Wikimedia Projects and Tourism in Nigeria: Trends, Visits and Prediction

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Abstract

In this research we propose a data-driven approach for understanding and predicting tourist interest in Nigerian destinations. This study will develop and validate a model for predicting tourism trends by incorporating Wikimedia data, thereby offering new approaches for researchers in this field. The data and insights generated will be valuable for the Wikimedia community and the Wikimedia Foundation, informing strategies for improving the coverage, quality, and accessibility of tourism-related content across Wikimedia projects.

Introduction

The tourism sector in Nigeria is increasingly recognised for its potential to contribute significantly to the nation's economic development and job creation. In 2019, the travel and tourism industry accounted for 4% of Nigeria's total Gross Domestic Product (GDP), directly contributing US$2.6 billion and supporting a total impact of US$7.9 billion [1]. When the sector experienced a downturn, as reflected in the 2.8% GDP contribution in 2020, it demonstrated resilience with a rebound to 3.6% in 2021 and 2022, equating to approximately US$17.3 billion [2]. Statistical projections indicated a positive trajectory, with the sector expected to generate US$2.95 billion in 2023 and potentially reaching US$3.74 billion by 2027 [3]. The forecasts suggest an average annual growth rate of 5.4% in the Travel & Tourism sector's contribution to GDP between 2022 and 2032 [4]. These figures underscore the growing economic significance of tourism in Nigeria.

A key characteristic of Nigeria's tourism landscape is the prominence of domestic travel. In 2019, approximately 75% of air passengers within Nigeria were domestic travellers, highlighting a strong reliance on internal movement for business, family visits, and government purposes [5]. This trend suggests a robust internal market that forms the foundation of the hospitality industry. The Nigerian populace exhibits a propensity for leisure and enjoyment, with beaches being a significant attraction. Moreover, cultural tourism, driven by Nigeria's rich music, fashion, and culinary scenes, is currently a major draw for both domestic and international visitors [6]. The substantial size of Nigeria's population presents a considerable potential for further growth in local tourism if effectively harnessed. The observed surge in domestic tourism in 2024 further emphasises the increasing vibrancy of this market segment [7].

The Nigerian tourism sector is also witnessing the emergence and growth of specific tourism trends. Cultural tourism, capitalising on the country's diverse ethnic heritage and traditions, is gaining momentum [6]. Eco-tourism, focusing on Nigeria's natural landscapes and biodiversity, and luxury tourism, catering to a demand for high-end experiences, are also present and hold potential for further development [6]. The richness of Nigeria's cultural heritage and the variety of its natural attractions offer opportunities to cater to a wide range of tourist interests.

In the contemporary digital age, online platforms play an increasingly vital role in promoting tourism globally, and Nigeria is no exception [1]. In 2019, a significant 70% of overnight stays in

Nigeria were either booked or researched via digital platforms, marking an increase from 50% in 2012 [1]. This growing reliance on digital tools underscores their importance in shaping travel decisions and experiences. The rise in digital content usage between 2014 and 2019 contributed an estimated US$1.1 billion to Nigeria's GDP, demonstrating the tangible economic impact of online platforms in the tourism sector [1]. The pervasiveness of digitalisation across the tourism ecosystem, from initial research to the actual travel and hospitality experiences, highlights the transformative power of online platforms [8]. The projections suggested that the continued adoption of digital platforms will further boost Nigeria's tourism sector, potentially creating approximately 74,000 new jobs and generating 8.5 million incremental overnight stays by 2025 [8].

Introducing Wikimedia and its Potential Role in Tourism

Wikimedia encompasses a suite of collaborative, free, and open-source projects, most notably Wikipedia, a multilingual online encyclopaedia; Wikimedia Commons, a repository of freely usable media files; and Wikivoyage, a collaborative travel guide. These platforms operate on the principle of user-generated content, making information widely accessible to a global audience. Given the increasing reliance on digital resources for travel planning, Wikimedia projects hold significant potential as comprehensive sources of information for tourism in Nigeria [9]. Wikipedia, with its extensive list of tourist attractions in Nigeria [10], can serve as an initial point of information for prospective travellers. Wikimedia Commons provides a platform for visual documentation of Nigeria's diverse landscapes, cultural sites, and tourist activities [11]. Wikivoyage offers practical travel guidance, including details on destinations, transportation, accommodation, and activities within Nigeria [12]. The accessibility and breadth of information available on these platforms position Wikimedia as a valuable resource for promoting and facilitating tourism in Nigeria.

Problem Statement and Research Objectives

Despite the growing importance of tourism in Nigeria and the widespread use of digital platforms for travel-related information, there is limited specific research on the impact of Wikimedia projects on tourism in developing countries, particularly Nigeria. While Wikimedia platforms contain a substantial amount of information relevant to Nigerian tourism, the current state of this content, its usage patterns, and its correlation with actual tourism activities remain largely unexplored. Furthermore, there is a lack of predictive models that incorporate Wikimedia data to forecast tourism trends and visits in Nigeria. Addressing these gaps is crucial for understanding the role of open-source information in supporting and driving tourism in Nigeria.

This research proposes two answer the following questions:

1. What is the current state of Wikimedia content (Wikipedia and Wikivoyage) related to tourism in Nigeria?
2. What are the trends in visits to Wikimedia pages associated with Nigerian tourist destinations over the past five years?
3. Is there a statistically significant correlation between Wikimedia page view data and tourism statistics (arrivals, visits) for specific locations in Nigeria?
4. Can time series analysis of Wikimedia page view data effectively forecast future interest in Nigerian tourist destinations?
5. Can integrating Wikimedia page view data with traditional tourism forecasting models improve prediction accuracy for Nigeria?
6. How can machine learning techniques be applied to predict tourism trends and visits in Nigeria using Wikimedia data and other relevant sources?

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Related work

The existing research [1] on tourism in Nigeria explored its economic significance and contribution to the nation's gross domestic product (GDP). The studies indicated that while tourism's contribution fluctuates, it remains a vital sector with considerable growth potential. Data from [2] shows the sector's recovery after the 2020 downturn, highlighting its dynamic nature. The [13] emphasises the importance of robust tourism statistics for effective planning and policy-making in Nigeria, noting the efforts of the Nigerian Tourism Development Corporation (NTDC) in data collection. These findings establish the economic relevance of tourism and the ongoing efforts to understand its performance.

A significant body of research focuses on identifying and describing popular tourist destinations and attractions across Nigeria. Online resources like [9] and [14] provide lists and descriptions of natural wonders, cultural sites, and historical monuments. The [10] offers a comprehensive, though potentially incomplete, overview. These studies collectively showcase the diverse tourism offerings available in Nigeria, ranging from natural landscapes to cultural heritage.

Furthermore, research has analysed the challenges and opportunities within the Nigerian tourism sector [7]. Inadequate infrastructure, security concerns, and marketing limitations are frequently cited as key challenges hindering the sector's growth [15a]. However, the country's rich cultural and natural resources, coupled with increasing government support and a growing domestic tourism market, present substantial opportunities for development [7]. These analyses provide a crucial context for understanding the factors influencing tourism in Nigeria.

<u>The Impact of Digital Platforms and Social Media on Tourism</u>

Tourism studies within Nigeria have specifically examined the role of online information in travel planning and decision-making [1]. Research focusing on destinations like Ikogosi Warm Spring [15] indicates that a significant majority of respondents believe digital marketing strongly influences tourist choices. The broader trend of travellers increasingly using digital platforms for research and booking underscores the necessity of a strong online presence for tourism destinations in Nigeria [1].

A considerable body of research explored the use of social media for tourism marketing and promotion in both Africa and Nigeria. Various platforms, including Instagram, TikTok, Facebook, and YouTube, are recognised as powerful tools for visual storytelling, engaging with potential tourists, and disseminating real-time information [16]. The studies highlighted the influence of social media on destination choices among Nigerian youth [17] and its positive relationship with tourist satisfaction at heritage festivals [18]. The ability of social media to increase destination awareness, leverage user-generated content, and facilitate direct engagement with travellers makes it an invaluable asset for the African tourism industry [19].

Analysis of the impact of online content on tourism growth and recovery further emphasised the importance of digital strategies [1]. Research on e-tourism in Nigeria [15b] suggests that the Internet has the potential to significantly enhance the visibility and attractiveness of tourist sites, provided that issues related to infrastructure and online content are addressed. The substantial contribution of digital platforms to Nigeria's tourism economy and the projected future growth linked to their adoption underscore the critical role of online content in driving the sector forward [1].

<u>Tourism Trend Analysis and Prediction</u>

Literature search presented a variety of methodologies for monitoring and analysing tourism trends, encompassing both qualitative and quantitative approaches. Techniques such as interviews, focus groups, surveys, and the analysis of existing data are employed to

understand traveler preferences and industry patterns. The use of social media analytics and tools like Google Trends provides additional avenues for monitoring shifts in traveller behaviour and popular destinations.

For forecasting tourism demand, time series analysis and econometric models are commonly utilised. These methods leverage historical data and economic indicators to predict future trends and visitor numbers. Time series models like ARIMA and exponential smoothing are frequently applied to identify and project patterns in tourism data.

Emerging research highlights the increasing use of online search data and social media data to improve the accuracy of tourism predictions [20]. [21] showed that incorporating search engine queries and analysing sentiment in social media content can enhance the predictability of tourism demand. This suggests that data reflecting online information-seeking behavior can serve as valuable indicators for forecasting.

The application of machine learning techniques in tourism forecasting is also gaining prominence [22]. Algorithms such as regression trees, support vector regression, and neural networks offer advanced capabilities for analysing complex datasets and potentially providing more accurate forecasts compared to traditional statistical methods [22]. These techniques can identify intricate relationships within the data and are increasingly being explored for their predictive power in the tourism sector.

Wikimedia and Tourism in Nigeria: The Current State

Wikipedia currently hosts a significant amount of content related to tourism in Nigeria. The [10] serves as a comprehensive starting point, enumerating a wide array of sites from natural wonders like Zuma Rock and Gurara Waterfalls to cultural landmarks such as the Ancient Kano City Walls and the Osun-Osogbo Sacred Grove. Curated lists, such as the one provided by [9], highlight some of the most compelling natural attractions, suggesting the availability of high-quality descriptive content for certain key destinations. However, as indicated within [10], the comprehensiveness and representativeness of this information may vary across different attractions. Popular destinations with higher visibility are likely to have more detailed and frequently updated articles compared to lesser-known sites.

A preliminary review suggests that major categories of tourism in Nigeria are covered on Wikipedia, including natural attractions (waterfalls, national parks like Yankari and Gashaka Gumti, hills, beaches), cultural and historical sites (museums, ancient cities, slave trade routes), and urban tourism (information on major cities like Lagos and Abuja). However, there might be gaps in coverage for niche areas such as specific adventure tourism activities, detailed information on local festivals beyond their listing, or comprehensive practical travel advice typically found in travel guides. A more systematic analysis of the existing content is required to pinpoint specific topics that are well-represented and those that need further development.

The use of multimedia elements, particularly images, enhances the informative and engaging nature of Wikipedia articles on Nigerian tourism. Wikimedia Commons serves as a repository for these visuals, hosting a category specifically for "Tourism in Nigeria" containing numerous images of various attractions, such as the Obudu Mountain Resort and Erin-Ijesha Waterfalls [11]. The presence of a category for the Nigerian Tourism Development Corporation on [23] suggests official engagement in providing visual resources. Community-driven efforts, as indicated by the Wikidata edit-a-thon related to tourism in Nigeria [24], also contribute to enriching the multimedia content associated with Nigerian tourism on Wikimedia platforms. Analysing the integration of these media files within Wikipedia articles can provide insights into the extent to which visual elements are used to showcase Nigeria's tourism offerings.

Wikivoyage Travel Guide for Nigeria

Wikivoyage provides a structured travel guide for Nigeria, offering a range of information for prospective travellers [12]. The main Nigeria page on Wikivoyage introduces the country's rich diversity, appealing tourist attractions, and friendly people. It includes sections on regions, major cities like Abuja, Benin City, Kano, Lagos, and Osogbo, as well as other notable destinations including national parks and waterfalls. The guide also covers practical aspects of travel, such as how to get in and around Nigeria, what to see and do, where to eat and sleep, and safety and health considerations. For specific cities like Lagos [25] and Abuja [26], Wikivoyage offers more detailed information on attractions, activities, and local transportation. For instance, the Lagos guide provides insights into getting around by bus, car, taxi, and ferry, and lists various parks, beaches, and accommodation options. Similarly, the Abuja guide highlights key attractions like Aso Rock and Millennium Park, along with activities and dining options. The breadth of topics covered in the Nigeria Wikivoyage guide suggests its potential as a valuable resource for travel planning.

Comparing the content of Wikivoyage with other online travel resources, such as commercial travel websites and blogs, reveals both similarities and differences. Wikivoyage's strength lies in its collaborative and open-source nature, which can lead to diverse perspectives and practical, community-driven advice. The detailed information on getting around cities and the inclusion of budget and mid-range accommodation options are particularly useful for independent travellers. However, the editorial oversight and consistency of information might differ from professionally curated travel guides. Commercial platforms often invest heavily in high-quality photography and marketing narratives, which might be less emphasised on Wikivoyage. Nevertheless, Wikivoyage's commitment to providing free and accessible travel information positions it as a unique and valuable resource for those seeking open-source travel guidance for Nigeria.

Methods

The case study methodology will be used. The data collection is automated and the Tourism prediction model built using machine learning algorithms. This study will use secondary data only.

Data Collection: The process includes

- Scraping and analysing content from Wikipedia and Wikivoyage related to Nigerian tourism
- Collecting page view statistics for relevant Wikimedia pages using the Pageviews Analysis tool
- Gathering tourism statistics from the National Bureau of Statistics, Nigerian Tourism Development Corporation, and other relevant sources
- Collecting social media data related to Nigerian tourism.

Data Analysis: The analysis will comprise of

- Qualitative analysis of Wikimedia content for comprehensiveness and accuracy
- Statistical analysis (correlation, regression, time series analysis) and tools such as Autoregressive Integrated Moving Average (ARIMA) and Exponential Smoothing to identify relationships between Wikimedia usage and tourism data
- Sentiment analysis of social media data.

Tourism Prediction Model Development:

- Dataset creation using tourism data and Wikimedia projects data
- Application of machine learning algorithms such as Regression Trees, Support Vector Regression (SVR), and Neural Networks to develop a Tourism prediction model

The results of the data analysis and model development will be discussed using previous works and in the Nigerian context.

A technical report will be submitted to Wikimedia Research Fund. Publication in an open-access journal will be done.

Expected output

The specific research outputs include:

- Content and data on Nigerian Tourism available on Wikimedia Projects: showcase this to Tourism agencies, hospitality businesses and investors
- Prediction model integrating Wikimedia data: showcase this to Tourism agencies, hospitality businesses and investors
- Seminars and workshops: Two public seminars/workshops to introduce the developed prediction model, get feedback and train tourism agencies
- Scientific publication in institutional-based journals like Journal of Computer Science and Its Application by Nigeria Computer Society and AKSU Journal of Social Sciences for the academic community. IEEE open-access journal will be targeted
- Office Hours: Communicate the results of the studies with Wikipedia communities in Nigeria and globally.

Risks

The following risks are expected:

1. **Inability to visit to some locations for data collection and verification:** this will be noted and estimated data used.
2. **Lack of participation from Government:** the data collection, analysis and model building can be done without government participation.
3. **Lack of cooperation by Tourism agencies:** individual members will be worked with.
4. **Delayed authorisation for social media data collection:** activities will be done in parallel to gain time while waiting for approval.
5. **Low participation in seminars/workshops:** Wikipedians and academics will be invited to increase participation. Secondary school students will be engaged also
6. **Lack of secondary data about tourist locations**: surveys, observations and interviews will be used to generate the data required.

Community impact plan

We plan to work with Shola and Ayokanmi leaders of the Wikimedia User Group Nigeria and technical persons in the 36 States Ministry of Tourism and Culture. Professional associations related to hospitality e.g. hoteliers, transportation and entertainment will also be contacted. We will share our findings at Wiki Workshops and Wikimania 2026. An online presence will be maintained on the project page at MetaWiki:Research.

Evaluation

This project can be evaluated using the number of tourist sites analysed, number of states in Nigeria covered by the study, number of participants at seminar/workshop, number of articles published and the number of downloads/ shares of the Tourism prediction model using Wikimedia data.

Budget

The budget is available here (https://docs.google.com/spreadsheets/d/1GN9o202Ev-PdnJ-mEvRdPgfZDY5Th-iSs8RY7YElkM4/edit?usp=sharing)

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