



# The Application of Multinomial Regression Analysis to Heritage Tourism

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## Abstract

The attitude towards the rich heritage resources in Nigerian communities is poor on behalf of the state, at time when the government is looking for avenues through which it may possibly diversify the economy so as to boost employment generation and forge better standards of living for the general population. A closer and articulated observation has revealed that every community in Nigeria has a minimum of one major and viable heritage resource that can and should be utilized to conveniently boost the economy of communities if well harnessed and properly managed. The analysis in this article shows that majority of the respondents visit the Osun Sacred Grove deliberately because of its traditional exhibition and entertainment activities. It is deemed advisable that the Nigerian government could spend more money in such heritage areas to make more people visit the grove. The Osun Sacred Grove is a magical place located on the outskirts of Osogbo, the capital city of Osun State. The grove which is one of the last remnants of chief high forests in southern Nigeria, is viewed as the abode of the goddess of fertility – Osun – one of the pantheon of the many Yoruba gods. The landscape of the grove is unique and its meandering river is scattered with sanctuaries and shrines, sculptures and artworks in honour of Osun and other Yoruba gods. The sacred grove, is viewed as a symbol of identity for all Yoruba people, and attests to the once widespread practice of establishing sacred groves outside all settlements. The question of the level of development and sustainability of heritage tourism in Nigeria, amongst other issues, is what this article has sought to address.

**Keywords:** Nigeria, Osun Sacred Grove, Yoruba people, heritage tourism

## Introduction

A more critical focus is increasingly being placed on the undeniable significance of heritage in global tourism development. The human fascination with experiencing and consuming the past continues to grow across the globe, from the Acropolis of Athens to the pyramids of Egypt to the settlement of Macchu Pichu in Peru. On an international scale the heritage tourism experience encourages people to encounter and appreciate diverse historic environments and cultural assets thereby enhancing the understanding of different people and cultures. In a time of dynamic socio-cultural changes, heritage visits are expected to contribute to enhancing personal and collective memories, forging a sense of cultural and national identity and community cohesion and promote a sense of belonging on a domestic and global scale. As highlighted, heritage means different things to different people and tourists visit heritage sites with different motivations and demands in mind. It is essential to recognize the significance of understanding the different motivations of heritage tourists, which subsequently influence



interpretations and representation. In general, there is substantial lack of detailed information as regards global patterns and trends in the area of heritage tourism (Timothy, 2011). However, it is evident that heritage tourism is a fast growing sector in both developed and undeveloped countries. Many developing countries have recently seen a surge of interest in heritage sites, setting and events as the main pull factors of both inbound and outbound tourism development.

Nigeria with a landmass of about 923,733 sq km<sup>2</sup> is Africa's most populous country with about 160 million people. It has over 250 ethnic groups within its geo-polity, and each of them is identified with a unique cultural heritage. The riches, beauties and diversities of Nigeria's culture are a manifestation of the socio-cultural differences of ethnic groups which inhabit the land. Each city in Nigeria has distinctively interesting things to offer a tourist who is bound to enjoy not only the hospitality of the people, but also the physical beauty of the land.

The attitude towards the rich heritage resources on the part of key stakeholders and especially the state is painful, when in the current dispensation, the government is looking for avenues via which to diversify the economy in order to boost employment generation and promote better standards of living for the majority of the people. A close observation has revealed that every community in Nigeria has at least a minimum of one major and viable heritage resources that can conveniently boost the economy of that community if harnessed effectively and critically, if properly managed. Culturally Nigerians have a unique cultural heritage that is gradually going into extinction owing to the great forces of modernity, neglect and abuse in the wake of the Fourth Industrial Revolution. This situation has raised questions on the existence, significance and development of heritage resources in Nigeria. The question relating to the level of development and sustainability of heritage tourism in Nigeria, amongst other issues, is what this paper seeks to partly address by looking at a case in point, the Osun Sacred Grove.

### **The Osun Sacred Grove**

The Osun Sacred Grove is located on the outskirts of Osogbo, the capital city of Osun State. The grove which is one of the last remnants of chief high forests in southern Nigeria, is viewed as the abode of the goddess of fertility – Osun – one of the pantheon of the many Yoruba gods. The landscape of the grove is unique and its winding river is scattered with sanctuaries and shrines, sculptures and artworks in honour of Osun and other Yoruba gods. The sacred grove, is viewed as a symbol of identity for all Yoruba people, and attests to the once widespread practice of establishing sacred groves outside all settlements.

“Abuja – Malam Yusuf Abdalalh, the Director-General, National Commission for Museums and Monuments (NCMM) on Thursday said the Osun Osogbo Groove would be developed to become the best tourists' destination in Africa...the listing of Osun Osogbo festival on the World Heritage List had improved the image of the site. He said that the participation of private sectors had equally made it gain a lot of attention. Abdallah said that the site was not only about artifacts and monument but had also helped in enterprise development, which had provided employment for the people of Osun. He said that this had reduced the level of poverty and helped to put food on the table of the people. “The contributions of the festival have been very significant in the state,” he said.” (Vanguard, 2010).



## Research Methodology

### A Multinomial Regression Model

Like all linear regressions, the multinomial regression is a predictive analysis which is used to predict categorical placement in or the probability of category membership on a dependent variable based on multiple independent variables. The independent variables can be either dichotomous (i.e., binary) or continuous (i.e., interval or ratio in scale). Multinomial logistic regression is a simple extension of binary logistic regression that allows for more than two categories of the dependent or outcome variable. Like binary logistic regression, multinomial logistic regression uses maximum likelihood estimation to evaluate the probability of categorical membership.

In this study, let R be a response factor on c levels. Let  $\pi = (\pi_1, \dots, \pi_c)$  be the probability vector listing the probabilities that an individual response at various levels. Suppose we have set of independent observations on the multinomial variable R, i.e  $Y_i^T = (Y_{i1}, \dots, Y_{ic})$  gives the numbers of individuals in the c categories under the i<sup>th</sup> set of experimental conditions are summarized by a set of covariate measurements  $x_i$ . The probability vector describing the i<sup>th</sup> multinomial data vector  $Y_i^T$  is

$$\pi = (\pi_{1/i}, \dots, \pi_{c/i}) .$$

A multinomial logit model is one that restricts the probability vector  $\pi_i$  to have the components of the form

$$\Pr(R = j / i) = \pi_{j/i} = \frac{e^{x_i^T \phi_j}}{e^{x_i^T \beta_1 + \dots + e^{x_i^T \beta_c}} \dots \dots \dots 1$$

Or equivalent satisfying

$$\psi_{j/i} = \log\left(\frac{\pi_{j/i}}{\pi_{c/i}}\right) = x_i^T (\beta_j - \beta_c) \dots \dots \dots 2$$

The parameter  $\psi_{j/i}$  is the log-odds for category j compared to l (under conditions i). Only (c-1) of these are needed to describe the probability vector  $\pi_i$ . In the special case of c=2 categories there is only one such logit. Renaming  $\pi_1 = \pi$  and  $\pi_2 = 1 - \pi$

Parametric estimates of  $\psi_{j/i}$  follow upon replacing  $\beta_j$  with estimates  $\hat{\beta}_j$ . Empirical logits can be defined by replacing the  $\pi_{j/i}$  by their empirical estimates  $Y_{ij} / Y_i$  giving

$$\psi_{j/i} = \log(Y_{ij}) - \log(Y_{il}) \dots \dots \dots 3$$



The equation 2 can be transform to  $\psi_{j|i} = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_j X_{ji} \dots\dots\dots 4$

And plotting these against various covariates at the data exploration stage might suggest suitable covariates to include in the vector x of explanatory variables.

The standard error of the point estimator  $\hat{\psi}_{j|i}$  is

$$s.e(\hat{\psi}_{j|i}) = \frac{Y_{ij} + Y_{il}}{Y_{ij} Y_{il}} \dots\dots\dots 5$$

### Data Collection

A survey of 1,000 respondents was conducted at Osun Oshogbo Grove, Nigeria, after ethical issues were attended to, with less than five percent of questionnaires returned unattended to. Each willing respondent was asked to complete a questionnaire which had three categories namely, Destination Environment, Entertainment and Leisure and Destination Culture. The destination environment consists of four factors that may conceivably attract the respondents to the grove. These were (i) a clean and neat environment (ii) agreeable climate (iii) Safe environment and (iv) friendly host community. The second category: entertainment and leisure variables or factors that attract visitors to the grove included: (i). colorful nightlife (ii) entertainment activity (iii) traditional exhibition and (iv) festival. Under the destination culture we have the following factors that attracts visitors to the grove: (i) distinct architecture (ii) abundant history associating the grove with Oshogbo people (iii) local traditional myths that has been used in protecting local culture and (iv) different religion. All were categorized under “strongly agree”, “Disagree”, “strongly agree”, “agree” and “strongly agree”.

Let  $\pi_{ijk}$  be the probability for destination environment for variable j under category k ( SD or D etc).

$$\log(\mu_{ijk}) = m + a_i + b_j + c_k + (ac)_{ik} + (bc)_{jk} + (ab)_{ij} \dots\dots\dots 6$$

Where a = Destination environment;

b = Entertainment and leisure

c = destination culture

ac = relationship between Destination environment and destination culture

ab = Destination environment, and Entertainment and leisure..

bc = Entertainment and leisure, and destination culture

m = constant term

The multinomial logistic regression was constant with the hypothesis about random variable comparisons and the relationship between them.



**Data Analysis:** Quantitative data was analysed using SPSS and Minitab computer packages.

Table 1: Model formation

	Model fitting Criteria			
	-log likelihood	Chi-square	Degree of Freedom	Significance
Intercept only	507.508	681.064		
Final	698.299	33.095	16	0.00

The intercept is only 207.509. This does not comfort for any predictable variables and simply fits an intercept to predict the outcome of the variable. The test of null hypothesis stated that all regression coefficients in the model are equal to zero. Since it is significant at  $\alpha = 0.05$ . One can conclude that at least one of the variables is not equal to zero.

Table II: Likelihood Ratio Tests

Effect	Modelling Criteria -2log likelihood of Reduced Models	Likelihood Ratio Tests		
		Chi-square	df	Significant
Intercept	698.09	0.0000	0	0.0000
a	48.896	-	16	-
b	537.723	4639.454	16	0.0000
c	170.871		16	
ab	26.716	0.0000	16	0.0000
ac	425.338	5487.211	16	0.0000
ac	588.262	9871.344	16	0.0000

This reduced model was formed by equivalence to the final model because omitting the effect does not increase the degrees of freedom. Also unexpected singularities in the Hessian matrix were encountered. This indicates that some predictor variables should be excluded or some categories should rather be merged.



The table for parameter estimates is presented in appendix I. Only traditional exhibition festivals gives strongly agree with visiting the grove for strongly agree. Others are not significant when setting  $\alpha = 0.05$ .

### **Observed and Predicted Frequencies**

The table shows destination image festival, where some respondents claim that it is not only festivals that make them visit the grove but there are other factors as well such as nature and tranquility.

### **Conclusion**

Culture and heritage tourism plays an important critical role in constructing a tourist economy and goes even beyond that. A recent survey on Mytravelresearch.com (Childs, 2018) has shown that over 50% of respondents polled agreed that history and culture are strong influences on their selection of a holiday destination and heritage tourism tends to appeal to high-yield tourists.

The analysis shows that the majority of the respondents visit the grove deliberately due to the traditional exhibitions and entertainment activities. It is thus advisable that government should spend more money in areas such as these, so as to attract a greater tourism contingent from both the domestic and foreign markets and this will result in more people visiting this special grove. Such interventions will invariably make the grove more sustainable and also promote jobs and boost foreign earnings. This is corroborated by the predicted frequency of the people that will be visiting it in future.

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## Appendix

### DEMOGRAPHIC CHARACTERISTICS

#### 1. GENDER

	Frequency	Percentage
Male	262	40.3
Female	388	59.7
Total	650	100

#### 2. Educational Status

Types	Frequency	Percentage
Primary education	151	23.2
Secondary Education	42	6.5
Tertiary Education	372	57.5
University Education	43	6.6
Total	650	100

#### 3. Age of Respondent

Types	Frequency	Percentage
18-25	300	46.2
26 – 35	149	22.9
36 – 45	91	14.0
46 – 55	110	16.9
Total	650	100

#### 4. Marital Status

Types	Frequency	Percentage
Married	467	71.8
Unmarried	167	25.7
Widowed	16	2.5
Total	650	100

#### 5. Nationality

Types	Frequency	Percentage
Nigerian	607	93.4



Foreign	43	6.6
Total	650	100

#### 6. Occupation

Types	Frequency	Percentage
Employed	211	32.5
Self-employed	166	25.5
Unemployed	79	12.2
Retired	21	3.2
Student	73	26.6
Total	650	100

#### 7. Income Levels

Types	Frequency	Percentage
Below 100,000	353	54.3
100,001 – 300,000	138	21.2
300,001 – 500,000	87	13.4
500,001 – 1,000,000	44	6.8
1,000,001 – 2,000,000	28	4.3
Total	650	100

#### 8. Purpose of Trip

Types	Frequency	Percentage
Business	87	13.4
Government official	87	13.4
Visit family friends	174	26.8
Sightseeing	194	29.8
Vacation	108	16.6
Total	650	100

VARIABLE	HERITAGE RESOURCES AND ATTRACTIONS in %			
	The traditional art works in this grove are	The shrines are the reason why I visit	The palaces in the grove are the motivating	Osun river is what motivates to visit the destination



	highly unique		factor for my visit	
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**Casewise Diagnostics<sup>a</sup>**

Strongly Disagree	10.2	16.8	16.9	16.8
Disagree	16.9	26.3	10.2	16.5
Slightly disagree	16.6	13.2	10.0	13.5
Agree	26.6	33.7	52.8	26.3
Strongly agree	29.7	10.0	10.2	26.9
Total	100	100	100	100

DESTINATION CULTURE			
Distinct architecture	Abundant history associating the grove with Osogbo people	Local traditional myths that has been used in protecting local culture	Different Religions
13.2	16.8	10.0	3.4
16.8	3.2	20.0	20.0
13.5	16.9	20.2	26.8
43.2	36.8	26.6	39.8
13.2	26.3	23.2	10.0
100	100	100	100

VARIABLE	ENTERTAINMENT AND LEISURE			
	Colourful nightlife	Entertainment activity	Traditional exhibition	Festival
Strongly Disagree	13.4	10.0	13.4	20.2
Disagree	16.8	10.0	13.5	13.4
Slightly disagree	13.4	20.0	10.0	6.8
Agree	26.8	36.6	40.2	33.4
Strongly agree	29.7	23.2	22.9	26.3
Total	100	100	100	100



Case Number	Std. Residual	Purpose of Trip	Predicted Value	Residual
459	-4.635	1	3.87	-2.873
470	4.043	7	4.49	2.506
489	-4.333	1	3.69	-2.686
500	3.001	7	5.14	1.860

. Dependent Variable:  
Purpose of Trip

a. Dependent Variable: Purpose of Trip

**Residuals Statistics<sup>a</sup>**

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.05	6.43	3.55	1.267	650
Residual	-2.873	2.506	.000	.609	650
Std. Predicted Value	-1.978	2.273	.000	1.000	650
Std. Residual	-4.635	4.043	.000	.983	650

**Coefficients<sup>a</sup>**

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	The traditional art works in this groove are highly unique	.147	6.809
	The Sculpture within the groove encourage my visit	.295	3.387
	Osun river is what motivates to visit the destination	.190	5.272
	The shrines are the reason why I visit	.243	4.119
	The groove is active religious site of worship	.171	5.846
	The palaces in the grove are the motivating factor for my visit	.251	3.978
	The sacred places are the motivating factor for my visit	.231	4.320
	Undisturbed forest canopy attracts myto the destination	.086	11.681
	Rich and diverse flora and fauna are factors that attracts me to the grove	.195	5.118
	Herbal pharmacy /remedy is the reason why I visit the grove.	.418	2.390



Destination Image - clean and neat environment	.068	14.755
Destination Image - Agreeable climate	.177	5.652
Destination image - Safe environment	.078	12.810
Destination Image - Friendly host community	.092	10.813
Destination Image - Colourful nightlife	.078	12.799
Destination Image - Entertainment activity	.080	12.574
Destination Image - Traditional exhibition	.034	29.214
Destination Image - Festival	.077	12.962
Destination culture - Distinct architecture	.302	3.306
Destination culture - Abundant history associating the grove with Osogbo people	.110	9.111
Destination culture - Local traditional myths that has been used in protecting local culture	.207	4.824
Destination culture - different religions	.192	5.210

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.901 <sup>a</sup>	.812	.806	.620	.812	123.231

**Model Summary<sup>b</sup>**

Model	Change Statistics		
	df1	df2	Sig. F Change
1	22	627	.000

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1041.785	22	47.354	123.231	.000 <sup>b</sup>
	Residual	240.937	627	.384		
	Total	1282.722	649			

**Coefficients<sup>a</sup>**



Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
	B	Std. Error	Beta			Zero-order	Partial	Part
	1							
(Constant)	4.345	.240		18.108	.000			
The traditional art works in this groove are highly unique	.330	.047	.314	6.959	.000	.575	.268	.120
The Sculpture within the groove encourage my visit	.646	.039	.527	16.548	.000	.394	.551	.286
Osun river is what motivates to visit the destination	-.083	.039	-.085	-2.147	.032	.217	-.085	-.037
The shrines are the reasonwhy I visit	.157	.038	.144	4.110	.000	.169	.162	.071
The groove is active religious site of worship	-.062	.048	-.055	-1.303	.193	.148	-.052	-.023
The palaces in the grove are the motivating fcator for my visit	.197	.038	.179	5.191	.000	.164	.203	.090
The sacred placesare the motivating factor for my visit	.115	.034	.121	3.359	.001	.082	.133	.058
Undisturbed forest canopy attarcts myto the destination	-.711	.056	-.747	12.626	.000	.073	-.450	-.219
Rich and diverse floraand fauna are factors that attracts me to the grove	.410	.039	.416	10.632	.000	.275	.391	.184



Herbal pharmacy /remedy is the reason why I visit the grove.	-0.557	0.026	-0.570	-	0.000	-0.100	-0.648	-0.369
Destinations Image - clean and neat environment	0.788	0.071	0.737	21.295	0.000	0.229	0.405	0.192
Destination Image - Agreeable climate	-0.416	0.044	-0.388	-9.425	0.000	0.089	-0.352	-0.163
Destination image - Safe environment	-0.143	0.070	-0.127	-2.052	0.041	0.214	-0.082	-0.036
Destination Image - Friendly host community	-0.465	0.057	-0.468	-8.221	0.000	0.205	-0.312	-0.142
Destination Image - Colourful nightlife	0.346	0.062	0.347	5.600	0.000	-0.045	0.218	0.097
Destination Image - Entertainment activity	0.198	0.070	0.173	2.822	0.005	-0.025	0.112	0.049
Destination Image - Traditional exhibition	-0.481	0.098	-0.457	-4.882	0.000	0.121	-0.191	-0.084
Destination Image - Festival	0.950	0.059	1.008	16.182	0.000	0.050	0.543	0.280
Destination culture - Distinct architecture	-0.519	0.035	-0.466	-	0.000	-0.120	-0.509	-0.256
Destination culture - Abundant history associating the grove with Osogbo people	0.196	0.054	0.189	3.624	0.000	0.135	0.143	0.063
Destination culture - Local traditional myths that has been used in protecting local culture	-0.637	0.041	-0.589	-	0.000	-0.104	-0.526	-0.268



Destination culture - different religions	-0.693	0.055	-0.500	-	12.644	0.000	-0.281	-0.451	-0.219
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