

Survey of Adjoining Communities Awareness, Perception and Attitude on Conservation of Yankari Game Reserve, Bauchi State Nigeria, Using Structural Equation Modeling

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Abstract: Studying Local people's (psychometric characteristics) awareness, perceptions and attitudes on Yankari game reserve is a predisposition in evaluating their activities around the conserve area. This is because such psychometric concepts cannot be observed directly but rather elicited based on individual socio-demographic characteristics and psychometric responses on the design questions. YGR being a famous biodiversity, ecological, hydrological, education and research hotspot in Nigeria, the reserve hosted over 20,000 tourists from over 100 countries making it one of the most popular visited tourist destination in Nigeria. If the reserve is properly managed and maintained, it may become a major source of the tourism and revenue generation source to Nigeria. The objective of this finding is to assess the relationship of awareness, perception and attitude of the adjoining local peoples of YGR on the conservation of the reserve. Face to face questionnaire interview was administered to 422 respondents from adjoining communities of the reserve and the result finding indicates that showed that the correlation matrix of the relationships between the independent variable, "awareness and perception" and the dependent variable "attitude". Structural Equation Modeling was used to examine the influence of predictor variables entered into the Structural Equation Modeling in relation to the outcome variable the result shows the following Goodness-of-Fit indices of the model; Chi - Square χ^2 (CMIN) = 730.540 (df = 223), Relative χ^2 (CMIN/df) = 3.276, p = .000, AGFI = .933, GFI = .965, CFI = .928, IFI = .929, NFI = .871, TLI = .904, RMSEA = .064. Also the finding depicts that the factor influencing to attitude are awareness and perception, therefore, the Structural Model consist of two predicting constructs in relation to two criterion construct. This entails that, the independent variables of (awareness and perception) are significant when regressed against the dependent variables (attitude). The model revealed that awareness and perception are significant predictors of attitude of the respondents on the conservation of YGR.

Keywords: Attitudes, Awareness, Biodiversity, Conservation, Perceptions, Structural Equation Model, Yankari game reserve.

1. INTRODUCTION

Local people's attitudes are molded by their level of awareness on goals and characteristics in relation to their socioeconomic features. As used in most psychometric studies, awareness, perceptions and attitudes terms are referred to a suppositious thought or a susceptibility to evaluate some events or entity in a positive or negative state (Prislin & Crano, 2011 and Eagly & Chaiken, 1993). This susceptibility cannot be seen directly, therefore the needs to be elicitation from individuals' responses to the psyche-Question. The responses will be run from overt behavior and explicit voiced statements (e.g., answers to a psychometric question) to covert the responses, which may be exterior of the person's cognizance. These responses can be used to infer a respondent awareness, perceptions and attitudes;

Awareness convey how individuals monitor and perceive certain information surrounding him and his environment (Gellersen & Schmidt, 2002; Dourish & Bellotti, 1992). Therefore, evaluating the awareness, perceptions and attitudes of people towards ecosystem conservation is paramount and important in other to achieve a long-term protected areas survival. Studies have revealed that people's perceptions and attitudes are shaped by their level of knowledge about a phenomenon in relation to their socioeconomic characteristics.

Attitude is an action that depicts or leads to behavior. It is related to thinking and feeling that urges a person to be inclined to do a certain thing or activity in a form of option or actions. Fishbein (1967) characterized attitude as a state of readiness that was organised through experience and provoked an individual's behaviour acquisitive or aversive, favorable or unfavourable, affirmative or negative toward an object or event. Attitude is a hypothetical construct that one could not actually see nor touch, although its consequences are often seen. Attitudes could only be inferred from behavior or expressed opinion (Stewart, 1996).

2. METHODOLOGY

Study area:

The study area comprises of adjoining settlements of Yankari game reserve because the reserve was carved out from a relatively unpopulated portion of the southern Sudan savannah zone which has become an island of well-developed savannah woodland. While the main socio economic activities involved by such communities ranges from large and small scale farming, animal rearing, food processing and some forms of informal trading and micro entrepreneurship activities (Ibrahim & Aliero, 2012).

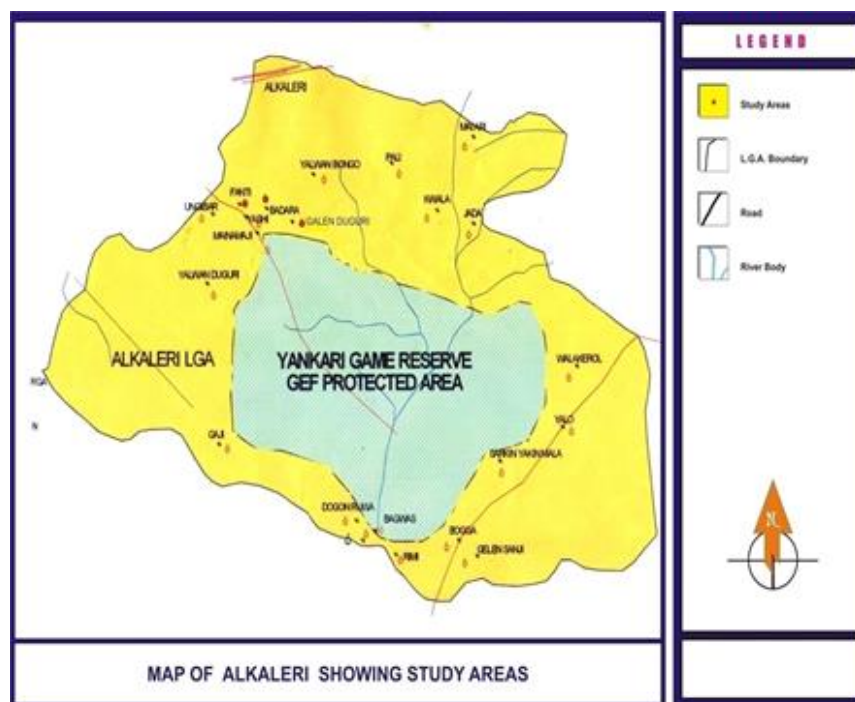


Figure 1: Map of Alkaleri Local government showing Yankari Game Reserve

Population:

Yankari game reserve is situated at Alkaleri local government area of Bauchi State and the Local government has a population of 328,284 people and 54,714 households (NBS, 2012). The targeted respondents are all members of the adjoining communities who are above eighteen (18) years of age.

Sampling:

For the purpose of this study, the Yamane (1976) sample size determining formula was used and a sample size of 400 was achieved, however 40 (10%) additional questionnaires were top up to curtail questionnaire rejection or poor return rate (Ismail, 1992). And Ten (10) adjoining communities of the reserve were selected based on their proximity using Microsoft excel after stratifying the communities into strata and simple random sampling was used in selecting the study respondents.

Data Collection:

The study adopts the face-to-face questionnaire survey administration interview in eliciting the responses of the 440 respondents and at the end only 422 valid responses were obtained after treating the outliers due to missing cases of vital information on vital questions.

Instrument Design:

The direct face-to-face questionnaire interview method containing psychometric questions on the respondents' awareness, perception and attitude towards YGR

3. RESULTS' AND DISCUSSION

Socio-demographic profile of the Respondents:

The respondents socio demographic profile result shows that, male respondents constituting of 321 (76.1%) while that of female is 101 (23.9%) respondents which was associated to the socio cultural and religious belief of typical northern Nigeria Muslims that mostly prevent their wives and female associate from staying outdoors and taking part on social activities.

The respondents age mean score is calculated to be 35 years, with those respondents ageing between 18-25 years constituting 107(25.4%), those ageing between 26-35 years constituting 119(28.3%), and those ageing between 36-45 years constituting 103(24.4%) respondents, while those ageing ranging from 46-55 years and 56 and above years constitutes 53(12.6%) and 40(9.5%) respectively.

The survey marital status result shows that those respondents that indicate their status as married constitutes 279(66.1%) while the non-married (singles) constitutes 143(33.9%). The respondent level of education indicates that 105(24.9%) attended a non-formal type of education, those with primary qualification were 83(19.7%), 187(44.3%) respondents have secondary school qualification which constitute majority of the research respondents and those that attended colleges, polytechnics and university (tertiary education) constitute only 47(11.1%) of the study respondents.

The occupational status result of the respondents shows that 95(22.5%) are been employed by government while those that are self-employed were 128(30.3%), farmers constitutes 133(31.5%) of the respondents while unemployed and retirees respondents constitutes 51(12.1%) and 15(3.6%) of the total survey respondents respectively.

Membership to environmentally associated association by the respondents indicates that about 226(53.6%) belong to a particular association whereas those that do not belong to any association constitute only 196(46.4%). While the respondents gross monthly income earning shows that 167(39.6%) of the respondents earn between ₦10,000-₦20,000 monthly, 129(30.6%) earn between ₦21,000-₦30,000 while those earning between ₦31,000-₦40,000 were 97(23.0%) respondents and ₦ 41,000-₦ 50,000 were 23(5.5%) of the respondents. And those respondents with the highest monthly earning of ₦51,000 and above constitute only 6(1.4%) of the survey respondents. Therefore, ₦25,597 is calculated to be the mean gross monthly income of the respondents.

Table 1: Socio-demographic profile of the Respondents

Element	Freq.	Percentage (%)
Gender		
Male	321	76
Female	101	23.9
Age		
18-25	107	25.4
26-35	119	28.3
36-45	103	24.4
46-55	53	12.6
56 and above	40	9.5
Marital status		
Non married	143	33.9
Married	279	66.1
Educational level		
Non formal	105	24.9
Primary	83	19.7
Secondary	187	44.3
Tertiary	47	11.1
Occupation		
Government employed	92	22.5
Self-employed	128	30.3
Farmers	133	31.5
Unemployed	51	12.1
Retiree	13	3.6
Membership of Association		
Yes	226	53.6
No	196	46.4
Level of Income		
₦ 10,000-₦ 20,000	167	39.6
₦ 21,000-₦ 30,000	129	30.6
₦ 31,000-₦ 40,000	97	23.0
₦ 41,000-₦ 50,000	23	5.5
₦ 51,000 and above	6	1.6

Convergent Validity and Construct Reliability using Measurement Model:

In order to test for convergent validity and construct reliability, Confirmatory Factor Analysis (CFA) was assessed using measurement model. According to Kline (2005) convergent validity is a set of items (indicators) that presume to measure a given construct. It can be measured through testing the Average Variance Extracted (AVE) which Fornell and Larcker (1981) defined as a high AVE ≥ 0.5 indicates a high convergent validity. While Hair et al. (2009) argued that convergent validity should be tested by assessing factor loading of the individual items in which a high factor loading of ≥ 0.5 of each construct indicates a high convergent validity of that particular construct and any construct below that should be cut off from the latent variable. Moreover, construct reliability on the other hand refers to the internal consistency of a data in which the measurement instrument produces consistent results (Glasow, 2005). Thus, construct reliability (CR) is an alternative to Cronbach's alpha coefficient in which an instrument with CR $> .70$ is considered reliable (Hair et al., 2010). In this study, factor loading and (Hair et al. 2009) and construct reliability ((Hair et al., 2010) were used to assess the CFA.

Therefore, Figure 3 below depicts the Modified Measurement Model of the study after several adjustments has been made from Proposed Measurement Model on Figure 1. The Goodness-of-Fit indices of the Modified Measurement Model are as follows; Chi-Square (χ^2) = 701.865, df = 222, $p = .000$, Relative χ^2 (χ^2/df) = 3.162, AGFI = .941, GFI = .972, CFI = .937, IFI = .939, NFI = .870, TLI = .914, RMSEA = .053. From these Goodness-of-Fit indices, the researcher concluded that the Measurement Model fits the data because, Hair et al. (2009) suggested that, if any 3 – 4 of the Goodness-of-Fit indices meets the requirement, then the model is acceptable as measurement model or structural model.

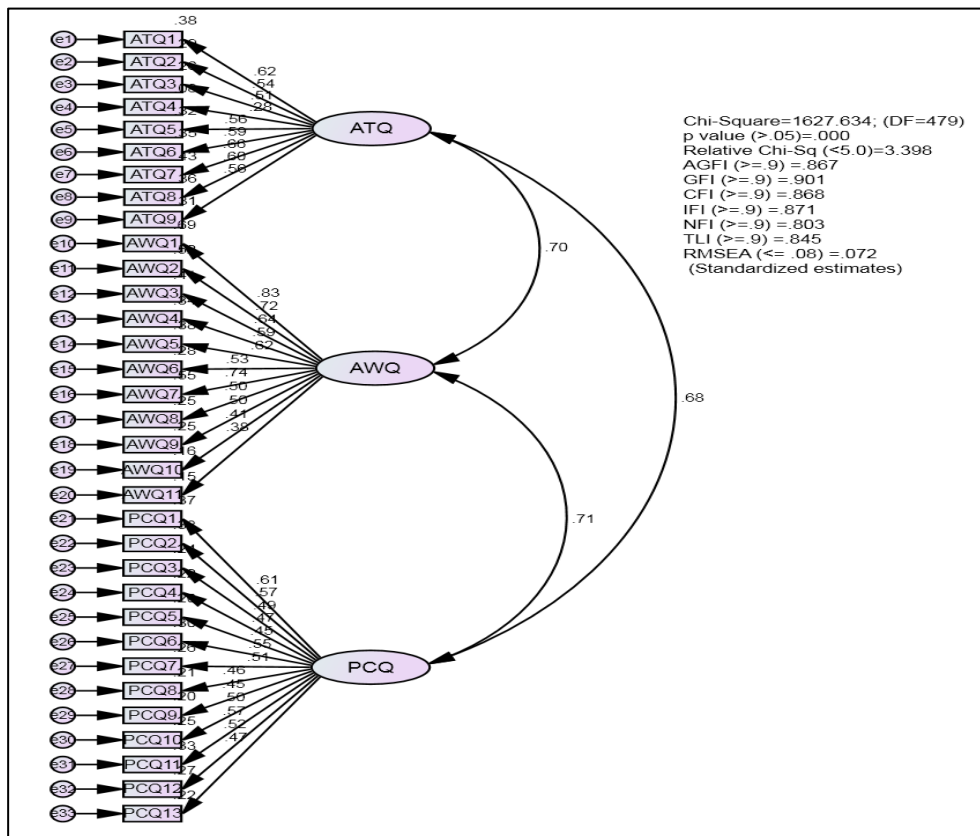


Figure 2: Proposed Measurement Model of the Study

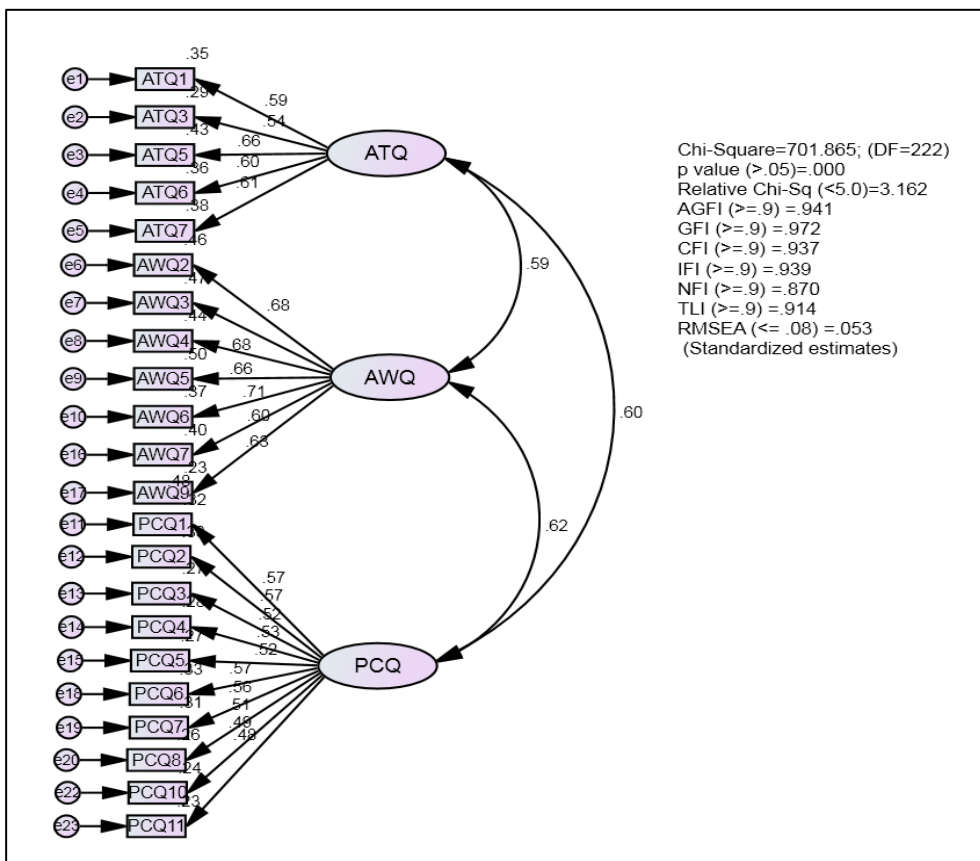


Figure 3: Modified Measurement Model of the Study

Table 2 below illustrates the CFAs of the study in which all the items that did not met the cut-off point of 0.5 were deleted from the path diagrams of CFAs, and the construct reliability (CR) were also calculated. From the beginning, attitude (ATQ) has 9 items but after the CFA the items were reduced to 5 with CR = .740. Awareness (AWQ) has 11 items, however, after conducting CFA the items cut down to 8 with CR = .823. Lastly, Perception (PCQ) has 13 items also but, after the CFA the items were slashed down to 11 with CR = .799.

Table 2: Convergent Validity and Construct Reliability using Confirmatory Factor Analysis (CFA)

CONSTRUCTS	ITEMS	Factor Loading ≥ 0.5		CR $\geq .7$
			CFA	
Attitude (ATQ)				.740
	ATQ 1	.62	.59	
	ATQ 2	.54	Del	
	ATQ 3	.51	.54	
	ATQ 4	.28	Del	
	ATQ 5	.56	.66	
	ATQ 6	.59	.60	
	ATQ 7	.66	.62	
	ATQ 8	.60	Del	
	ATQ 9	.56	Del	
Awareness (AWQ)				.823
	AWQ 1	.83	Del	
	AWQ 2	.72	.68	
	AWQ 3	.64	.68	
	AWQ 4	.59	.66	
	AWQ 5	.62	.71	
	AWQ 6	.53	.60	
	AWQ 7	.74	.63	
	AWQ 8	.50	.94	
	AWQ 9	.50	Del	
	AWQ 10	.41	.48	
	AWQ 11	.38	Del	
Perception (PCQ)				.799
	PCQ 1	.61	.57	
	PCQ 2	.57	.57	
	PCQ 3	.49	.52	
	PCQ 4	.47	.53	
	PCQ 5	.45	.52	
	PCQ 6	.55	.57	
	PCQ 7	.51	.56	
	PCQ 8	.46	.51	
	PCQ 9	.45	Del	
	PCQ 10	.50	.49	
	PCQ 11	.57	.48	
	PCQ 12	.52	Del	
	PCQ 13	.47	Del	

Note: CR: composite reliability

Assessing normality:

Conventionally, checking for normality and outlier is a necessary step in conducting a quality research. Therefore, test of normality was conducted with the purpose to clear the data from any type of error. In statistical research Skewness has more effect on Means (Byrne, 2010), therefore, with regards to this argument, DeCarlo (1997) suggested that, for Structural Equation Modeling, Kurtosis should be given consideration because it seriously affects the test of variance and covariances. Considering SEM as an analysis of covariance structures, Byrne (2010) emphasized that the researcher should always be concern about Kurtosis. Although, Kline (2005) indicated that, there is no clear consensus on the actual bench mark of extreme Kurtosis, however, West, Finch and Curran (1995) consider values > 7 to be early departure from

normality. In contrast, Ullman and Bentler (2001) have suggested that, kurtosis values > 5 are considered to be non-normally distributed.

For this study, test of normality has been conducted to assess the normality of the data and it was found out that all the latent constructs and measured variables were < 5 . The following table 2 below illustrates the respective Kurtosis values for the latent constructs and measured variables. Kurtosis for all items ranges from maximum of -1.579 to minimum of -.480 which all falls within the values of less than 5. And also, the overall multivariate Kurtosis = 131.440 which implies that the sample is normally distributed because the multivariate Kurtosis is not large, as argued by Gao, Makhtarian and Johnston (2008) that, large multivariate Kurtosis indicated that the sample has severely multivariate non-normal distribution. Certainly, if the data is normally distributed then, it is a clear indication that there is no outlier in the data set. Even though, the Mahalanobis d-squared Table indicated about 11 cases observations farthest from the centroid. These cases can be considered as potential outliers because they did not influence the data set to deviate from normality, therefore, the 11 cases can still be maintained in the data set.

Table 3: Assessment of normality

Variable	min	max	skew	c.r.	kurtosis	c.r.
PCQ11	1.000	5.000	-.404	-3.386	-1.060	-4.443
PCQ10	1.000	5.000	-.344	-2.886	-1.193	-5.002
PCQ8	1.000	5.000	-.241	-2.021	-1.370	-5.745
PCQ7	1.000	5.000	-.379	-3.182	-1.163	-4.877
PCQ6	1.000	5.000	-.376	-3.151	-1.138	-4.774
AWQ9	1.000	5.000	-.549	-4.607	-1.044	-4.379
AWQ7	1.000	5.000	-.367	-3.080	-1.579	-6.622
PCQ5	1.000	5.000	-.283	-2.372	-1.188	-4.981
PCQ4	1.000	5.000	-.388	-3.258	-1.137	-4.766
PCQ3	1.000	5.000	-.438	-3.669	-1.268	-5.319
PCQ2	1.000	5.000	-.647	-5.429	-.956	-4.009
PCQ1	1.000	5.000	-.505	-4.237	-1.400	-5.869
AWQ6	1.000	5.000	-.874	-7.329	-.664	-2.786
AWQ5	1.000	5.000	-.650	-5.447	-.819	-3.435
AWQ4	1.000	5.000	-.825	-6.916	-.480	-2.014
AWQ3	1.000	5.000	-.519	-4.352	-1.146	-4.806
AWQ2	1.000	5.000	-.589	-4.942	-1.197	-5.021
ATQ7	1.000	5.000	-.552	-4.633	-.897	-3.762
ATQ6	1.000	5.000	-.594	-4.979	-.744	-3.119
ATQ5	1.000	5.000	-.559	-4.688	-.674	-2.825
ATQ3	1.000	5.000	-.695	-5.831	-.647	-2.713
ATQ1	1.000	5.000	-.491	-4.116	-1.390	-5.829
Multivariate					131.440	41.545

Relationship between Independent and Dependent Variables:

Measurement Model was used to determine the relationship between independent variables of awareness and perception and the dependent variable of Attitude and the Measurement Model analysis result from in table 3 below showed that the correlation matrix of the relationships between the above mentioned variables.

There is significant relationship between awareness and attitude among the respondents.

The Pearson correlation analysis conducted to examine the relationship between awareness and attitude as shown in table 3, indicates that there is a significant high and positive relationship between awareness and attitude ($r = .592, p < .01$). This indicated that, the higher the awareness, the higher the attitude.

There is significant relationship between perception and attitude among the respondents.

Table 4 of the Pearson correlation analysis of perception and attitude analysis shows that there is a significant high and positive relationship between perception and attitude ($r = .594, p < .01$) thus. This result revealed that higher attitude is associated with higher perception.

Table 4: Correlation Matrix of independent variables and Attitude

Variables	Y	X ₁	X ₂
Y (Attitude)	1		
X ₁ (Awareness)	.591**	1	
X ₂ (Perception)	.601**	.622**	1

** . Correlation is significant at the 0.01 level (2-tailed).

Unique Predictors to Attitude (Influence of Awareness and Perception on Attitude):

The Structural Model in figure 4 below consist of two predicting constructs in relation to two criterion construct factor influencing to attitude are awareness and perception. Hence, the proposed hypothesis that examines the validity of the model is expressed as follows:

The independent variables (awareness and perception) are significant when regressed against the dependent variables (attitude).

SEM was used to examine the influence of predictor variables entered into the Modeling in relation to the outcome variable. Consequently, the analysis of SEM using AMOS in Figure 2 below shows the following model Goodness-of-Fit indices; Chi – Square χ^2 (CMIN) = 730.540 (df = 223), Relative χ^2 (CMIN/df) = 3.276, p = .000, AGFI = .933, GFI = .965, CFI = .928, IFI = .929, NFI = .871, TLI = .904, RMSEA = .064. According Hair et al., (2010) if any 3 or 4 of the Goodness-of-Fit indices are within the threshold then the entire model is fit, therefore, based on this reason the Structural Model for this study fits the data. So, the proposed hypothesis is supported. Moreover, the Model also indicates that, about 43% of variances in attitude was explained by the predictor variables entered in to the SEM.

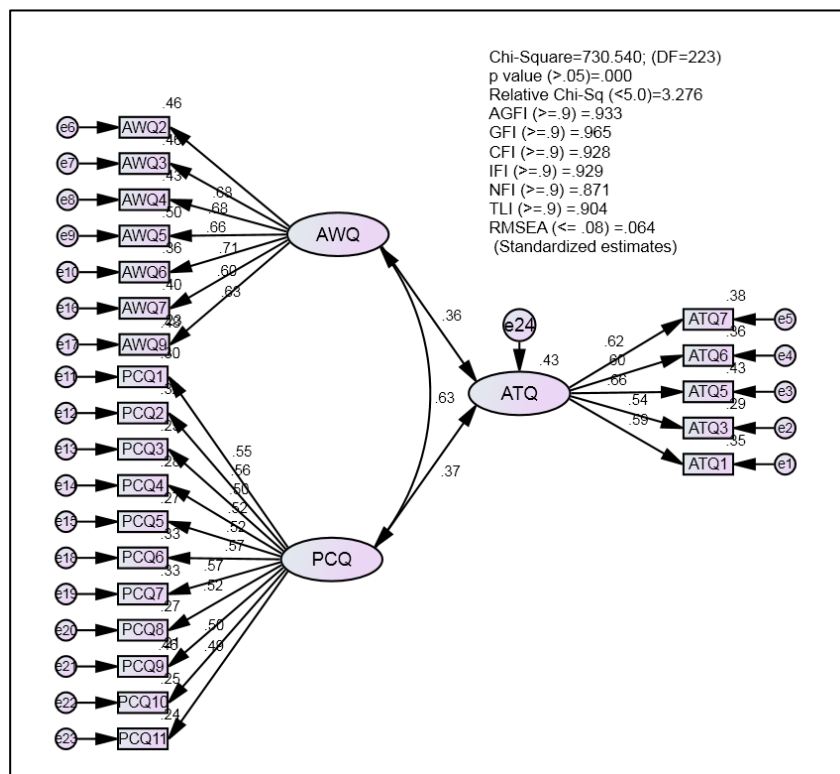


Figure 4: Structural Equation Modeling depicting the influence of Awareness (AWQ) and Perception (PCQ) on Attitude (ATQ) on conservation in Yankari game reserve.

Moreover, the analysis of SEM in Table 4 below shows that, the standardized coefficients path was consistent with the hypotheses by indicating significant relationships between predictors and criterion variable.

Awareness significantly Influence Attitude among the respondents:

The model revealed that awareness is a significant predictor of attitude as presented in Table 5, that there is a significant relationship between awareness and attitude ($\beta = .361$, $CR = 4.412$, $p < .05$). Therefore, the proposed hypothesis showing that awareness significantly influenced attitude is supported.

Perception significantly influence attitude among the respondents:

Similarly, the Model in Table 5 indicated that, there is a significant relationship between perception and attitude ($\beta = .368$, $CR = 4.303$, $p < .05$), this means, perception is a significant predictor of attitude.

Table 5: Unstandardized and standardized regression weight in the hypothesized path model

Hypothesized relationships			B	S.E	B	CR	p
Attitude	<---	Awareness	.331	.075	.361	4.412	.000
Attitude	<---	Perception	.391	.091	.368	4.303	.000
<i>R² for Attitude = .43;</i>							

Note: B:- Unstandardized Regression Weight; S.E:- Standard Error; β :- Standardized Regression Weight; CR:- Critical Ratio; p:- Significant – p; R^2 :- Coefficient of Determination

4. CONCLUSION

Protected areas such as game reserves and national parks are aim at protecting endangered species from poaching and extinction. Negative human attitudes and activities have for so long being greatly affecting such conserve areas and making the plants and animals species more vulnerable and the land water areas degraded, but the reason for such threats is either because the government and the reserve management has been unable to provide development projects and control the threats affecting the reserve and lack of enough funding (Kaffashi et al. 2012)which make the adjoining communities to have negative perception and attitude towards the conserve reserve and its resources. The studying of awareness and perception peoples of the adjoining communities will aid or give more insight towards their attitudes on conservation of environmental resources such as that of Yankari.

The results obtained revealed that there is significant relationship between awareness and attitude among the respondents, there is significant relationship between perception and attitude among the respondents, that the independent variables of awareness and perception are significant when regressed against the dependent variables of attitude, that awareness significantly Influence attitude among the respondents and that perception significantly influence attitude among the respondents.

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