CHAPTER 3

METHODOLOGY

The methodology relating to the current study on '**An Analysis of Ecotourism experience and Future Behavioral Intention with specific reference to Periyar Tiger Reserve in Kerala**' is discussed under the following heads.

3.1 Selection of the area;

3.2 Selection of the sample;

3.3 Collection of data

3.4 Period of study;

3.5 Theoretical framework;

3.6 Operational definitions of the terms used in the study;

3.7 Hypothesis formulated;

3.8 Development of scale-CO-ARS-E procedure;

3.9 Techniques of analysis

3.10 Data analysis strategy and

3.11 Tabulation and analysis of data

3.1 Selection of the area

The study was related to Periyar Tiger Reserve, Thekaddy of Kerala State. Kerala has an area of 38,863 square kilometers and is located in the southernmost tip of India.

Kerala has won national and international acclaim for it's achievements in tourism. These include, the following:

- The best tourism State award of the Government of India for several years.

- The best eco-friendly organisation award.
- Acclaim by the National Geographic Traveller as one of the 12 paradises in the world,
- International awards for the “Responsible Tourism” initiative, and
- The best website national award for Kerala Tourism, for deploying the latest advances in Information Technology for marketing.

Within the tourism sector, ecotourism subsector is of high potential encompassing 60 forest destinations and 12 nominated sites and this subsector is playing a pivotal role in accelerating the pace of tourism in the State. There are 15 Wildlife sanctuaries and 5 National Parks in Kerala covering 5.5 percent of the geographical area of the State (Government of Kerala, 2007). Ecotourism projects in Kerala, based on the concept of sustainability, play a predominant role in the ecotourism initiative of the State. The recent proclamation of the World Heritage Tag to the ecotourism sites of western Ghats is expected to increase the global attention and visitation to these States (UNESCO, 2012). Out of 39 adorned serial sites of Ghats, 12 are from Kerala, thus attracting international and domestic tourists.

Periyar Tiger Reserve is one of the seven India Ecotourism Development Projects (IEDP) sites in India. It is one of the well-known ecotourism sites in Kerala and the biggest wildlife sanctuary in Kerala. Domestic and International tourists visit Periyar Tiger Reserve in large numbers throughout the year.

The prominent reasons of opting for Periyar Tiger Reserve were:

- Unique ecotourism experience promised through it’s blend of attributes – climate, attractive landscape, wildlife and other unique features like wildlife watching cum boat cruise in artificially formed Periyar lake.(www.Kerala Tourism.org)

- The number of tourists visiting Thekkady has been quite encouraging since 2005. In 2014, 3,52,370 tourist arrivals have been recorded. (www.Kerala Tourism.org)
- Plethora of novel ecotourism activities like Periyar Tiger Trial, Bamboo Rafting, Day Trekking Programme, Jungle Inn, Learning Programe in Bamboo Groove, Tribal Heritage. (www.periyartigerfoundation.com) and
- Good facilities like elephant ride, boating, visitor centre, information centre at boat landing, intrepretation Centre are available.

Periyar Tiger Reserve has also bagged number of awards like

- Best 'conservation model' by the Tiger Task Force in 2005.
- U.N.-India Biodiversity Governance award instituted by the Government of India in 2012
- United Nations Development Programme Award in 2012 for best managed Protected Area in the country. The Reserve attained this award on the strength of its holistic management strategies which involved the participation of local communities in wildlife conservation.
- Chief Ministers Award for the Innovations in Public Policy in 2013
- WWF-PATA BAGH MITHRA Award in the year 2014 and
- The best performing Eco Development Committee Award in 2015.

All this indicates the prominence of Periyar Tiger Reserve, among all other ecotourism destinations.

Profile of the study area

3.1.1 Administrative and Topographical background Of Periyar Tiger Reserve :

The total area of the reserve spread over 925 square kilometer consisting of core, tourism and buffer zones, including ecological, eco-development and management zone respectively

The Periyar Tiger Reserve falls into Idukki and Pathanamthitta District of Kerala. Periyar is divided into two divisions: Periyar East with three ranges under it Periyar (376 sq km), Thekkady (99 sq km) and Vallakadavu Range (143 sq km) and Periyar West with two ranges under it - Azutha Range (68 sq km) and Pampa range (91 sq km).

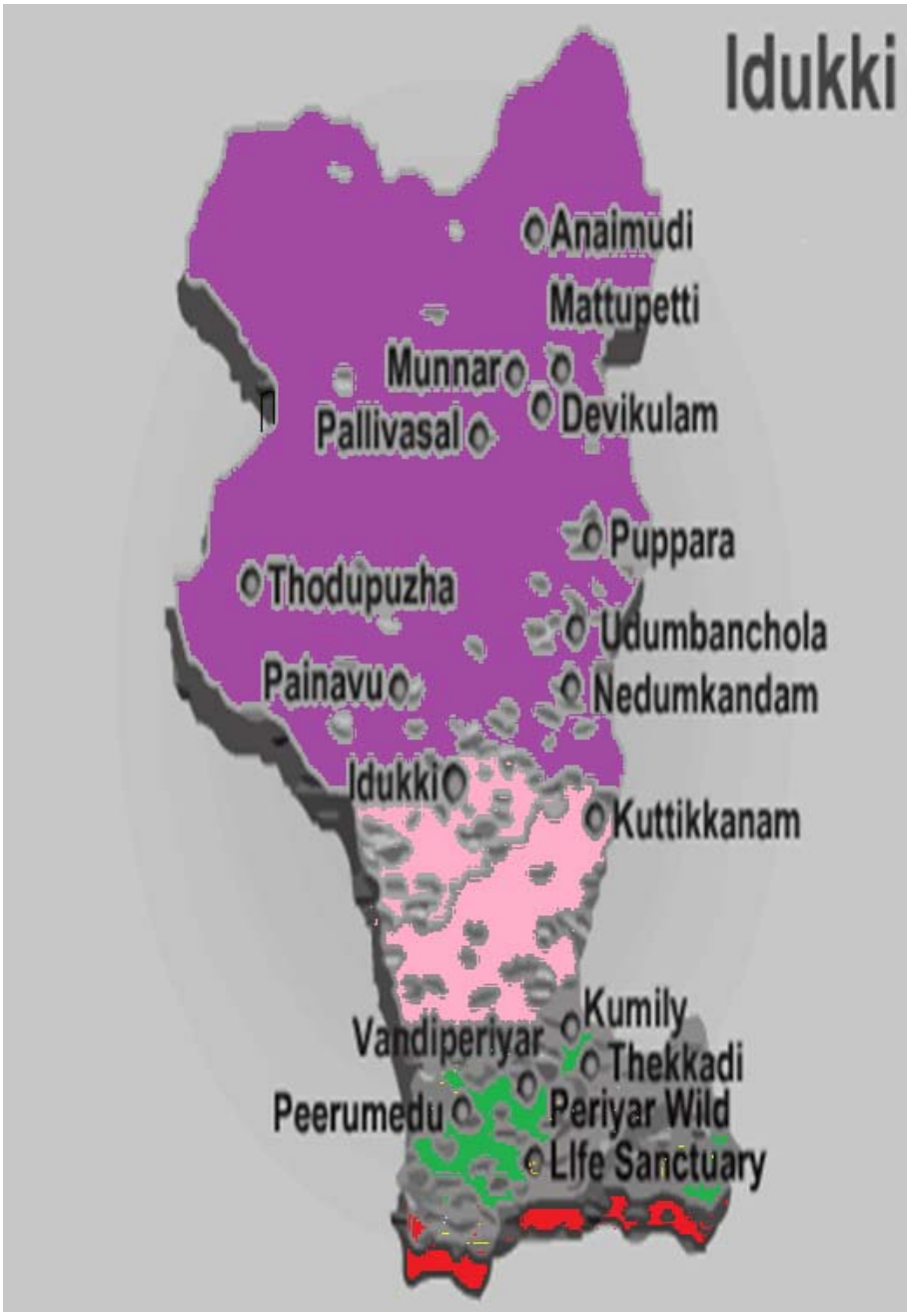
3.1.2 Location and boundaries

Lying between the Latitude - from 90-18'- 00 N to 90-41'-00 N, Longitude - from 760-55'- 00 E to 770-25'- 00 E, Periyar Tiger Reserve shares the common border with the three districts of Tamil Nadu such as Theni, Ramnad and Thirunelvelli. On the Kerala side, it is bordered on the South by the Ranni Division falling in district of Pathanamthitta and on the west by Kottayam Division located between the Kottayam and Idukki district.

Figure 1 represents the location of Periyar Tiger Reserve.

Figure 1

Location of Periyar Tiger Reserve



3.1.3 Climate

The temperature varies depending upon the altitude and it ranges between 15 Celsius in December and January and 31 Celsius in April and May. Annual precipitation is between 2000 and 3000 mm, about two thirds occurring during the southwest monsoon between June to September. Much of the rest occurs during the northeast monsoon between October and December. Summers are warm with some precipitation in April and winters are cold. (www.theindianjourneys.com)

3.1.4 Ecological values

The adjacent stretch of evergreen forest of the Tiger Reserve along with the bordering forest area creates one of the 18 biodiversity hotspots of the country.This forest supports the population of species such as Tiger, Sloth Bear, Elephant, Gaur, Lion Tailed Macaque, Great Indian Horn Bill, etc. It is a major repository of rare endangered and endemic species of flora and fauna representing the Periyar region.

3.1.5 Biodiversity at Periyar Tiger Reserve

Peryar Tiger Reserve is the oldest and one of the twenty-seven reserves in India. The statistical records prove that there are 62 species of mammals, 320 variety of colorful birds, 45 species of reptiles, 27 species of amphibians, 38 species of fish and 160 collections of butterflies and 1,966 varieties of flowers. 'The Travancore Evening Brown', one of the most difficult to find butterflies in the World is spotted here. Herds of gaur, sambar and wild boar can often be noticed in a distance grazing in the grasslands. Water birds like darters, grey herons and kingfishers can be sighted here. There is an opportunity to observe not only mammal species such as the sloth bear and the Nilgiri languor but also rare birds like Paradise flycatcher, racket tailed drongo and pied hornbill. There are three watch towers for observing wild life- at Edappalayam, Manakkavala and Thannikudi. (www.theindianjourneys.com)

3.1.6 Ecotourism activities in Periyar Tiger Reserve

- **Nature walk**

This is an interpretive programme offering excellent opportunity to watch birds, butterflies and other wildlife. Different nature trails traversing diverse habitats form the trekking routes, generally 4 to 5 kilometers in length. The trails often pass through evergreen and moist deciduous forests interspersed with marshy grasslands. The programme is offered in six time slots and lasts for two and half hours. A maximum of six persons can go for trekking at a time along each nature trail, covering the boat-landing – Kokkara route, accompanied by a trained tribal guide.

- **Clouds walk**

By clouds walk visitors can see the exuberance of Cumbam Valley, the dizzying heights of Mangaladevi, Kumarikulam, glory of Palani hills, habitat specialist birds and butterflies including endemics like the Nilgiri Pipit, broad-tailed grass bird, tree nymph etc.

- **Border trekking - Protection oriented range hiking**

This is a conservation-oriented hard trek taking up a full day, starting at 8 a.m and ending at 5 p.m, covering 15 kilometers. The route passes through undulating terrains. Altitudinal ranges of 900 meters to 1300 meters will be covered and trekkers obtain glimpses of the lofty escarpments bordering the park watershed and the vast plains down below. Gaur, sloth bear, elephant etc. are often sighted along this route apart from birds and butterflies. A maximum of 12 tourists can take the programme in two different groups. The trekkers will go with two guides and an armed forest guard.

- **Bamboo rafting - Dawn to dusk range hiking**

This is a dawn-to-dusk range hiking and rafting programme through some of the richest forest tracts of Periyar Tiger Reserve. Starting at 8 a.m from the boat landing, a mosaic of habitats will be traversed before the party gets into rafts made of bamboos. Rafting lasts for about three hours and one gets a panoramic

view of forest-clad hills reflected on the lake. Animals like elephant, gaur and sambar are sighted keeping close to the edges of the lake. An armed guard and four guides will accompany a maximum of ten tourists.

- **The bamboo grove**

The fifteen bamboo huts with hygienic and modern furnishing are placed between bamboo thickets. The ambience of bamboo grove provides an opportunity to listen to the whistling of bamboo culms, chirping of birds and the flow of small rivulets emerging out from the swamps of the surrounding Periyar meadows. The bamboo grove programme also offers an eco-friendly environment to conduct seminars, symposiums, workshops and training programs in the centrally located 'Kalari', a conference hall with audio-visual facilities. The bamboo grove package consists of an orientation programme, a visit to a tribal colony, wildlife film shows, bird watching, trekking and a complimentary boat ride on the famous Periyar Lake.

- **Jungle Inn - Jungle in the night**

This is an opportunity for nature lovers to stay inside one of the watch towers constructed inside the forests in the ambience of jungle with minimal creature comfort. The forest cottage at Kokkara, about an hour's walk from the forest check post is an ideal place to board two persons hoping to share the quietness of the jungle night.

- **Bullock cart discoveries**

This is a trans-boundary initiative in which tourists are taken in a bullock cart to visit the farmlands of a village in Tamil Nadu, hidden in a valley behind the mountains of Periyar Tiger Reserve, to see a variety of crops and several species of birds.

- **Jungle scout (Night trekking)**

This unique ecotourism programme intends to entertain those who are desirous of experiencing the wilderness during night and contribute towards forest protection by joining the regular forest protection party as a paid volunteer.

The programme is offered in three time slots of three hours each, starting at 7 p.m and ending at 4 a.m.

- **Periyar tiger trail**

Tiger trail is an adventurous trekking and camping programme, offered in two packages; one night and two night stays. The programme is unique in being conducted by a team of rehabilitated poachers and tree cutters of the park, who have an intimate knowledge of the forest terrain.

3.2 . Selection of the sample

The study adopted proportionate random sampling method for selecting the sample respondents from the chosen destination**.** The study covered both foreign and domestic tourists in peak and lean seasons. The peak seasons in the context of Periyar Tiger Reserve ranges from September to January and the lean seasons are June, July and August.

Table 3 represents the number of domestic and foreign tourists visiting Periyar Tiger Reserve during peak and lean seasons, on an average between 2014-15.

Table 3

Number of domestic and foreign Tourists visiting Periyar Tiger Reserve on an average in peak and lean season between 2014-15.

Type of Tourists	Peak season	Lean season
Domestic tourists	41067	6712
Foreign tourists	3916	74

Source: Official records of Periyar Tiger Reserve, 2015

By adopting proportionate random sampling, (1 percent of the total number of tourists), the number of sample respondents in peak and lean season were decided.

Table 4 represents number of sample respondents selected in peak and lean season.

Table 4

Number of sample respondents selected in peak and lean season

Type of tourists	Peak season	Lean season	Total
Domestic tourists	410	67	477
Foreign tourists	39	7	46

The study covered 477 domestic tourists and 46 foreign tourists.Hence the total size of the sample was 523.

3.3 Collection of data:

The data has been collected from secondary and primary sources.

Secondary sources include:

- Reports and Statistics on Tourism- Ministry of Tourism, Government of India, Government of Kerala.
- Reports on International Tourism Trends, United Nations World Tourism Organisation, World Tourism and Travel Council.
- Websites of Government and private Organizations - Ministry of Tourism, Government of Kerala, United Nations World Tourism Organisation, World Tourism and Travel Council. EcoClub, Periyar Foundation, Periyar Tiger Reserve, International Ecotourism Society etc.
- Working papers on Ecotourism, Periyar Tiger Reserve.

Primary data collection

Primary data were collected in two phases**.**

Phase I - Exploratory Research through Interviews and Focus Group Discussion

Exploratory research forms the foundation of a good study (Churchill and Iacobuci 2004). Exploratory research has been adopted in this study and it has helped to determine the research design as such and methods of data collection and in selection of relevant subjects for the study.

The study conducted interviews and focus group discussions to identify and understand the relevant dimensions and variables to be considered or modified appropriately to suit the destination considered for the study. In the current study interviews were held with eight officials from Wildlife Department, ten guides operating in Periyar Tiger Reserve and twenty five service providers (hotels, homestays, shops) in and around the region. Group discussions were held with twelve watchers and five guards. Five experts from the academia were also interviewed to provide their contribution on the relevance of the research problem identified.

Phase-II –Descriptive research through Survey Method

Survey method was adopted in collecting responses from the respondents of Periyar Tiger Reserve. This approach was adopted as it gives an opportunity to generalize conclusions from a given context on the basis of penetrating and relevant questions to capturing the richness of the concept – the link between ecotourism experience and post trip satisfaction and the link between ecotourism experience and future behavioral intention . The interview schedule (Appendix I) had four sections:

Section A of the interview schedule was related to general information pertaining to age, gender, educational qualification, employment, income, marital status and nationality.

Section B consisted of questions for identifying the dimensions of ecotourism experience.

Section C consisted of questions pertaining to post trip satisfaction.

Section D consisted of questions to examine the future behavioural intention

3.4 Period of study

The study was related to 2014-15. The pilot study was conducted during October –November ,2014 for 63 respondents . It was undertakento check the reliability of items. Testing the reliability of the various constructs is the pre-requisite for data analysis and inference. Reliability analysis tests whether a scale consistently reflects the subset it measures (Churchill 1979; Nunnally and Bernstein 1994). Cronbach's alpha coefficient is used to measure the reliability. The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. George and Mallery (2003 p. 231) provide the following rules of thumb: "Cronbach's alpha coefficient ≥ .9 , Excellent if Cronbach's alpha coefficient ≥ .8 , Good if Cronbach's alpha coefficient ≥ .7, Acceptable if value is ≥.6 , Questionable if the value is ≥.5 , Poor if value is≥ .5, lesser than .5 is Unacceptable". So a high value for Cronbach's alpha indicates good internal consistency of the items in the scale.In the present study the indicators were having Cronbach's alpha coefficient(calculated using SPSS 16) between 0.7 to 0.9, thus indicating good reliability.

The final data collection was done during the period December 2014 to April 2015 (for peak season) and from June 2015 to August 2015 (for lean season).

3.5 Theoretical framework

Economic impact of tourism is well documented in tourism studies and has been classified as direct, indirect and induced based on the production changes resulting from spending and re-spending of tourists (Stynes,1997). Owing to positive and negative impact of tourism, globalization, overall increase in outbound and inbound travels in both developing and developed nations, tourism impact was measured not only in economic perspective but in socio, cultural and environmental dimensions, which urged for the emergence of alternative forms of tourism, focusing on sustainability, popularly known as new age tourism (Mowforth and Munt,2003). Ecotourism, especially in developing countries, also gained popularity through new age tourism.

There is a link between consumption experience and overall satisfaction (Spreng, MacKenzie, and Olshavsky, 1996, Huang, Weiler, and Assaker 2015). Such a function would provide a focus on consumption experience at ecotourism destinations. On the basis of application of Theory of Reasoned Action, overall satisfaction is found to influence destination choices.

Some theories exist in the domain of tourism literature establishing the link between satisfaction and future behavioural intention. The two prominent theories of Psychology are Theory of Reasoned Action (Martin Fishbein and Ajzen,1967) and Theory of Planned Behaviour (Ajzen,1985) which were found to have applicability in tourism context, especially in tourist motivation studies and future behavioural intention (Tian-Cole and Crompton, 2003, Chih-Yung Tsai, 2010). As tourists are rational ,they tend to make informal choices on the basis of available information (i.e), if a tourist is experiencing overall satisfaction with a particular site, then these feelings are expected to have an influence upon their intention to return to the destination. Since intentions are expected to precede behavior, the tourists are likely to return to the site or atleast provide favourable word of mouth advertising to friends and family about the site(Tian-Cole and Crompton,2003).

3.6 Operational definition of the terms used in the study

- **Ecotourism**: Ecotourism refers to protected area – Periyar Tiger Reserve
- **Ecotourist**: It refers to a tourist visiting protected area. It includes all type of ecotourists - hard, soft and casual.
- **Peak season**: It is the period when the foreign and domestic tourists visiting the destination is at its maximum.
- **Lean season**: It is the period when the foreign and domestic tourists visiting the destination is minimum or less in comparison to peak season.
- **Tangible attributes**: Tangible attributes refer to those attributes available at the destination. These tangible attributes contribute in enhancing the overall tourist experience as these tangible attributes help in building

destination image. Tangible attributes identified in the current study are Accomadation, Amenities, Display of art forms, Ecofriendly technology, Flora and fauna, ecotourism activities etc.

- **Intangible attributes:** Intangible attributes refer to those attributes available at the destination which and they play a major role in determining holiday experience and contribute in building destination image. Intangible attributes in the study include quality of service, local culture influence, reasonableness of price, environment education, quality of information, security, scenic beauty etc.
- **Psychological attributes**: Psychological attributes refers to memorable, enjoyable, unique aspects of the experiences derived or gained at the destination due to the visit to the destination.
- **Demographic attributes**: Demographic variables like age, gender, educational qualification, marital status are referred to as the demographic attributes.
- **Ecotourism experience**: This refers to the experience generated by the tangible, intangible, psychological and demographic attributes, gained from ecotourism activities by tourists visiting ecotourism destinations.
- **Ecotourist satisfaction**: This refers to satisfaction derived from destination attributes, service encounters and holiday experience .
- **Future behavioral intention**: This refers to the post-trip behavior of the tourists in the future, which generally manifests as revisit intention, recommendation intention etc.

3.7 Hypothesis formulated

- There is no significant difference in ecotourism experience between peak and lean season.
- Ecotourism experience has no significant dimensional orientation

- There is no significant relationship between ecotourism experience and ecotourist satisfaction.
- There is no significant relationship between ecotourist satisfaction and future behavioural intention.
- There is no significant relationship between ecotourism experience, ecotourist satisfaction and future behavioural intention and
- There is no significant difference in constraints faced in peak and lean seasons.

3.8 Development of Scale - C-OAR-SE procedure

3.8.1 Scale development process sequence

Generally the term “scale” is used to refer to a measurement instrument developed for the purpose of measuring a theoretical phenomenon that cannot be readily observed or assessed directly (DeVellis, 2003).

The C-OAR-SE procedure for development of scale consists of six steps such as;

- Construct definition consisting : (1) the OBJECT to be rated, (2) the ATTRIBUTE on which it is to be rated, and (3) the RATER ENTITY, which is the person or group who does the ratings.
- Object classification and identification of constituents or components
- Attribute classification and identification of components
- Rater entity classification
- Scale (item type and answer format) selection and
- Enumeration (scoring)

This study has adopted the C-OAR-SE procedure involving the following steps:

- Definition of Initial construct definition
- Item generation : 105 items were shortlisted from literature

- Focus Group discussions and Expert reviews led to classification of items into 27 items.
- Interview schedule designed and collection of primary data.
- Pilot study
- Data collection as per sampling design.
- Validation as per statistical procedures and
- Finalization of constructs

3.8.2 Validity of C-OAR-SE Scale

The scale developed for ecotourism experience was validated through Common method of variance (CMV), convergent validity, composite validity, discriminant validity and nomological validity.

- **Common method of variance**

CMV is "variance that is attributable to the measurement method rather than to the constructs the measures represent"(Podsakoff ,Mackenzie,Lee, and Podsakoff,2003). CMV creates a false internal consistency which could be attributed to apparent correlation among variables generated by their common source. According to Podsakoff et al.(2003), four general sources of CMV is possible: the use of common rater, the manner in which items are presented to respondents, the context in which items on a questionnaire are placed and the contextual influences(time, location and media) used to measure the constructs .In this study, the presence of CMV is not of much concern as data has been collected from different participants at different points of time(data has been collected in peak and lean season). However possibility of CMV has been reviewed. Post Doc Harman one factor analysis is used to check the variance in data which can be attributed to a single factor. In this method all items are loaded from each of the constructs into an exploratory factor analysis to check whether one single factor emerges or check whether one general factor is accounting for a majority of the covariance between the measures.

In this study, Harmon one Factor Test was conducted to check for CMV.

- **Convergent Validity**

Convergent validity is established when the relationship between measurement items and factor are significantly different from Zero. Based on this, critical ratios are used to evaluate the statistical significance. Parameters which have a critical ratio greater than 1.96 were considered significant based on the level of p=0.05(Anderson and Gerbing,1988). For establishing convergent validity, all the standardized regression weights should be linked to the latent construct and have least loading estimate of 0.5 and ideally exceed 0.7. (Hair et al., 2003).

The next aspect to be considered for the purpose of convergent validity is Average variance Extracted (AVE). Variance extracted refers to "the amount of variance that is captured by the construct in relation to the amount of variance due to measurement error (Fornell and Lercker, 1985). Variance extracted for a construct should be larger than 0.5,which indicates reliable factors (Hair et.al,1995).

- **Composite Validity**

Composite reliability is considered high if squared multiple correlation (SMC) is greater than 0.5,modest if it is below 0.3 and 0.5 and poor if it is lesser than .3(Holmes-Smith,2001).

- **Discriminant Validity**

Discriminant validity was confirmed by examining correlation among constructs. As a rule of thumb, 0.85 correlation or higher indicates poor discriminant validity in structured equation modelling (Kaplan and David, 2007). To confirm discriminant validity, squared inter construct correlation estimates were calculated and compared with average variance extracted.

- **Nomological Validity**

Nomological Validity is established by assessing the construct covariance. The nomological validity is tested by examining whether the covariance between the constructs in the measurement model are positive and significant.

3.8.3 Constructs of the study

A construct is defined as the conceptual term used to elaborate a phenomenon of theoretical interest to the researcher which is not directly measurable in the study. The focus of every research lies typically on identifying the constructs, identifying relationships between constructs proposed in the study and measurement of the constructs e.g. ecotourism experience, ecotourist satisfaction.

In the current study, “ecotourism experience, “ecotourist satisfaction”, “future behavioural intention” constructs were conceived as second order constructs .

The current study focussed on analysis of relationship between variables which are abstract and are not directly measurable. Therefore, the concept of latent variables was adopted to explain the variables of interest in the present study. According to Bentler (1980), the latent variables can be considered as hypothetical constructs invented by the researcher for the purpose of understanding the research area. As the latent variables are unobservable and cannot be directly measured, researchers use observable and empirically measurable indicator variables also called as manifest variables to estimate the latent variables in the model.

Two basic types of relationships exist in causal modeling namely

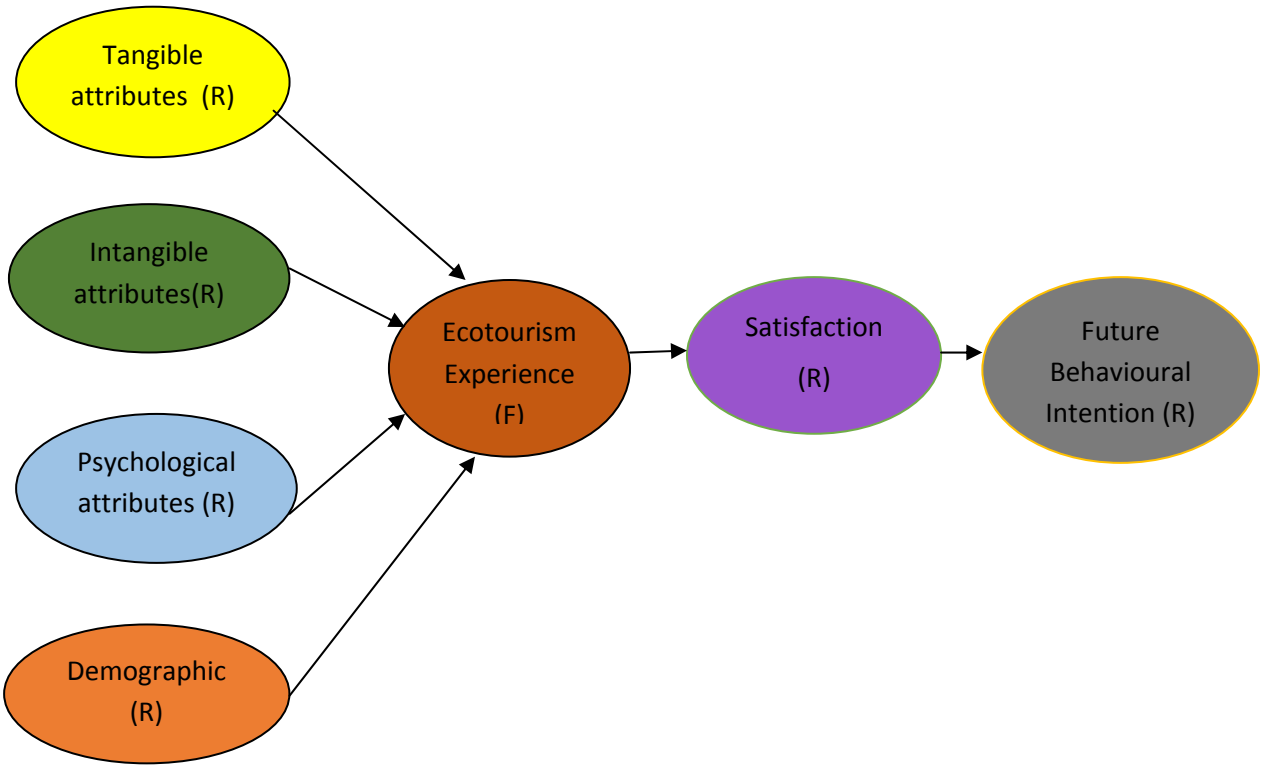
- Reflective
- Formative

Constructs are usually viewed as causes of indicators, meaning that variation in a construct leads to variation in its indicators. Such indicators are termed ‘‘reflective’’ because they represent reflections or manifestations, of a construct. The “formative” indicators are viewed as causes of constructs as construct is formed or induced by its indicators (Edwards and Bagozzi, 2000).

Figure 2 represents the construct mapping used in the study

Figure 2

Construct mapping used in the study



In the figure, 'R' denotes constructs conceptualized in reflective manner and 'F' denotes constructs conceptualized in the formative manner. The constructs of ecotourism satisfaction and future behavioral intention were defined as reflective constructs. The construct of ecotourism experience was defined in the formative manner and was developed as formative construct with first order dimensions showing the indicators pertaining to tangible, intangible, psychological and demographic attributes.

3.8 4 Explanation of the constructs

The important constructs considered in the current study are :

1. Ecotourism experience
2. Ecotourist satisfaction and
3. Future behavioural Intention

3.8.4.1 Explanation of minor constructs leading to development of ecotourism experience

Table 5 represents the constructs and indicators of ecotourism experience

Table 5

Constructs and indicators of ecotourism experience

Name of the construct	Indicators
Tangible attributes	Accomodation, amenities, display of art forms, flora, fauna, ecotourism activities
Intangible attributes	Quality of service, local culture influence, reasonableness of price, environment education, quality of information, security and scenic beauty
Psychological factors	Enjoyment, memorable, uniqueness, physical comfort and mental relaxation
Demographic factors	Age, gender, level of education, marital status

The indicators have been identified from the literature available and on the basis of the appropriateness of the destination.

Table 6 gives the list of major reference used for developing the construct-Ecotourism Experience.

Table 6

List of major reference used for developing the construct - Ecotourism Experience.

Item	Reference
Identification of indicators – Tangible attributes	Reynolds and Braithwie (2001), Juric and Damine (2002), Roxana (2013), Newsome et al. (2013)
Identification of indicators- Intangible attributes	Reynolds and Braithwie (2001), Wight (1996), Newsome et.al (2013)
Identification of indicators – Psycholgical attributes	Jennifer Kim Lian Chan and Tom Baum (2007), Newsome et al. (2013)
Identification of indicators – Demographic attributes	Moisey and Bichis (1999), Mykletun et al. (2001), Oh(2002), Raj (2004); Cini et al. (2010)

3.8.4.2 Ecotourist satisfaction.

Table 7 represents the indicators of the construct – Ecotourist satisfaction

Table 7

Indicators of the construct- Ecotourist satisfaction

Name of the construct	Indicators
Ecotourist satisfaction	Ecotourism activities at the destination, non ecotourism activities at the destination, destination attributes, service quality, cognition and affect and emotional connections

Table 8 represents the list of major references used for identifying these indicators

Table 8

List of major reference used for developing the construct - Ecotourist satisfaction

Name of the construct	References
Ecotourist satisfaction	Chen and Tsai (2007), Chen, Lehto and Choi S. (2009), G.Prayag (2009), Francis Eric Amuquandoh, Kwaku Adutwum Boakye and Emmanuel A. Mensah C (2011).

3.8.4.3 Future Behavioural intention

Table 9 shows the indicators of the construct- Future behavioural Intention

Table 9

Indicators of the construct- Future Behavioural Intention

Name of the Construct	Indicators
Future Behavioural Intention	Revisitation Intention, recommendation Intention to friends and relatives, choose the destination among others, Ikeliness to say positive things about the overall experiences at the destination and deeper involvement in ecotourism.

Table 10 gives the list of major reference used for identifying these indicators

Table 10

List of major reference used for developing the construct – Future Behavioural Intention

Name of the construct	References
Future Behavioral Intention	Opperman (2000), Bigne et al. (2001); Akama et.al. (2003) and Bigne et al. (2009)

3.9 Techniques of analysis

- **Likert rating Scales**

Likert rating scale is simply a statement that the respondent is asked to evaluate value on any kind of subjective or objective dimension, with level of agreement/disagreement being the dimension most commonly used. Each point on the scale carries a score of 1=Strongly disagree,2= Disagree, 3=Neutral, 4= Agree and 5= Strongly agree.

In the current study, Likert rating Scale was used to identify dimensions of ecotourism experience, ecotourists satisfaction and the future behavioural intention.

- **Cronbach Alpha**

Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability.

Cronbach's alpha can be written as a function of the number of test items and the average inter-correlation among the items. The formula for the Cronbach's alpha is

$$\lambda\, standardised = \frac{k\bar{r}}{1 + (k-1)\bar{r}}$$

Cronbach Alpha was calculated for checking the validity of the indicators of the study and at different stages consequent to performance of the factor analysis

- **Analysis of Variance** (**ANOVA**).

ANOVA is a statistical test which analyzes variance. It is helpful in making comparison of two or more means which enables a researcher to draw various results and predictions about two or more sets of data.

ANOVA is a procedure used mainly for testing the difference among different groups of data for homogeneity. The essence of ANOVA is that the total amount of variation in a set of data is broken down into two types- the amount attributed to chance and the the amount attributed to specified causes. There may be a variation between samples and also within sample items and ANOVA splits the variance for analytical purposes.

ANOVA tests for differences among the means of the populations by examining the amount of variation within each of these samples, relative to the amount of variation between the samples.In terms of variation within the given population, it is assumed that the values of (Xij) differ from the mean of this population due to random effects, whereas in examining differences between populations , it is assumed that the difference between the mean of the jth population and the grand mean is attributable to what is called a 'specific factor' or what is technically described as treatment effect. ANOVA is used based on the assumption that samples are drawn from normal population and also that each of these population has the same variance.

$$F = \frac{\text{Estimate of population variance based on variance between samples}}{\text{Estimate of the population variance based on the variance within samples.}}$$

The calculated value of F is to be compared to the F-limit for given degrees of freedom. If the F value is equal or exceeds the F-limit value, it is inferred that there are significant differences between the sample means.

In the present study, ANOVA was used to evaluate as to whether there is difference in ecotourism experience during the peak and the lean season in the context of Periyar Tiger Reserve.

- **Factor analysis :**

Factor analysis is a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors. A factor is an underlying construct or dimension that represents a set of observed variables. Factor loadings help in interpretation and labelling of factors. Factor loadings are correlation coefficients between the variables and the factors. Eigen values measure the variance in all the variables corresponding to the factor. They are calculated by adding the squares of factor loadings of all variables in the factor. It explaining the importance of the factor with respect to variables. Generally, factors with eigen values more than one are considered stable.

KMO and Bartlett's Test

Two tests, Kaiser-Meyer-Olkin measures of sampling adequacy(KMO) and Bartlett's Test of Sphericity have been applied to test whether the relationship among the variables has been significant or not.

Bartlett's test of Sphericity helps in testing the statistical significance of the data. Existence of high relationship among variables is ascertained with the value of test statistic and associated significance level.

Principal component analysis:

Communalities measure the percentage of variance in each variable explained by factors extracted, which ranges from 0 to 1. A high communality value indicates that the maximum amount of variance in the variable is explained by factors extracted from the factor analysis. In the case of principal components solution, all the initial communalities are 1. There could be as many factors (Principal Components) as there are variables.

Factor Analysis are of two types: exploratory and confirmatory. It is exploratory when there is no pre-defined idea of the structure or the number of dimensions in a set of variables. Confirmatory factor analysis is done when one wants to test specific hypothesis, the structure or dimensions of variables, especially underlying variables..

In the present study, exploratory factor analysis was used to identify the factors or dimensions of ecotourism experience. Confirmatory factor analysis was used to confirm the dimensions of ecotourism experience.

- **Structural equation modeling** (**SEM**):

The term "structural equation model" most commonly refers to a combination of two things: a "measurement model" that defines latent variables using one or more observed variables, and a "structural regression model" that links latent variables together. The parts of a structural equation model are linked to one another using a system of simultaneous regression equations(.Loehlin,2004)

Structural equation modelling has distinct approaches:

- Covariance based SEM(CB-SEM) done using different software packages such as AMOS,EQS,LISREL and MPLUS
- Partial Least squares, which focuses on the analysis of variance done using PLS-Graph, SmartPLS and WarpPLS and
- Generalised Structured Component Analysis (GSCA) forming an optimizing global criterion .

In the current study, structural equation modelling was used to test the existence of causal relationship between ecotourism experience, ecotourist satisfaction and future intentional behavior.

In this study, both the approaches of CB-SEM and PLS have been used. The confirmatory factor analysis of ecotourism experience, has been analysed using CB-SEM based software AMOS.16. The model fit was analysed by calculating the goodness of fit indices.

PLS based Warppls 5.0 has been used as it can accommodate both the scales - namely formative and reflective as inclusion of formative measures in CB-SEM has been found to encounter identification problems.PLS does not require any priori distributional assumptions and accepts relatively small samples (Chin et al., 2003). PLS is found to be appropriate if conditions relating to sample size, independence, normal distribution are not satisfied and also if prediction assumes more importance than parameter estimation. PLS is also found suitable for the conceptual model as the research objective is more exploratory and nothing much is known about the relationships between variables. Thus in this study the conceptual model which is representing all the constructs has been anlaysed by using Warp-PLS 2.0.

- **Garrett ranking technique**

  Garrett ranking technique is used to analyse the constraints faced by the eco tourists in peak and lean season. The respondents were asked to assign the rank for problems and outcomes of such ranking have been converted into score value using the formula:

  Percent position = $\frac{100(Rij - 0.5)}{N_j}$

  Where R_{ij} = Rank given for ith variable by the jth respondent. N_j= Number of variables ranked by jth respondent. The percent position of rank obtained is converted into scores by referring to the table given by Henry.E.Garrett .The scores of each individual were added and then total value of scores and mean values of score were calculated. The mean scores were arranged in descending order and the corresponding ranks were allotted.

- **Kruskal-Wallis test**

  Kruskal-Wallis test is an analysis of variance that uses the ranks of the observation rather than the data themselves. Kruskal Wallis test is used for comparing the k populations, where n is greater than 2. The Kruskal Wallis test hypothesis test is

H_0: All k populations have the same distribution

H_1: Not all k populations have the same distribution.

The assumption required for Kruskal Wallis test is that k samples are random and are drawn independently from the respective population.

All the population of the entire set is ranked in ascending order. n_1 is the sample size from population 1,n_2 is the sample size from population 2 and so on upto n_k, which is the sample size from population k. n is defined as the total sample size.

$n= n_1+n_2+…..n_k$

R_1 is the sum of the ranks of sample 1, R_2 is the sum of the ranks of sample 2 and R_K is the sum of the ranks of sample k.

The Kruskal Wallis test statistic is

$H = \frac{1}{n(n+1)} [\sum_{\substack{i=0 \\ j=0}}^{k} \frac{Rj2}{nj}$]-3(n+1)

In the current study, Kruskal Wallis test was used to find out whether there is a significant difference in the scores assigned for the problems faced by tourists in peak and lean season.

3.10 Data analysis strategy

A three level approach was adopted to analyze the relationship between ecotourism experience, ecotourist satisfaction and future behavioural intention at Periyar Tiger Reserve.

- The first attempt was to identify the existence of four distinct factors with regard to ecotourism experience construct by performing an exploratory factor analysis of 27 indicators used for measurement. The analysis confirmed existence of four factors and in the process two indicator variables were eliminated due to low communalities.

- The second attempt was to develop measurement models for all latent constructs considered for the study. Using confirmatory factor analysis and by testing the goodness of fit, measurement models were developed and final indicators -22 indicators capable of measuring the constructs were finalized.

  Table 11 represents goodness of fit indices for the measurement model

Table 11

Goodness of fit indices for the measurement model

Sl. No.	Fit index	Threshold value
1.	Normed chi-square (CMIN(df)	< 5
2.	Root mean square error of approximation(RMSEA)	< 0.08
3	GFI	> .90
5	Non Normal Fit Index	> .90
6	Adjusted Goodness of Fit index(AGFI)	> .90

Source: Kenney(2015).

Table 12 represents the details of final constructs and indicators used in the study

Table 12

The Details of final constructs and indicators used in the study

Construct.	Nature of Construct.	Number of Indicators.	Name of Indicators
Tangible	Reflective	6	Accomadation, amenities, display of art forms, flora, fauna, number of ecotourism activities.
Intangible	Reflective	7	Quality of service, local culture influence, reasonableness of price, Environment education, quality of information, security, scenic beauty
Psychological	Reflective	5	Enjoyment, memorable, uniqueness, physical comfort, mental relaxation
Demographic	Reflective	4	Age, gender, level of education, marital status
Ecotourism experience	Formative	4	Intangible attributes, tangible attributes, psychological attributes, Demographic
Ecotourism satisfaction	Reflective	6	Ecotourism activities at the destination, non ecotourism activities offered at the destination, Destination attributes, service quality, cognition, age.
Future Behavioural intention	Reflective	5	Revisitation Intention, Recommen-dation Intention to friends and relatives, Choose the destination, Likeliness to say positive things about the experiences at the destination, Deeper involvement in ecotourism

Source: Field survey 2014-15.

- Thirdly, the structural model with all the constructs which are measured either as reflective or formative were tested for its ability to represent the data as per guidelines for testing using Warp PLS 2.0.

Table represents Validity /Reliability guidelines in WarpPLS 2.0

Table 13

Validity /Reliability guidelines in WarpPLS 2.0

Sl.No	Item	Guidelines	
		Reflective construct	Formative construct
1.	Cronbach alpha coefficient	> 0.7	NA
2.	Composite Reliability	> 0.7	NA
3.	Average Variance Extracted	> 0.5	> 0.5
4	Convergent validity	P values associated with the loadings be lower than 0.5; and the loading needs to be equal or greater than 0.5.	VIF< 5, and indicator weights shall be with P< 0.05

Source: Ned kock (2015)

The significant paths in the model are utilized for drawing various conclusions in the study

3.11 Tabulation and analysis of data

The data collected were tabulated and analyzed in the following chapter on '**Results and Discussion**'.