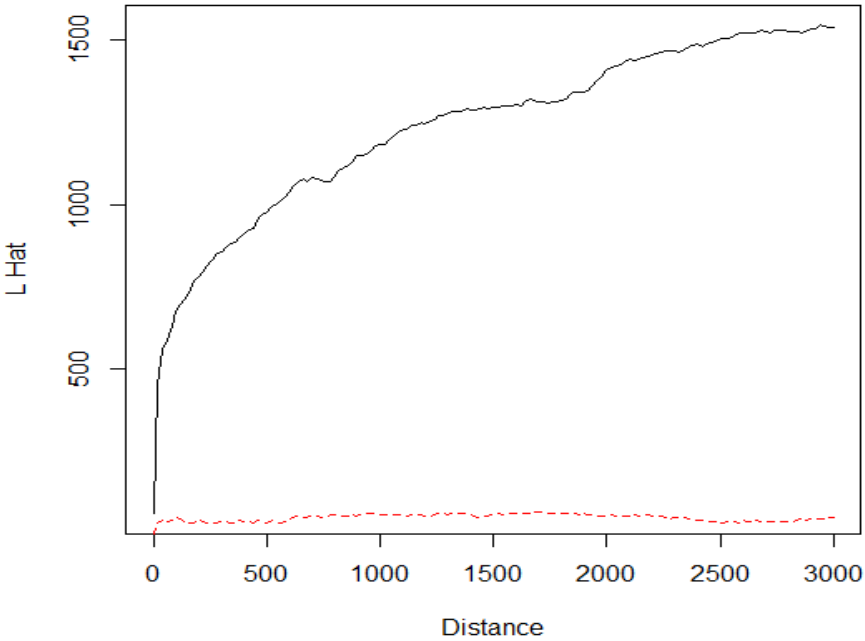

Figure 4: L-function analysis of tourism attractions distribution in Calabar, Nigeria, with simulation envelopes
Source: Authors' GIS analysis, 2023

Factors influencing the distribution of tourism attractions in Calabar, Nigeria

This research emphasises deciphering the elements that shape the geographical positioning of tourism attractions within the study's focal region. As depicted in Table 4, the findings elucidate the pivotal factors governing attractions' spatial dispersion throughout Calabar, Nigeria, and their respective significance. Data from a comprehensive survey of 26 distinct attractions illustrate the collective perception of these factors' importance. Accessibility emerged as the predominant consideration, with 24 out of the 26 surveyed attractions highlighting its significance. Infrastructure's role was similarly underscored, garnering 22 nods, while economic considerations closely trailed with 23 affirmations.

Table 4: Factors influencing the spatial distribution of attractions

Factors influencing the location of attractions	N	Sum	Mean	Std. deviation	Minimum	Maximum
Accessibility	26	24.00	1.00	0.000	1.000	1.000
Threshold population	26	19.00	1.00	0.000	1.000	1.000
Proximity to transportation hubs	26	19.00	1.00	0.000	1.000	1.000
Infrastructure	26	22.00	1.00	0.000	1.000	1.000
Natural, scenic, cultural, and historical significance	26	10.00	1.00	0.000	1.000	1.000
Economic considerations	26	23.00	1.00	0.000	1.000	1.000
Policy and regulations	26	1.00	1.00	0.000	1.000	1.000
Competitiveness and collaboration	26	1.00	1.00	0.000	1.000	1.000
Other factors	26	9.00	1.00	0.000	1.000	1.000

Furthermore, the threshold population and the proximity to transportation hubs were acknowledged for their roles, each clinching 19 positive recognitions. Conversely, several factors did not resonate as compelling influencers. The intrinsic values of an area, encompassing its natural, scenic, cultural, and historical essence, secured just 10 affirmations. Meanwhile, the 'other factors' category resonated with a mere 9 respondents. Surprisingly, policy, regulations, competitiveness, and collaboration were perceived to wield minimal sway, each registering a singular affirmation. While a consistent mean and an absent standard deviation for these determinants hint at data homogeneity, the predominant takeaway remains:

factors like accessibility, infrastructure, and economic implications stand out as the chief catalysts in determining the spatial layout of tourist attractions in Calabar, Nigeria.

Patronage patterns of tourists at different attractions in Calabar, Nigeria

Table 5 offers a meticulous breakdown of visitor counts at diverse attractions in Calabar, Nigeria, spanning five years from 2018 to 2022. It methodically segments these attractions based on distinct classifications: Shopping and Entertainment, Natural and Leisure, Historical and Cultural, Event, and Sports and Recreational. By showcasing annual visitor counts for each attraction category, the table facilitates a granular exploration of visitor trajectories and prevailing tendencies. For instance, the Shopping and Entertainment segment registered 198 visitors in 2018. This number witnessed a consistent surge, culminating in 538 visitors in 2022. Across the five years, this category attracted an aggregate of 1622 visitors. On the other hand, Natural and Leisure attractions, commencing with an inaugural count of 301 visitors in 2018, experienced periodic fluctuations before soaring to a robust 779 visitors in 2022. Cumulatively, this bracket enticed a noteworthy 2239 visitors.

Historical and Cultural sites commenced their journey with 87 visitors in 2018, tracing a steady ascent to attain 321 visitors by 2022. Over the five years, these attractions amassed 869 enthusiastic visitors. Contrarily, Event attractions portrayed a more erratic pattern, although they managed to attract a substantial 735 visitors in 2022 alone, culminating in an overall count of 1076. Although witnessing oscillating figures, the Sports and Recreational venues peaked in 2022 with 300 visitors, registering a total of 553 visitors across the years.

Table 5. Visitor numbers at tourism attractions (2018-2022)

Attractions	**2018**	**2019**	**2020**	**2021**	**2022**	**Total**
Shopping and entertainment	198	211	293	382	538	1622
Natural and leisure	301	298	294	567	779	2239
Historical and cultural	87	109	164	188	321	869
Event	60	90	30	161	735	1076
Sports and recreational	40	57	16	140	300	553
Total	**687**	**765**	**797**	**1438**	**2673**	**6359**

Source: Tourism attraction's registry and authors field work, 2023

Table 6 provides an intricate analysis of annual visitor numbers from 2018 to 2022 using the data derived from Table 5. It furnishes detailed statistical measures to elucidate variations, tendencies, and inferences related to visitor counts across different tourism attractions in the study area. For every year under consideration, there are five data entries marked as N=5. The column labelled 'Mean' represents the typical annual visitor count, signifying a pivotal statistical benchmark known as the central tendency. Also, proceeding from there, the 'Standard Deviation' column furnishes an assessment of how much the annual visitor numbers for each year deviate from this established mean, indicating the inherent dispersion or variability in the data set. Additionally, the 'Standard Error' column is paramount, as it delivers insights into the accuracy of our estimations relating to the overarching population mean. It provides a gauge of the dispersion of sample means we might expect if we repeatedly drew samples from the same population.

Further refining our analysis, the '95% Confidence Interval for Mean' paints a vivid picture of the interval within which we can confidently posit the genuine population mean lies. This boundary, demarcated by the 'Lower Bound' and 'Upper Bound', effectively circumscribes the range wherein the true mean is expected to reside. To cap it off, by examining the 'Minimum' and 'Maximum' values, we understand the lowest and highest visitor counts recorded for each respective year. Table 6 does not just display numbers; it meticulously unpacks them, serving as a compass that guides us through the labyrinth of annual visitor data.

Doing so aids in decoding patterns, discerning trends, and crafting well-founded hypotheses related to visitor dynamics in the study area.

Table 7 presents the results of an ANOVA analysis, which reveals a statistically significant variation in visitor numbers across different years within the context of tourism attractions. The F-value of 5.672 and significance level of 0.003 confirm the presence of significant differences in visitor numbers over the years, supporting the conclusion that the variation is meaningful. These findings shed light on the dynamics and trends in visitor patterns, providing valuable insights for informed decision-making and strategic planning in ecotourism management and development. The implication is that it is crucial to consider temporal factors and develop targeted strategies to attract and accommodate visitors in specific years, leading to effective resource allocation, focused marketing efforts, and enhanced forecasting of future visitor trends.

Table 6; Descriptive analysis of annual visitor numbers to tourism attractions (2018-2022)

Descriptives								
Year								
					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
2018	5	137.2000	110.06226	49.22134	.5397	273.8603	40.00	301.00
2019	5	153.0000	99.38561	44.44660	29.5965	276.4035	57.00	298.00
2020	5	159.4000	135.36543	60.53726	-8.6784	327.4784	16.00	294.00
2021	5	287.6000	183.51376	82.06985	59.7376	515.4624	140.00	567.00
2022	5	534.6000	223.92253	100.14120	256.5635	812.6365	300.00	779.00
Total	25	254.3600	210.14080	42.02816	167.6181	341.1019	16.00	779.00

Table 7 Analysis of variance (ANOVA) for visitor numbers across years in tourism attractions

Year					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	563285.360	4	140821.340	5.672	0.003
Within Groups	496534.400	20	24826.720		
Total	1059819.760	24			

Consequently, during our interview session, some respondents provided insightful feedback that further enhanced the depth of our study. Their perspectives shed light on visitors' nuanced preferences, motivations, and experiences. Specifically, a significant percentage mentioned key determinants when queried about the factors influencing their choices of attractions in Calabar. Safety and security were paramount for many, with 27% of respondents emphasizing its importance. This underscores the critical role of ensuring visitors' well-being, and it is evident that an attraction's ability to guarantee a secure environment has a major influence on its appeal. Interests and experiences followed closely, with 25% of respondents highlighting their significance. This accentuates the importance of curating diverse and engaging attractions that resonate with the visitors' interests, ensuring that their visit is enjoyable and memorable. Accessibility and infrastructure were cited by 24% of respondents, highlighting the significance of good connectivity and well-maintained facilities in driving visitor footfall.

Affordability played a key role for 18% of respondents, indicating that the cost of visiting an attraction can be a deciding factor for a sizable segment of visitors. This suggests that pricing strategies should be devised with a keen understanding of the target audience's budgetary constraints and perceptions of value. Interestingly, only 2% of the respondents felt that policies, regulations, and marketing were significant factors in their decision-making. This relatively low percentage might suggest that while these elements are foundational for managing and promoting attractions, they might need to be more front-of-mind for the average visitor. However, it is also a reminder that clear policies, effective regulations, and targeted marketing strategies remain integral for tourism attractions' long-term success and

sustainability. An additional 4% of respondents grouped into the "Others" category, indicating that there are varied and individual-specific factors that might influence visitor preferences.

Discussion

The tourism sector's success often hinges on understanding and optimising the interplay between the spatial distribution of attractions and the preferences of the visiting public. This study delves into these dynamics within Calabar, Nigeria's vibrant tourism environment, through a rigorous investigation. Thus, using Table 1 as a foundation, the research elucidates the geographical distribution of 26 distinct tourism attractions, each complete with precise coordinates. The strategic alignment of these attractions greatly benefits visitors, with specific sites such as the Itiat Abasi Orok/Watt Market Effigy and Obong's Palace being proximal, enriching visitors with deep cultural and historical narratives. Such positioning mirrors the studies of Eneyo et al. (2021) and Eja et al. (2015), where the importance of accessibility in enhancing urban tourism experiences is highlighted.

Also, categorising these attractions revealed five distinct types: historical and cultural, natural and leisure, shopping and entertainment, sports and recreational, and event attractions. Such categorisation, aligning with studies from distinguished researchers like Eneyo et al. (2017) and McKercher and Lew (2003), provides a lens to assess the multifaceted appeal of Calabar as a tourist destination. The analysis delves deeper, assessing these attractions' spatial distribution and concentration. Figures 1 and 2 indicate a pronounced clustering of these attractions along major transportation routes, emphasising accessibility. Furthermore, the proximity of these attractions to key infrastructure elements underscores their strategic positioning. Again, attractions predominantly fall within 1km to 3km buffers, further facilitating convenient exploration for visitors. Such patterns, congruent with established studies, including those of Tobler (1970; 2004) and Brown et al. (2022), highlight the threshold concept and the importance of clustering in tourism dynamics.

Further, this study employed statistical tools such as the Average Nearest Neighbour statistical technique, summarising findings in Table 3. Hence, clustering, statistically significant and deviating from random spatial patterns, confirms the observations of Mansfeld and Pizam (2006) and Mathenge et al. (2022). Subsequent analyses employing the K-function and L-function statistics reinforced this clustering tendency. Both analytical techniques unveiled pronounced patterns, further solidifying the findings' robustness. Moreover, Table 5 offers a temporal perspective, documenting the ebb and flow of visitor numbers from 2018 to 2022. A general uptrend in visitation across attraction categories echoes global tourism trends, as Eneyo et al. (2023) and Liu et al. (2022) identified. Lastly, when focusing on visitor preferences, the study revealed that safety and security emerge as paramount. This emphasis on safety mirrors sentiments from established scholars, underscoring its significance in tourist decision-making.

This study meticulously maps the interplay between spatial distribution, visitor patterns, and attraction typologies within Calabar's tourism milieu. These insights enhance our academic understanding and provide actionable intelligence for tourism professionals and policymakers. The intersection of geography, visitor preferences, and attraction categorisation provides a comprehensive platform for crafting future strategies. By capitalising on identified strengths and addressing potential areas of improvement, Calabar can solidify its position as a premier tourist destination, ensuring both sustainable growth and visitor satisfaction.

Conclusion and recommendations

The tourism landscape in Calabar, Nigeria, as highlighted by the research, presents a vibrant tapestry of attractions driven by geographical proximities, diverse categorisations, and

evolving visitor preferences. Calabar's attractions, predominantly clustering along major thoroughfares, offer a unique blend of historical, cultural, natural, and recreational experiences that cater to diverse visitor interests. This spatial distribution not only underscores the city's rich heritage and natural allure but also emphasises the strategic significance of location in enhancing visitor convenience and exploration potential.

The study's findings, rooted in established theories such as the Law of Spatial Interaction, Location Theory, and Tobler's First Law of Geography, provide a holistic perspective on Calabar's tourism dynamics. The pronounced clustering of attractions, particularly along primary routes, emphasises the city's potential as a hub for integrated tourist routes. These routes, encompassing multiple attractions, can significantly enrich the tourist experience, fostering an immersive exploration of Calabar's diverse offerings. Moreover, categorising attractions into specific types, from cultural to recreational, resonates with global tourism trends, emphasising the importance of varied experiences in ensuring visitor satisfaction. Furthermore, the research identifies core factors, including safety, interests, experiences, accessibility, and affordability, that profoundly shape visitor preferences in Calabar. These factors, particularly safety and security, emerge as paramount considerations, reflecting the broader global context where safety is often a primary concern for tourists.

Given these insights, several recommendations emerge for policymakers, stakeholders, and tourism professionals to further enhance Calabar's appeal as a leading tourist destination:

1. **Integrated Tourism Routes**: Given the clustering of attractions along major roads, there is an opportunity to develop integrated tourism routes that cover multiple attractions. These routes, marketed as cohesive itineraries, can offer tourists a comprehensive exploration experience, maximising their engagement while ensuring optimal time utilisation.
2. **Diversification of Attractions**: To cater to a broader spectrum of tourist interests, efforts should be made to diversify Calabar's attraction portfolio further. This can involve the development of niche experiences, such as eco-tourism ventures, gastronomic trails, or art and craft workshops, leveraging Calabar's rich cultural and natural heritage.
3. **Safety and Security**: Prioritising safety and security measures at all tourist attractions is paramount. Investment in security infrastructure, regular patrolling, and establishing tourist police units can significantly enhance visitors' confidence, making them feel more secure and relaxed.
4. **Stakeholder Collaboration**: To enhance the tourism ecosystem, Foster collaborations between local communities, businesses, and authorities. Joint initiatives like community-based tourism projects can provide visitors with authentic experiences while ensuring local communities benefit from tourism revenues.
5. **Effective Marketing and Promotion**: Leverage digital platforms, especially social media, to promote Calabar's attractions. Engaging storytelling, captivating visuals, and targeted marketing campaigns can attract a global audience, enhancing Calabar's visibility on the global tourism map.
6. **Continuous Monitoring and Feedback**: Establish a mechanism for continuously monitoring visitor trends and feedback. Regular surveys, online reviews, and feedback forms can provide invaluable insights, helping to refine offerings, address gaps, and ensure consistent visitor satisfaction.

In conclusion, Calabar, with its rich mosaic of attractions, offers immense potential as a premier tourist destination. The insights from this study and the recommended strategies can pave the way for sustainable tourism development in Calabar, ensuring it continues to enchant visitors for years to come.

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