CHAPTER – I

INTRODUCTION AND DESIGN OF THE STUDY

Introduction

The telecom services have been recognized the world-over as an important tool for socio-economic development for a nation. It is one of the prime support services needed for rapid growth and modernization of various sectors of the economy. Driven by various policy initiatives, the Indian telecom sector witnessed a complete transformation in the last decade. Globalization, liberalization and privatization are the three most spoken words in today’s world. These initiatives paved way for all-round reforms, especially in developing economies, like India. These countries realized that development of effective and efficient means of communications and information technology is important to push them on to the path of development. The growth of the telecom sector in India during post-liberalization has been phenomenal.

The telecom sector is growing at a speed of 46-50 percent during the recent years. This rapid growth is possible due to various proactive and positive decisions of the Government and contribution of both by the public and the private sectors. The rapid strides in the telecom sector have been facilitated by liberal policies of the Government that provides easy market access for telecom equipment and a fair regulatory framework for offering telecom services to the Indian consumers at affordable prices. Presently, all the telecom services have been opened for private participation. The Government has taken following main initiatives for the growth of the telecom sector.

Accordingly, the Department of Telecom (DoT) has been formulating developmental policies for the accelerated growth of the telecommunication services. The Department of Telecommunications has been able to provide the world-class infrastructure at globally competitive tariffs and reduce the digital divide by extending connectivity to the unconnected areas. India has emerged as a major base for the telecom industry worldwide. Thus Indian telecom sector has been able to provide affordable and effective communication facilities to Indian citizens. As a result common man today has access to this most needed facility. The Department is also responsible for grant of licenses for various telecom services like Unified Access Service, Internet and VSAT service. The Department is also responsible for frequency
management in the field of radio communication in close coordination with the international bodies. It also enforces wireless regulatory measures by monitoring wireless transmission of all users in the country.

1.1 World Telecom Industry:

World Telecom Industry is an uprising industry, proceeding towards a goal of achieving two third of the world’s telecom connections. Over the past few years information and communication technology has changed in a dramatic manner and as a result of that world telecom industry is going to be a booming industry. Substantial economic growth and mounting population enable the rapid growth of this industry.

1.1.1 Market Potentially of World Telecommunication Industry:

The world telecommunications market is expected to rise at an 11 percent compound annual growth rate at the end of year 2010. The leading telecom companies like AT&T, Vodafone, Verizon, SBC Communications, Bell South and Qwest Communications are trying to take the advantage of this growth. These companies are working on telecommunication fields like broadband technologies, EDGE technologies; LAN-WAN inter networking, optical networking, and voice over Internet protocol, wireless data service, etc.

1.1.2 Economical Aspect of Telecommunication Industry:

World telecom industry is taking a crucial part of world economy. The total revenue earned from this industry is 3 percent of the gross world products and is aiming at attaining more revenues. one statistical report reveals that approximately 16.9% of the world population has access to the Internet.

1.1.3 Present Market Scenario of World Telecom Industry:

Over the last couple of years, world telecommunication industry has been consolidating by allowing private organizations the opportunities to run their businesses with this industry. The Government monopolies are now being privatized and consequently competition is developing. Among all, the domestic and small business markets are the hardest.

1.2 Indian Telecommunication Industry:

The history of Indian telecommunication industry started in 1851 when the first operational land lines were laid by the government near Calcutta. Telephone services were introduced in India 1881. In 1883 telephone services were merged with the postal system. Indian Radio Telegraph Company was formed in 1923. After
independence in 1947, all the foreign telecommunication companies were nationalized to form the Posts, Telephone and Telegraph, a monopoly run by the Government of India (GoI). The Indian Telecom Sector, like most other infrastructure sectors is controlled by the state. Telecom sector was considered as a strategic service and the government considered it best to bring it under state’s control. The first step of reforms in telecommunication sector began to flow in 1980’s when the private sector was allowed in telecommunication equipment manufacturing.

The Department of Telecommunications (DoT), reporting to the Ministry of Communications (MoC) is the key body for policy issues and regulation, apart from being a basic service provider to rest of country. By an act of Parliament, the Telecom Regulatory Authority of India (TRAI) was formed to be the regulatory agency.

1.2.1 Ministry of Communication:

All the operations of this sector come under the control of MoC. It is responsible for all major policy changes, planning, supervision, spectrum control, etc.

1.2.2 Department of Telecommunications (DoT):

In 1985, Department of Telecommunications was established. It was an exclusive provider of domestic and long-distance service that would be its own regulator separate from the postal system. In 1986, two wholly government-owned companies were created: the Videsh Sanchar Nigam Limited for international telecommunication and Mahanagar Telephone Nigam Limited for service in metropolitan areas.

In1990’s telecommunication sector benefited from the general opening up of the economy. Also, examples of telecom revolution in many other countries, which resulted in better quality of service and lower tariffs led Indian policy makers to initiate a change process resulting in opening up of telecom services sector for the private sector.

1.2.3 National Telecom Policy (NTP):

National Telecom Policy 1994 was the first attempt to give a comprehensive roadmap for the Indian telecommunication sector. The mobile service was commercially launched in August 1995.

1.2.4 Telecom Regulatory Authority of India (TRAI):

In 1997, Telecom Regulatory Authority of India was created. TRAI was formed to act as a regulator to facilitate the growth of the telecom sector. New National Telecom Policy was adopted in 1999 and cellular services were also
launched in the same year. The mobile industry announces several pro consumers’ initiatives. Mobile subscriber’s additions started picking up.

1.3 Structure of the Indian Telecom Industry:

The Indian Telecommunications network with 943.5 million connections (as on February 2012) is the second largest in the world after China\(^1\). Wireless telephony will continue to fuel growth in the Indian telecom industry with mobile subscribers’ base in India is expected to reach 1.159 billion by 2013. Currently, both public sector players as well as the private sector players are actively catering to the rapidly growing telecommunication needs in India. Private participation is permitted in all segments of the telecom industry, including ILD, DLD, basic cellular, internet, radio paging, etc. The broad structure of the telecom industry (in terms of service providers) is depicted in the diagram figure 1.1:

![Diagram of Telecom Industry Structure]

1.3.1 Public Sector:

After the privatisation of VSNL in 2002, only two premier PSUs, MTNL and BSNL operate in India and provide various telecom services. MTNL operates in Delhi and Mumbai and BSNL provides services to the remaining country. In the post-liberalisation era, these PSUs not only have made significant progress but also have provided stiff competition to their private counterparts.

1.3.2 Private Sector:

Private operators have played a very crucial role in the growth of the telecommunication industry, primarily in the mobile services. With the liberalisation of the telecom industry, the private sector has been increasing its foothold in the telecom services space. After the introduction of NTP-99, the contribution of private

\(^1\) http://www.indiatelecomonline.com
players towards telecom services has witnessed rapid strides. While the private sector is instrumental in providing both fixed line as well as wireless services, it is mainly active in the wireless segment. The fixed lines account for only about 2% of private sector's total subscriber base. While some private players have a pan-India presence, there are many regional players that cater to only certain service areas.

1.4 Growth of Telecom Industry:

The rapid progress witnessed in the Indian economy in the recent past has been instrumental in catalyzing the growth of the Indian telecom industry. It has achieved a phenomenal growth during the last few years and is poised to take a big leap in the future also. The telecom sector in India experienced a rapid growth over the past decade on account of regulatory liberalisation, structural reforms and competition, making telecom one of the major catalysts in India’s growth story. However, much of this growth can be attributed to the unprecedented growth in mobile telephony as the number of mobile subscribers grew at an astounding rate from 10 million in 2002 to nearly 850 million in 2011. Besides, the growth in the service and IT and ITeS sector also increased the prominence of the telecom industry in India. Telecom has emerged as a key infrastructure for economic and consumer growth because of its multiplier effect and the fact that it is beneficial to trade in other industries. The following table outlines the growth in the total subscriber base of telecom industry.

**Table – 1.1**

<table>
<thead>
<tr>
<th>Years</th>
<th>Subscriber Base (in millions)</th>
<th>Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-2002</td>
<td>44.97</td>
<td>23.92</td>
</tr>
<tr>
<td>2002-2003</td>
<td>54.62</td>
<td>21.46</td>
</tr>
<tr>
<td>2003-2004</td>
<td>76.54</td>
<td>40.13</td>
</tr>
<tr>
<td>2004-2005</td>
<td>98.41</td>
<td>28.57</td>
</tr>
<tr>
<td>2005-2006</td>
<td>140.32</td>
<td>42.59</td>
</tr>
<tr>
<td>2006-2007</td>
<td>205.86</td>
<td>46.71</td>
</tr>
<tr>
<td>2007-2008</td>
<td>300.49</td>
<td>45.97</td>
</tr>
<tr>
<td>2008-2009</td>
<td>429.72</td>
<td>43.01</td>
</tr>
<tr>
<td>Year</td>
<td>Subscribers</td>
<td>Growth Rate</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>2009-2010</td>
<td>621.28</td>
<td>44.58</td>
</tr>
<tr>
<td>2010-2011</td>
<td>846.32</td>
<td>36.22</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>37.32</td>
</tr>
</tbody>
</table>

*Source: www.trai.com*

The above table explains that growth in the subscriber base of telecom industry for the years 2001-2002 to 2010-2011. The trend in the growth rate of the subscriber base depicted an increasing trend over the years under study. The growth rate was 40.13 percent was during the year 2003-2004, and thereafter the subscriber base recorded a decreased growth rate of 28.57 percent during 2004-05. It could also be observed from the industry maximum growth of subscriber base was 46.71 percent during the year 2006-2007. It could also be said that mean growth rate of telecom subscriber base was 37.32 percent during the study period. Though the growth trend was fluctuating over the years, there was consistency in the growth of total subscriber base.

### 1.5 Growth Avenues of Telecom Industry:

![Growth Avenues Diagram](image)

#### 1.5.1 Managed Services:

Managed Services is another segment that is attracting telecom companies. On account of the rapidly growing subscriber case, service providers find it difficult to manage their infrastructure and network management operations. In such cases, they completely or partially outsource their infrastructure or network management operations.

- To reduce their network deployment many service providers are considering.
1.5.2 Infrastructure Sharing:
Infrastructure sharing offers the following advantages:
- Improved service quality
- Increased affordability for customers
- Faster roll out of services in rural and remote areas
- Significant reduction in initial set up costs
- Increased environmental aesthetics
- Lower operating costs for service providers

1.5.3 Enterprise Telecom Services:
Enterprise Telecom services includes key services such as Voice over Internet Protocol (VoIP) dedicated telecom communication systems; IT infrastructure enabled unified communication services, etc. Telecom service providers are increasingly targeting enterprises by providing dedicated services and are expected to witness major developments in near future.

1.5.4 Virtual Private Network:
Virtual Private Network is a private data network that provides connectivity within closed user groups via public telecommunication infrastructure. Competition is likely to heat up in the VPN segment as DoT has relaxed the norms for private players.

1.5.5 3G:
The Indian government plans to auction the spectrum for 3G services by inviting bids from domestic as well as foreign players and creating a competitive environment that offers better services to consumers. Therefore, the 3G spectrum is among the major investment opportunities and growth drivers of the telecom industry.
- The immense potential for 3G is reflected by the 30 - 40 percent annual growth in Value Added Services.
- Cell phone manufactures are striving to develop USD 100 priced 3G handsets for the Indian market. India expects to replicate its 2G growth in 3G services.

1.5.6 Wi-Max:
Wi-Max has been one of the most significant developments in wireless communication in the recent past. Since this mode of communication provides network access in inaccessible locations at a speed of more than 4Mbps, it is expected
to be a major factor in driving telecom services in India, especially wireless services. Thus, it will lead to the increased use of telecom services, Internet, Value added services and Enterprise services. Wi-Max is expected to accelerate economic growth and assist in providing better education, healthcare and entertainment services.

- It is estimated that India will have 13 million Wi-Max subscribers by 2012.
- Aircel is the pioneer in Wi-Max technology in India
- The State – Owned player, BSNL, aims to connect 74,000 villages through Wi-Max.
- Bharti, Reliance and VSNL have acquired licenses in the 3.3GHz range to utilise the opportunities offered by this domain.

1.5.7 Value Added Services:

The VAS industry is currently focusing on the entertainment sector, such as the Indian film industry and cricket. There is scope for growth in other avenues as utility – based services such as location information and mobile transactions.

1.5.8 Rural Telephony:

As the government targets to increase rural tele-density from the current 2 percent to 25 percent by 2012, rural telephony will require major investments. This segment will boost the demand for telecom services, equipment, Internet Services and other value added services; thereby, offering greater market opportunities for telecom players.

1.6 Segments in the Telecommunication Industry:

Telecommunication services in India can be divided into two broad segments, wireline services and wireless services. While the wireline services include the fixed line telephony, wireless services comprise mobile, WLL (F) and WLL (M). On the whole, the Indian telecom industry has made significant progress; however, the source of emergence of this growth in terms of wireless and wireline segments has undergone substantial change in the past few years.

Other telecommunication services such as Internet Services, Broadband Services and VSAT also have evolved gradually and have become an integral part of the Indian telecom industry. Thus, broadly the Indian telecommunication industry can be classified into the following segments:

1. Wireline services
2. Wireless service: GSM and CDMA
3. Internet services
4. Public Mobile Radio Trunked Services (PMRTS)
5. Global Mobile Personal Communication by Satellite (GMPCS)
6. Very Small Aperture Terminals (VSAT)
7. Mobile Value Added Services (MVAS)

1.6.1 Wireline Services:

The wireline segment includes basic wireline services rendered to households, commercial units and to service providers such as public call offices. While the incumbent PSUs have been the dominant players in wireline service, some private players have been gradually making their presence felt in this segment. As on March 31, 2008, 5 licensed private operator groups were providing wireline connections in addition to the incumbent BSNL and MTNL.

1.6.2 Wireless Services:

Wireless services can be further divided into Global System for Mobile Communications (GSM) and Code Division Multiple Access (CDMA). The WLL (F) is operated under the CDMA technology. The GSM services, which account for 73% of the total subscriber base of the wireless service, dominate the wireless segment.

1.6.3 Internet Services:

Internet services in India have witnessed significant growth in the last few years owing to increased presence of the private players and emergence of new technologies. A significant improvement has also been seen in the quality of internet services given the substantial upgradation of telecom infrastructure.

1.6.4 Public Mobile Radio Trunked Services:

Public Mobile Radio Trucking Service (PMRTS) is an easy-to-use two-way radio communication, mainly used for command and control and group talking while on the move. PMRTS is used mostly in hotels, tour agencies, airports and hospitals among other places. Sixteen operators provide PMRTS in India (as on March 31, 2009).

1.6.5 Global Mobile Personal Communication by Satellite (GMPCS):

GMPCS services allow a subscriber to communicate from any point on earth through a handheld terminal. Under these services, the telephone numbers of users remain unchanged, irrespective of their location. GMPCS services have been
operational in India since 1999. As on date, there is no licence for providing GMPCS service in India.

1.6.6 Very Small Aperture Terminals (VSAT):

VSAT is a communication system in which the radio signals are received and transmitted through a satellite. VSAT has a less than 3 meter tall dish antenna that relays data to the satellites in the geosynchronous orbit, which then relays data from terminals on earth to other terminals and hubs located in various parts of the world. It is an economical and viable option to connect different geographical locations. It provides connectivity to the points where regular systems or wired lines fail to reach and last mile connectivity is difficult to achieve. VSATs are mostly used for various types of communications as well as to transfer broadband data such as VoIP, satellite Internet and video or narrowband data such as polling, SCADA (Supervisory Control and Data Acquisition), credit cards transactions and RFID (Radio Frequency Identification). In India the VSAT services market is growing rapidly. Currently, 9 VSAT service providers are offering VSAT services in India.

1.6.7 Mobile Value added Services (MVAS):

Over the last few years, Mobile VAS has gained significance as it has been emerging as a potential alternative revenue stream. VAS enables the subscriber to use the mobile phone for a host of purposes such as for sending short messages, pictures, to surf the Internet, for mobile banking including mobile payments, to read news headlines, astrology, to listen to music, to play games and to seek various other types of information. Provision of VAS is either directly done by the telecom operators or by a third party VAS Provider (VASP). Services such as SMS, GPRS are provided directly by the telecom operators and others such as astrology, ring back tunes are provided by the VASPs. In most cases, the contents used for providing VAS are sourced from content providers/content developers or copyright owners known as content owners. Bulk of VAS services currently being provided by the mobile operators in India are in the form of SMS, ringtone and caller ring back tones (CRBT).

1.7 Telecom Circle:

A telecom circle is a cellular mobile service area in India classified by subscriber base and revenue potential. The four types of telecom circles are Metro, A,
B and C. While a Metro telecom circle has the highest revenue potential and a C telecom circle has the lowest.

<table>
<thead>
<tr>
<th>Telecom Circle Type</th>
<th>Cities / States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro</td>
<td>Cities of Delhi, Mumbai, Kolkata and Chennai</td>
</tr>
<tr>
<td>A</td>
<td>States of Maharashtra, Gujarat, Andhra Pradesh, Karnataka and Tamil Nadu</td>
</tr>
<tr>
<td>B</td>
<td>States of Kerala, Punjab, Haryana, Uttar Pradesh, Rajasthan and Madhya Pradesh</td>
</tr>
<tr>
<td>C</td>
<td>States of Himachal, Bihar, Orissa, Assam, Kashmir, Arunachal Pradesh, Meghalaya, Tripura, Nagaland, Mizoram, Manipur and Sikkim</td>
</tr>
</tbody>
</table>

### 1.8 Tele-density:

The tele-density in the country has increased considerably in the recent times, the urban rural divide in tele-density in India is widening. The following table outlines the growth in the subscriber base of tele-density in India.

#### Table – 1.2

**Growth in Tele-density**

<table>
<thead>
<tr>
<th>Years</th>
<th>Tele-density (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-2002</td>
<td>4.3</td>
</tr>
<tr>
<td>2002-2003</td>
<td>5.1</td>
</tr>
<tr>
<td>2003-2004</td>
<td>7.04</td>
</tr>
<tr>
<td>2004-2005</td>
<td>10.66</td>
</tr>
<tr>
<td>2005-2006</td>
<td>17.16</td>
</tr>
<tr>
<td>2006-2007</td>
<td>18.23</td>
</tr>
<tr>
<td>2007-2008</td>
<td>26.22</td>
</tr>
<tr>
<td>2008-2009</td>
<td>36.98</td>
</tr>
<tr>
<td>2009-2010</td>
<td>52.74</td>
</tr>
<tr>
<td>2010-2011</td>
<td>66.17</td>
</tr>
</tbody>
</table>

*Source: [www.trai.gov.in](http://www.trai.gov.in)*

India is also the fastest growing telecom market in the world with an addition of 9-10 million monthly subscribers. The tele-density of the country has increased from 10.66 percent in 2005 to 66 percent in March 2011, showing a stupendous
annual growth of about 66% one of the highest in any sector of the Indian economy. This is positive indication to prove that the globalization and liberalization policies introduced by the government in telecommunication sector have resulted in positive growth. To compare India with other developed countries in terms of total tele-density, India’s tele-density is very low. Despite greater achievement in terms of network expansion and mobile technology. For this many hold the size of the population responsible. It is also true that countries with smaller network sizes that India are having much higher tele-densities.

1.9 Statement of the Problem:

Indian telecom industry has the highest growth rate in the world. The telecom industry was opened up for private sector participation from the year 1994. Indian Telecom sector, starting from telegraphic and telephonic systems in the 19th century, the field of telephonic communication has now expanded to make use of advanced technologies like GSM, CDMA, and WLL to the 3G Technology in mobile phones.

Day by day, both the Public sector and Private sector enterprises are putting in their resources and efforts to improve the telecommunication technology so as to give the maximum to their customers. The major public sector and private sector are BSNL, MTNL in the fixed line and Airtel, Hutch, Idea, Tata, Reliance in the mobile segment are coming up with new tariffs and discount schemes to gain the competitive advantage. The two major reasons that have fuelled this growth are low tariffs combined with falling handset prices. The other reason that has tremendously helped the telecom industry is the regulatory changes and reforms that have been pushed for last 10 years by successive Indian governments.

According to Telecom Regulatory Authority of India (TRAI) the rate of market expansion would increase with further regulatory and structural reforms. The telecom reforms have allowed the foreign telecommunication companies to enter Indian market which has still got huge potential. Currently the Indian Telecommunication market is valued at around $ 100 billion.

In recent, the demand for mobile phone is increasing. There are many players in the mobile phone industry. Though cell phone industry has its origin in the recent past and the growth has been excellent. To market their services, every company is adding many new features. Day by day, many new competitors enter the market with new attractive schemes, provide additional facilities, add new features to existing
ones, reduce the charges her incoming and outgoing calls, introduce varieties of handsets, models a healthy competition that benefits of the subscribers. The subscribers are provided with various schemes of cell phone services. And the market for cell phone has become very competitive. In this context, the purpose of the study is to find the User’s level of satisfaction with mobile phone service providers with special reference to Tiruppur District was undertaken.

**1.10 Objectives of the Study:**

The study has been undertaken with the following objectives:

1. To analyse the personal variables and overall details of mobile phone service provider users and overall satisfaction.
2. To find the schemes offered by Mobile phone service providers.
3. To find the services offered by mobile phone service providers.
4. To analyse the mobile phone service provider users level of satisfaction.
5. To analyse the overall various services satisfaction on Mobile Phone Service Provider User’s & Overall Satisfaction among the Mobile Phone Service Providers.
6. To find the various problems faced by the mobile phone service provider users.
7. To offer suggestions to solve the problems and to improve the services.

**1.11 Hypothesis of the Study:**

1. There is no significant difference in the agreeability scores on the needs for mobile phone service provider users.
2. There is no significant difference between personal variables and monthly expenses on mobile phone among the mobile phone service provider users.
3. There is no significant difference in the mean of awareness scores on the value added services among the mobile phone service provider users.
4. There is no significant difference between personal variables and level of awareness on value added services among the mobile phone service provider users.
5. There is no significant difference in the satisfaction scores on the various services among the mobile phone service provider users.
6. There is no significant difference between personal variables and various services of level of satisfaction among the mobile phone service provider users.
7. There is no significant difference between personal variables and overall satisfaction among the mobile phone service provider users.

8. There is no significant difference in the overall satisfaction mean score among the mobile phone service providers.

1.12 Scope of the Study:

The present study is contained to Tirupur and it is decided to consider Airtel, Reliance, BSNL, Aircel and Vodafone. Mobile phone service rendered to the customers. In Tirupur District there are various mobile phone service providers are available. Mobile phone service provider has been selected to study the user’s level of satisfaction in it is the most popular mobile services.

1.13 Limitations of the study:

An attempt has been made to complete the research work in the best manner possible, but still, there are a few obvious limitations.

- Responses have been solicited from the User’s level of satisfaction with mobile service providers with special reference to Tirupur District.
- All the limitations of primary data are applicable to the study.
- The data collected is based on the questionnaire the result would he varying according to the opinion of the individuals.

1.14 Research Methodology:

The purpose of the present study was to study the User’s Level of Satisfaction with Mobile phone service provider in the telecom sector. Mobile phone service providers taken for the study were BSNL, Airtel, Reliance, Aircel and Vodafone.

1.14.1 Selection of the population:

For the purpose of this present study Tiruppur District is chosen. It is a convenient place to collect the sample to the researcher and sample design is determined before data are collected.

1.14.2 Selection of Sample Size:

A sample of 300 respondents was taken based on randomly. These respondents were interviewed and data were collected from Tiruppur District.

1.14.3 Selection of the Sample:

Selection of the sample unit was selected under the “Random sampling”. Random sampling is a sample selected from a population in such a way that the every
member of the population has to get an equal chance of being selected. The choice of sample items depends on chance.

1.14.4 Methods of Data Collection:

Both primary and secondary sources of data were used. The primary data required for the study were collected through questionnaire. Primary data has been collected from different mobile phone service provider users in Tirupur District. The main service providers are BSNL, Airtel, Reliance, Aircel and Vodafone. Secondary data was collected from the Annual reports of the companies, Magazines, Journals and Websites of various National and International Institutions.

1.14.5 Analysis of Data:

To arrive at certain conclusions regarding the hypothesis advanced in the present investigation, the following statistical tools for analysis of data were employed to consolidate, classify and analyse the data with reference to the selected objectives of the study. i.e., Simple Percentage Analysis, Weighted Average Score, Factor Analysis, ANOVA, Chi-Square Test, Multiple Regression Analysis, Discriminant Analysis and Garrett’s Ranking Technique. Statistical calculations have been made making extensive use of Microsoft Excel and SPSS Software Packages on the computer.

**Simple Percentage Analysis:**

Percentage analysis is a simplest tool of all. It is used to give the clear cut information about the analysis.

\[
\text{Percentage} = \frac{\text{Individual respondent}}{\text{Total number of respondents}} \times 100
\]

**Weighted Average Score:**

The researcher has adopted weighted average method to rank the performance according to respondents view. The researcher used a five point scale for each feature. Each scale was given a score according to its importance starting from 5 to 1.

\[
\bar{X_w} = \frac{\Sigma WX}{\Sigma W}
\]

Where \(\bar{X_w}\) represents the weighted arithmetic mean
X = The Variable
W = Weights attached to the variable X.

Factor Analysis:

Factor Analysis is a multivariate statistical technique used to condense and simplify the set of large number of variables to smaller number of variables called ‘factors’. This technique is helpful to identify the underlying factors that determine the relationship between the observed variables and to provide an empirical classification scheme of clustering of variables into groups called factors. This test is applied to measure the distribution of variables related to mobile phone user’s level of satisfaction.

ANOVA:

Under the one way ANOVA we consider only one factor and then observe that the reason for said factor to be important is that several possible type of samples can occur within that factor. We then determine if there are differences within that factor.

This table is summarized and shown below:

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares SS</th>
<th>Degrees of Freedom d. f.</th>
<th>Mean Square MS</th>
<th>Variance Ratio F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Samples</td>
<td>SSB</td>
<td>c-1</td>
<td>MSB = ( \frac{SSB}{c-1} )</td>
<td>F = ( \frac{MSB}{MSW} )</td>
</tr>
<tr>
<td>Within Samples</td>
<td>SSW</td>
<td>n-c</td>
<td>MSW = ( \frac{SSB}{n-c} )</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>SST</td>
<td>n-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-Square Test \((\chi^2)\):  

Chi-Square test is a non-parametric test is used for comparing as sample variance to a theoretical population of variance. The Chi-square test is applied if the cell frequency is more than 5.

\[
\chi^2 = \sum \frac{(O-E)^2}{E}
\]

Where,
O – Observed Frequency
E – Expected Frequency
E - Row total x Column total
Grand Total

V = (C-1) (r-1)

**Multiple Regression Analysis:**

Multiple Regression Analysis is a logical extension of two-variable regression analysis, instead of a single independent variable, two or more independent variables are used to estimate the values of a dependent variable. The regression model is fitted in order to study the relationship between them and to establish a functional relationship between the dependent variable with the set of independent variables. : 

\[ Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + \ldots \]

Where b1, b2, ……… and b6 are partial regression coefficients; b0-constant the results are presented in the following table. The R² the coefficient of determination indicate to what extent the set of explanatory variables X’s put together explain the variation of the dependent variable Y. The F statistic reveals the overall significance of the regression equation fitted. The ‘t’ statistic shows the significance of the partial regression coefficients in the regression equation fitted. Multiple Regression Analysis is used to draw the relevance between Monthly expenses and personal variables on mobile phone users.

**Discriminant Analysis:**

Discriminant analysis is a statistical technique which allows to study the differences between two or more groups with respect to several variables simultaneously and provide a means of classifying any object/individual into the group with which it is most closely associated and to infer the relative importance of each variable used to discriminate between different groups. A linear combination of predictor variables, weighted in such a way that it will best discriminate among groups with the least error is called a linear discriminant function and is given by:

\[ D = L_1 X_1 + L_2 X_2 + \ldots \ldots + L_k X_k, \]

where Xi’s are predictor variables, Li’s represent the discriminant coefficients, and D is the value of the discriminant function of a particular individuals/element such that if this value is greater than a certain critical value D* = (D1 bar +D2 bar)/2, the individual would be classified in Group I otherwise the individual would be classified in Group III.

Discriminant Analysis is applied to measure the personal variables and mobile phone service provider user’s level of satisfaction.
Garrett’s Ranking Technique:

Garret rank technique was used to rank the factors that influenced the users to select the particular mobile phone service providers. In this method, the mobile phone service provider users were asked to give ranks according to the magnitude of the problem. The order of merit given by the mobile phone service provider users were converted into ranks by using the formula,

\[ \text{Percentage position} = 100 \left( \frac{R_{ij} - 0.5}{N_j} \right) \]

Where, \( R_{ij} \) - Rank given for \( i \) th factor by \( j \) th individual

\( N_j \) - Number of factors ranked by \( j \) th individual

Garret rank technique was used to rank the factors that influenced the users to select the particular mobile phone service providers.

1.16 CHAPTER SCHEME:

Chapter - 1:- Introduction & Design of the Study:

This Chapter covers the fastest growing services and brief overview of Indian Telecom Sector, statement of the problem and research objectives of the study are also covered.

A detailed overview of the methodology used for this study is mentioned here in this chapter. This chapter covers, defining the problem of the study, coming up with the main objectives of the study, defining the hypothesis of the study, describing the sample design, highlighting the tools used for data collection, explaining the methods of data analysis and mentioning the limitations of the study and defining the list of abbreviations.

Chapter - 2:- Overview of Mobile Phone Service Providers and Review of Literature:

This Chapter covers the overview of Mobile Phone and mobile phone service providers, growth trend of mobile phone services and quality performance of mobile phone service providers.

This chapter also covers studies related to telecom sector, studies related to usage of mobile phone technology and studies related to customer satisfaction level in the small towns of India, European countries and U.S.

Chapter - 3:- Profile and Contribution of Public and Private Mobile Phone Service Providers in India:
This chapter covers studies various Mobile phone service providers and services provided by them includes management information, value added services, infrastructure development and technology etc.

This chapter covers Contribution of Public and Private of Mobile phone service providers in India. It includes for the growth trends of mobile phone service providers and market share of mobile phone service providers.

**Chapter- 4:- Analysis and Interpretation:**

This chapter explains the various methods used for analyzing the collected data. It also discusses the various statistical tool used for this analysis.

**Chapter - 5:- Summary of Findings, Suggestions and Conclusion:**

This chapter presents summary of findings, suggestions and conclusion of the study.