Chapter 4

Data Base and Research Methodology

The main purpose of this study is to explore the adoption and diffusion of mobile services in rural areas of Punjab. Based on the conceptual and theoretical framework in Chapter 3, this chapter outlines the data base, universe of the study, sample size and sampling design, data collection procedure, demographic profile, and the discussion of statistical tools to be used in the analysis.

4.1 Data Base

The present work is primarily based on primary data collected from 450 respondents from rural areas of Punjab. The respondents were interviewed through a non-disguised structured schedule. However, secondary data have also been used to emphasize the distinct features of rural market in India. The main sources of collected secondary data were the publications of TRAI (Telecom Regulatory Authority of India), DoT (Department of Telecommunication), COAI (Cellular Operators of India), CMIE (Centre of Monitoring Indian Economy), Punjab Statistical Abstract, Economic and Statistical Organisation, Punjab. These sources were used as supporting evidence to justify the significance of the study.

4.1.1 Universe of the Study

The present study is focused on the consumers residing in the rural areas of three economically significant districts (viz. Amritsar, Jalandhar and Ludhina) of Punjab state. Punjab has been selected because it has the highest rural tele-density (5.32 percent as against the national average of 1.77 percent) among all states of India and the region has been regarded as the most densely populated networks for mobile telephony in the country with 54 lakh subscribers in the year 2006 (Economic Times, 2006). The service providers like Spice, Bharti Tele Ventures-Air Tel, Tata Indicom, BSNL, HFCL, Hutch and Reliance companies are offering mobile services to the region and milking every possible opportunity. The service providers are offering pre-paid and post paid connections to the rural areas after proper verification of the residential addresses and identities of the connection applicants. Apart from incoming outgoing calling and SMS facility, the service providers offer value added services like gaming, mobile
internet, music, alerts of agricultural prices & commodity prices, new updates, daily horoscope, ring tones downloading and weather reports.

4.1.2 Sample Size and Sampling Design

To collect data, the present study used a survey method where a sample of 450 respondents was collected from the rural areas of three economically significant districts of Punjab viz. Amritsar, Jalandhar and Ludhiana.

Amritsar District has four tehsils viz. Ajnala, Amritsar-I, Amritsar-II and Baba Bakala. Besides, these there are five sub-tehsils namely Attari, Lopoke, Ramdas, Tarsika and Majitha. There are eight community development blocks namely Ajnala, Chogawan, Harsha-Chhina, Majitha, Verka, Rayya, Tarsika and Jandiala Guru.


Ludhiana, the Manchester of Punjab, has seven tehsils, viz. Ludhiana West, Ludhiana East, Jagraon, Khanna, Payal, Raikot and Samrala followed by six sub-tehsils, viz. Dehlon, Koom Kalan, Macchiwara, Malout, Mullanpur and Sidhwan Bet. The district is divided into 12 development blocks namely Ludhiana-I, Ludhiana-II, Doraha, Dehlon, Jagraon, Khanna, Macchiwara, Pakhowal, Raikot, Samrala, Sidhwan Bet and Sudhar.

Out of each district, three community blocks were considered on random sampling and from each block five villages were taken on judgement basis covering ten families per village on convenience cum judgement sampling (Annexure... ). It is pertinent to mention here that two or more members in a family had been found using mobile phones separately.
Table 4.1
Location

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Location</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Amritsar: (3 Blocks × 5 Villages × 10 families)</td>
<td>150 (33.33 %)</td>
</tr>
<tr>
<td>2.</td>
<td>Jalandhar: (3 Blocks × 5 Villages × 10 families)</td>
<td>150 (33.33 %)</td>
</tr>
<tr>
<td>3.</td>
<td>Ludhiana: (3 Blocks × 5 Villages × 10 families)</td>
<td>150 (33.34 %)</td>
</tr>
</tbody>
</table>

(Figures in parentheses show percentages)

The survey was conducted by taking one family as a unit. A member who was using mobile services (being nominated by others members collectively) was selected for the survey. However, other family members’ opinion was also taken into consideration, but the responses of the survey was restricted to the nominated adopter of the family who answered questions affecting the family as a whole.

Table 4.1 describes the number of respondents selected from three districts are 150 each being equal in all the three districts. Three development blocks from each district followed by 5 villages out of these three districts and 10 families from selected five villages are taken for the survey. The exact number of schedule that was responded by the respondents of Jalandhar District was 153 but three respondents were not found to be serious while giving responses. Hence these three schedules were not taken into consideration and 150 schedules were selected for the final analysis. Rest, all the respondents co-operated in a well manner and given time to complete the schedule.

4.1.3 Construction of Schedule and Data Collection

The present study is primarily base on primary data and to collect the data, survey method had been through a non-disguised structured schedule comprising questions of dichotomous type, multiple choice, ratio scale and Likert scale. The questions in the instrument were based on the initially information gathered from the twenty villagers of rural areas in general talk to get the knowledge of problems faced by the rural people i.e. what they perceive, and their expectations from the operators of mobile services. With the help of conceptual framework, the dimensions already identified were categorized according to the existing established constructs. Some of the dimensions had been adapted with modification as per the requirement of the rural
people. The sources from where the items already well established with scales are as follows:

Dimensions in the perceived ease of use and perceived usefulness constructs were taken from the previously validated record (Davis, 1989; Davis et al., 1989, Rose & Straub, 1998; Grover & Ramanlal, 1999; Venkatesh, 1999; Gefen et. al., 2003, Li et al., 2007). The items to measure behavioural intentions were taken from previous inventory of Technology Acceptance Model (Venkatesh & Davis, 1996; Agarwal & Prasad, 1999, Davis 1989). Perceived financial resources were measured by three dimensions adapted (Mathieson et al., 2001; Wang et. al., 2006). Facilitating conditions was measured from the previous study (J.C. Gu et al., 2009) and perceived credibility was measured and adapted from Wang et. al., (2003), Wang et. al., (2006). The service providers’ support had been partly adapted from the earlier studies (Kiesler, 1971; Pritchard, 1999; Arkin et. al., 1976; Bendapudi, 2003). Likert scales (1-7) ranging from strongly agree to strongly disagree were used for these dimensions in the study and the items to measure relative advantage, compatibility, complexity, observability, trailability were adopted from Rogers (1995) and were measured on ratio scale ranging from 0 percent to 100 percent. Time represented the number of years an individual is using the mobile services.

To assess the construct validity of the various scales being developed and taken from previous studies, three colleagues were taken from the marketing field and were asked to sort the various items based on the underlying constructs of service provider choice and adoption of mobile services and the similar results were found from the three experts in arranging the items to the given constructs. Then, the instrument was pre tested on 20 rural respondents and the reliabilities of the dimensions were assessed (Cronbach Alpha) which were found to be in the range of 0.70 to 0.80. This method of pre-testing is to ensure that understanding of the respondents about the statement used in the questionnaire, whether addition or deletion of the items are required, whether changing of words would make the clarity of the dimensions or changing of an order of the statement would ensure greater coherence. The schedule (see Annexure I and II) consisted of five sections:
Section I  It comprises of general information regarding mobile services and carried four questions.

Section II  It carries one question carrying sixteen statements. These questions were asked to assess the determinants of diffusion process of mobile services on seven point Likert Scale (Strongly Agree –Strongly Disagree) regarding relative advantage, compatibility, complexity, observability/ communication, trialability and social system.

Section III  It includes a set of 17 statements to be answered on seven point Likert scale (Strongly Agree- Strongly Disagree) regarding the factors affecting the perception of rural people while selecting a particular mobile service provider.

Section IV  It demonstrates a bunch of 20 different statements examining the factors affecting the adoption of mobile services. Seven point Likert scale (Strongly Agree- Strongly Disagree) was used to help them in rating their responses.

Section V  It contains 4 questions on five point scale (never use-constantly) regarding the current usage of services and their desired level of using services in future on one hand and current role of service providers in rural areas to get people aware about their mobile services and the desired level of activities demanded by the rural people regarding service providers efforts to get them train.

Section VI  It deals with the demographic profile of the respondents comprising questions about their gender, age, educational qualifications, income and occupation.  

The demographic profile of the adopters of the mobile services according to their location, age, gender, income, education and occupation is given below:

58
Table 4.2
Gender

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Gender</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Male</td>
<td>330</td>
<td>73.33</td>
<td>73.33</td>
</tr>
<tr>
<td>2.</td>
<td>Female</td>
<td>120</td>
<td>26.67</td>
<td>100.00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>450</td>
<td></td>
<td>100.00</td>
</tr>
</tbody>
</table>

Mean = 0.73, Std. Deviation = 0.44

The Table 4.2 depicted that male adopters had the majority (73.33 percent) over the female adopters (26.67 percent). More than one-fourth of the adopter belonging to female section revealed a good indication about the awareness among the rural females to adopt the mobile technology.

Table 4.3
Age-wise Adopters

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Age</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>≤20 Years</td>
<td>59</td>
<td>13.1</td>
<td>13.1</td>
</tr>
<tr>
<td>2</td>
<td>21-30 Years</td>
<td>180</td>
<td>40.0</td>
<td>53.1</td>
</tr>
<tr>
<td>3</td>
<td>31-40 Years</td>
<td>117</td>
<td>26.0</td>
<td>79.1</td>
</tr>
<tr>
<td>4</td>
<td>41-50 Years</td>
<td>53</td>
<td>11.8</td>
<td>90.9</td>
</tr>
<tr>
<td>5</td>
<td>≥51 Years</td>
<td>41</td>
<td>9.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>450</td>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

Mean = 2.64, Std. Deviation = 1.13

Age-wise adopters of mobile services were classified into five categories, viz. Below 20 years, between 21-30 years, 31-40 years, 41-50 years and 51 years and above. Table 4.3 indicated that the majority (40 percent) of the adopters belonged to 21-30 years of age class followed by 26 percent of 31-40 years class, 13.1 percent below 20 years age group, 11.8 percent of 41-50 years of age class and only 9.1 percent of above 50 years of adopters. Therefore, it had been observed that the data belonged to 53 percent (more than half) of young adopters whereas approx. 20 percent of the adopters had been observed above 41-50 years and above 50 years being the old aged adopters. So, it can be concluded that young adopters are more technology savvy than the old age people in rural areas.
Table 4.4

**Educational Qualification**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Educational Qualification</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Below Matric</td>
<td>147.00</td>
<td>32.66</td>
<td>32.66</td>
</tr>
<tr>
<td>2</td>
<td>Matric</td>
<td>105.00</td>
<td>23.33</td>
<td>55.99</td>
</tr>
<tr>
<td>3</td>
<td>Higher Secondary</td>
<td>85.00</td>
<td>18.89</td>
<td>74.88</td>
</tr>
<tr>
<td>4</td>
<td>Graduation</td>
<td>55.00</td>
<td>12.22</td>
<td>87.10</td>
</tr>
<tr>
<td>5</td>
<td>Post Graduation</td>
<td>32.00</td>
<td>07.12</td>
<td>94.22</td>
</tr>
<tr>
<td>6</td>
<td>Vocational Courses</td>
<td>26.00</td>
<td>05.78</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>450</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Mean 2.55, Std. Deviation 1.50

The educational qualification was classified into below matriculation, Matriculation, Higher Secondary, Graduation, Post Graduation and Vocational Courses. Table 4.4 describes that majority of the respondents belong to below matric followed by matriculation (23.33 percent), higher secondary (18.89 percent), graduation (12.22 percent), post graduation qualification with 7.12 percent and only 5.78 percent fall in vocational courses category. From the data, it can be concluded that more than half of the total respondents belong to matriculation level and below matriculation level and the number of respondents were declining as the educational level started increasing.
The adopters’ average monthly income was classified into four categories viz. less than and equal to Rs. 10,000, between Rs. 10,001 to Rs. 20,000, Rs. 20,001 to Rs. 30,000 and more than Rs. 30,000. The table 4.5 shows that majority of adopters (36.7 percent) had monthly income less than and equal to Rs. 10,000 followed by 31.8 percent in the income group of Rs. 10,001 to Rs. 20,000, 20.4 percent related to Rs. 20,001- Rs. 30,000 income group and 11.4 percent of adopters fall into more than Rs. 30,000 income group. From the table, it is evident that mostly the rural respondents were having less than and equal to Rs. 10,000 average monthly income.
Table 4.6

Occupation Classification

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Occupation</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Farmers</td>
<td>153.00</td>
<td>34.00</td>
<td>34.00</td>
</tr>
<tr>
<td>2</td>
<td>Micro Entrepreneurs</td>
<td>115.00</td>
<td>25.56</td>
<td>59.56</td>
</tr>
<tr>
<td>3</td>
<td>Employed</td>
<td>82.00</td>
<td>18.20</td>
<td>77.76</td>
</tr>
<tr>
<td>4</td>
<td>Businessmen</td>
<td>52.00</td>
<td>11.56</td>
<td>89.32</td>
</tr>
<tr>
<td>5</td>
<td>Professionals</td>
<td>27.00</td>
<td>6.00</td>
<td>95.32</td>
</tr>
<tr>
<td>6</td>
<td>Students and others</td>
<td>21.00</td>
<td>4.68</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>450</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Mean 2.44, Standard Deviation 1.44

The occupation classification was grouped into farmers, micro-entrepreneurs, employed, businessmen, professionals, students and others. Table 4.6 shows that majority (34.0 percent) of the respondents were farmers followed by micro-entrepreneurs (25.56 percent), employed (18.2 percent), businessmen (11.56 percent), professionals (6.0 percent) and students & others (4.68 percent). It can be concluded from the above table that the rural respondents were mostly engaged in farming and micro-entrepreneurship.
4.2 Methodology

Commensurate with the objectives of the study to study the adoption and diffusion of mobile services in rural areas, the survey was analysed and categorized by using descriptive statistical tools. Descriptive statistics was used to organize and summarize the data at hand to make them more intelligible (Singleton & Straits, 2005). Combination of figures and numerical methods were put in to explore possible patterns and the data characteristics. Tables and figures are presented in proper titles, caption to show clear, self-descriptive, and informative displays of the results. The various tools by taking care of the assumptions are used in the study are described as follows:

**Paired t-test:** The paired t-test is to measure the significant difference of the means of paired samples’ observations related to the same respondents. To compute t for paired samples, the paired difference variable is formed and its mean and variance is calculated. Then t statistics is computed with degree of freedom (n-1) where n is the number of pairs in the sample. If paired t-test has a probability of less than 0.05 level of significance, the null hypothesis is rejected and it is concluded that the mean difference of the paired samples are statistically significant.

**Multiple Regression:** Multiple Regression estimates the coefficient of the linear equation, involving one or more independent variables that best predict the value of dependent variable. In this study the variable extent to which the adopters were using mobile services being the metric variable had been taken as dependent variable and means of relative advantage, compatibility, complexity, observability or communication, trialability and social system constructs assessed on seven point Likert Scale (Strongly Agree-Strongly Disagree) had been taken as independent variable for multiple regression. Time represents the number of years an individual has been using the mobile services and has been taken as independent variable. The normality and linearity of the variables had been taken into account by normal probability plots and Durbin Watson Test. To measure the multicollinearity, Variance Inflation factor was also measured representing no multicollinearity observed in the data if it is observed to be less than 10.
Factor Analysis:

To study the behaviour of rural people towards the selection of service provider while adopting mobile services and their perception about adoption of mobile services, one of the multivariate data analysis techniques, factor analysis was used. Factor Analysis is a valuable method of reducing data complexity by reducing the number of variables being studied and specifies the underlying structure among the variables. Broadly speaking, factor analysis provides the tools for analysing the structure of the inter-correlational relationships among a large number of variables by defining sets of variables that are highly correlated, known as factors that are assumed to represent dimensions within the data (Hair et al., 2009).

Certain assumptions are to be followed before applying exploratory factor analysis to the data. Hence, data adequacy tests on the data collected were validated on the basis of the following statistical assumptions:

(i) Normality: In order to check the normality of the data, Normal Probability Plots were made for each variable. Normal Probability Plots compare the cumulative distribution of actual data values with the cumulative distribution of a normal distribution. The normal distribution forms a straight diagonal line, and the plotted data values are compared with the diagonal. If a distribution is normal, the line representing the actual data distribution closely follows the diagonal (Hair et al. 2009). All the variables of the study met the normality assumption (see Annexure No. IV and V). For Linearity the residual plots are made and graphically it had been observed the data follows the linearity or not.

(ii) Overall Measures of Intercorrelation:

- Correlation and Anti-Image Correlations: If visual inspection reveals no substantial number of correlations greater than 0.30, then factor analysis is probably inappropriate and if ‘true’ factors exist in the data, the partial correlation should be small, because the variable can be explained by the variables loading on the factor (Hair et al. 2009). Visual inspection of the correlation and anti-correlation matrix revealed that there is substantial number of correlation greater than .30 and small partial correlations indicating to move ahead for factor analysis.
• **Kaiser-Meyer-Olkin Measure of Sampling Adequacy (MSA):** Measure of Sampling Adequacy for each variable was observed from the diagonal elements of anti-image correlation matrix and the variables falling in the unacceptable range (below 0.50) were excluded. The overall Kaiser-Meyer-Olkin MSA can be interpreted with the following guidelines: 0.90 or above - marvellous; 0.80 or above - meritorious; 0.70 or above - middling; 0.60 or above - mediocre; 0.50 or above - miserable; and below 0.50 - unacceptable (Hair et al., 2009). Overall MSA was found to be 0.80 representing appropriate adequacy for factor analysis.

• **Bartlett Test of Sphericity:** The test signifies the overall presence of correlations among at least some of the variables. The test value of Bartlett’s Test of Sphericity indicates that correlation matrix is not an identity matrix and the value of chi-square for Bartlett’s Test of Sphericity was also significant.

After discussing all the assumptions of factor analysis that indicated the appropriateness of the data to proceed for factor analysis. Principal Component Analysis was employed for extracting the factors based on Latent Root Criterion (i.e. Eigen value > 1) for the number of factors to be extracted. An eigen value of 1.00 is the most commonly used criterion for deciding how many factors to retain in factor reduction (Bryant & Yarnold, 1998; Cattell, 1966; Stevens, 1996).

Another procedure for determining the appropriate number of Eigen values is known as Scree Test proposed by Cattell (1966). Eigen values associated in the steep slope decent are retained, however, those that are indicated in the gradual decent, correlated with values less than 1, are dropped as not significantly contributing to the variances and ultimately not being considered relevant factors in the principal component analysis (Bryant & Yarnold, 1998; Hoyle, 1995).

The percentage of variance has been used as an indicator to find out how well the total factor solution accounts for what the variables represent collectively. Communalities can be found mathematically by squaring the factor loadings of a dimension across all the factors extracted and then taking the sum of all squaring values.
IDENTIFYING SIGNIFICANT FACTOR LOADINGS

Based on sample size of 450 respondents, it has been specified that factor loading of 0.30 or above are considered to be significant (Hair et al., 2009). The results were obtained with orthogonal rotation with varimax criterion. Orthogonal rotation with varimax can also be done with quartimax. Since a varimax criterion maximises the sum of variances of the squared loadings within each column of the loading matrix, quartimax simplifies the rows. Hence, varimax was observed as more relevant and applied because quartimax created a large general factor, and in oblique rotation the axis are rotated and 90 degree angle is not maintained making it more flexible. All factors loading of 0.45 or above (ignoring signs) have been considered significant for the study. It has also been observed that the variables are having only one significant loading i.e. no cross loading identified. ‘After the factor solution has been obtained, in which all variables have a significant loading on a factor, an attempt was made to assign some meaning to the pattern of factor loading. Variables with higher loadings are considered to be having more importance and have influencing role in determining the name of the represented factor that is intuitively developed based on its appropriateness for representing the underlying dimension of a particular factor’.

Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis is used to provide a confirmatory test for the measurement theory that specifies how measured variables logically and systematically represent construct involved in a theoretical model. Confirmatory factor analysis requires the measurement variables either extracted from exploratory factor analysis or already established construct in the literature to construct the path diagram. The path diagram shows the graphical representation of cause and effect relationships between the latent variable and the observed variables. The oval in the diagram representing the latent variable and the rectangles indicate the observed variables in the path diagram representing component factor groupings. The circle indicates the overall degree of explained variance. The path coefficients show the direct effect the observed variable (factor) has on the latent variable in the path model (Bryant & Yarnold, 1998; Agresti & Finlay, 1997; University of Texas, 2004). In the path diagram, the relative strength of
association between variables is depicted by path coefficients. The directional one-headed arrows reflect the direction of influence observed variables (exogenous) in relation to the latent variable (endogenous) (Agresti & Finlay, 1997) and the two-headed arrows indicate the covariance paths between exogenous variables.

Validity and Reliabilities

Confirmatory factor analysis has the ability to assess the construct validity of measurement theory. Construct validity examine the extent to which a set of measured dimension actually falls or reflect the theoretical latent construct. Convergent Validity represents the items that are indicators of a specific construct should converge or share a high proportion of variance in common (Hair et al., 2009). High loadings on a factor indicate that they converge on some common point and are the case of high convergent validity. Variance extracted in confirmatory factor analysis is computed as the sum of all squared standardised factor loadings i.e. squared multiple correlations divided by the number of items reflecting the summary indicator of convergence. One of the indicators of convergent validity is to assess the reliabilities. Construct reliability value is calculated from the squared sum of factor loading for each construct divided by sum of squared sum of factor loading and the sum of error variance extracted for the construct. For satisfactory discriminant validity, the average variance extracted for each construct should be greater than the variance shared between the construct and other constructs in the model (Fornell & Bookstein, 1982; Gefen et al., 2003; Wixom & Watson, 2001).

Structural Equation Modelling (SEM)

SEM is regarded as more versatile than most of the other multivariate techniques because it permits for simultaneous, multiple dependent relationships between dependent and independent variables. That is, dependent variables can initially be used as independent variables in subsequent analyses. For example, perceived value is a dependent variable for service provider support but is an independent variable in its defined relationship with behavioural intentions. In structural equation modelling, two types of variables (i.e. latent and manifest) are used. The manifest variables are measured by the survey questions associated with each latent variable. The structural model describes the relationships between the manifest and latent variables.
Testing of Model for Goodness of fit (GoF)

Goodness of Fit indicates that the model is said to be fit when the estimated covariance matrix and actual observed covariance matrix tend to be same or close to each other.

Chi Square ($\chi^2$) is the fundamental measure of fit and it quantifies the differences between the observed and estimated covariance matrices. It is represented mathematically by the following equation:

$$\chi^2 = (O - E)^2 / E$$

i.e. $\chi^2 = (N-1) (\text{Observed sample covariance} - \text{SEM estimated covariance matrix})$

where, N is the overall sample size.

Degree of Freedom (df) is based on the number of unique covariances and variances in the observed covariance matrix. It is different from the degree of freedom calculated in regression analysis as sample size minus number of estimated observation. The number of degree of freedom for an analysis of covariance structure model is calculated by

$$df = \frac{1}{2} [(p)(p+1)] - k$$

where p is the total number of observed variable and k is the number of free estimated parameters.

It reflects the number of covariance below the diagonal plus the variances on the diagonal. The degree of freedom not affected by the sample size is an important implication under SEM.

GFI (Goodness of Fit Index) The GFI attempts to develop a fit statistic that is less responsive to sample size. It is indirectly sensitive to sample size due to the effect of N (number of observations) on sampling distributions. GFI value greater than 0.95 was considered good.

AGFI (Adjusted Goodness of Fit Index) It takes into consideration differing degrees of model complexity and adjusts GFI by a ratio of degree of freedom used in a model to the total degree of freedom available. It penalizes more complex models and favours those with minimum number of free path and AGFI value are lower than GFI values in proportion to model complexity (Hair et. al., 2009).

RMSEA (Root Mean Square Error of Approximation) It represents how well a model fits a population, not just a sample used for estimation. It clearly attempts to correct both model complexity and sample size by including each in its computation.
From the literature it has been observed that the value below 0.08 has been accepted for most acceptable models with 95 percent confidence level.

**NFI (Normed Fit Index)** It is the ratio of the difference in the $\chi^2$ value for the fitted model and a null model divided by the $\chi^2$ value for the null model. It ranges from 0 to 1 and more it approaches to 1 the model is regarded to be fit.

**CFI (Comparative Fit Index)** It is an improved version of NFI (Normed Fit Index) where the value ranges from 0 to 1. Higher the value the better it is for the model. As the CFI has many desirable properties including its relative, but not complete, insensitivity to model complexity, it is among the most widely used indices. CFI values less than 0.90 are not usually associated with a model that fits well (Hair et al., 2009).

**TLI (Tucker Lewis Index)** It is similar to CFI in all respect and involves a mathematical comparison of specified theoretical measurement model and baseline null model. It is normed if the value fall between 0 and 1. Normally the value above 0.90 has been regarding the model that fits well.

**IFI (Incremental Fit Index)** It should be equal to or greater than 0.90 to accept the model. IFI can be greater than 1.0 under certain circumstances (Nargundkar, 2010)

**NFI (Normed Fit Index)** It was developed as an alternative to CFI, but one which did not require making chi-square assumptions. It varies from 0 to 1, with 1= perfect fit. NFI reflects the proportion by which the researcher’s model improves fit compared to the null model. By convention, NFI values below 0.90 indicate a need to respecify the model.

**Software Packages Used**

Statistical Package for Social Science (SPSS) version 14 and Analysis of Moment Structure (AMOS) version 4 for window has been used for the analysis of the data.