2. OBJECTIVES AND METHODOLOGY

The objectives of the present study are essentially to map the growth of telephony in India with special emphasis on mobile telephony so as to

a) Trace the trajectory of growth of telephony in India in the 21st Century;
b) Identify 'sub-national' differences in the growth pattern, across States and along the urban-rural dimension;
c) Study the available evidence relating to economic impact of mobile growth both internationally and in the Indian context to draw lessons for policy;
d) Understand the social change dimension of the ascendance of the 'mobile society' in view of the recent ubiquity of the mobile telephone.

2.2 In the context of the rapid increase in teledensity driven by the growth of mobile telephones in India, and the evidence of causal links between such increases and economic development, these are important objectives that would yield valuable insight into how the broadbased acceptance of this new technology in a developing country context has impacted the economic and social arenas. There is, however, no doubt that the penetration of mobile phones has been uneven across States, and between urban and rural areas[26].

2.3 *Table 2.1* indicates the teledensity of different States as on 31st December, 2007. A wide diversity is apparent, even if the four large cities are excluded. It could be noticed in passing that the teledensity in metro cities reflects the penetration of multiple telephones in the average household.

[26] *Op. cit.*, TRAI (2008)

Table 2.1: State-wise total Teledensity

STATE	TELEDENSITY	STATE/CIRCLE	TELEDENSITY
Andaman & Nicobar	17.28	North East I*	23.53
Andhra Pradesh	25.63	North East II*	8.27
Assam	12.31	Orissa	13.17
Bihar	10.92	Punjab	44.69
Chhattisgarh	3.93	Rajasthan	21.56
Gujarat	30.87	Tamil Nadu	32.06
Haryana	28.06	Uttaranchal#	10.40
Himachal Pradesh	37.64	Uttar Pradesh E@	14.75
Jammu & Kashmir	19.87	Uttar Pradesh W	@
Jharkhand	3.41	West Bengal	12.51
Karnataka	32.05	Kolkata	57.39
Kerala	41.81	Chennai	96.36
Madhya Pradesh	17.97	Delhi	105.32
Maharashtra	24.62	Mumbai	78.83
		All India	**23.89**

* *North East I* refers to Meghalaya, Mizoram, and Tripura, *North East II* to Arunachal Pradesh, Manipur, and Nagaland
# Now *Uttarakhand*
@ Jointly for *UP East* and *UP West*

Source: Department of Telecom, Annual Report 2007-08

2.4 An examination of the comparative development impact of mobile telephony on different States in India would help deepen knowledge regarding the economic effects of teledensity growth at the sub-national level. While earlier comparative studies have concentrated on unraveling similar causations and effects across countries both developed and developing, the present study would seek to understand the impact that mobile telephony has at one level below national aggregation. Such a study would justify itself given the "sub-continental" dimension of India's economy, demography, geography, and market. A feature of such an intra-country study would be that at least a few of the variables that would affect the analysis of inter-country comparisons such as policy and regulatory framework and accounting differences can be held constant. The study would also be facilitated by the policy regime for mobile

telephony in India where operator licenses are granted broadly for State-wise operations[27].

2.5 The study would be expected to provide important insight into the relationship between teledensity and economic growth and consequential social impacts in different States and the factors that give rise to inter-State differences, and the thereby draw lessons for policy-making.

Research questions

2.6 The following research questions are proposed to be examined as part of this research study:

I. *What are the differences in growth rates of mobile teledensity in different States in India?*

II. *What are the important reasons for such differences?*

III. *Is there evidence of any relationship between the economic growth of a State and the growth in its (mobile) teledensity?*

IV. *How has the rapid penetration of mobile telephones impacted the economic and social life of individual actors in different States?*

[27] See *Appendix 1* for a description of Service Areas. Service providers tend to organize their operations on a State-wide basis, each State (or group of States, see *Table 2.1*) forming a 'Circle'.

V. *What, if any, are the policy lessons that can be drawn from the comparative analysis of mobile telephony and economic development across different States in India?*

Limitations

2.7. The present study is intended to gather evidence regarding the development impact of mobile telephony in India over a 3-4 year period, and is thereby subject to inherent limitations.

2.8 A primary limitation would be imposed by the short range of trend data. Since the Phase II growth phase is modeled only post 2005, the analysis of trend data may not truly reflect the long-term picture. A second limitation imposed by the relatively short timeframe is unraveling the role of environmental factors that have affected the differential rates of growth of telephony in the different States. It is a fact that the competition regime in the telecom services sector is yet to stabilize, and new entrants have recently been licensed[28] and are in the process of entering the market in many service areas. The resultant choppiness in the sector relating to spectrum availability and allocation, migration to 3-G (third generation) technologies, and indeed the potential effects of new business and management models that will be introduced both by new entrants and incumbents to gain market ascendancy, is likely to significantly

[28] One hundred and twenty Universal Access Service Licenses effective from 25th January, 2008 were signed by the Department of Telecom in February and March, 2008 (Source: DoT Circular No. 20-100/2007-AS-I (Part – C) dated 27th March, 2008 on Website) covering 22 Service Areas. It has been reported in the media that some of the licensees are getting ready to launch services soon.

alter the growth trajectory of the sector. What effects this will have on the overall economic scenario are therefore difficult to predict at this early stage of development.

2.9 Time constraints are a third limitation of the study, and may restrict the scope for developing a robust econometric framework to analyse macro-economic trends. Previous comparative research as in Röller and Waverman (2001), Waverman *et al.* (2005), and Sridhar and Sridhar (2004) have used sophisticated simultaneous approaches by modeling the Aggregate Production Function that endogenises telecommunications investment. Following the work of Robert J. Barro[29] who controlled for differences such as the initial endowments of human capital in richer countries for example in his cross-sectional study of growth rates in different countries, Waverman *et al* (2005) have proceeded to further refine the analysis by recourse to the Endogenous Growth Model (or the endogenous technical change approach). Kathuria *et al* (2009) have in their just released study adopted the Röller-Waverman framework in their work that analyses the economic impact of the growth of mobile telephony in different States in India. Given the extensive use of robust econometric analysis in their work that satisfactorily accounts of causation, the present study would confine itself to a simple approach by studying correlations of mobile telephony growth with GSDP *per capita* across different States. In trying to be simple, the study would naturally endeavour not to be simplistic, and would enrich the analysis by offering qualitative insights to inform and deepen the conclusions.

[29] Not referred to in the Bibliography

2.10 In view of the rather extensive literature available on the subject of economic and social impacts of telephony, it is first proposed to undertake a detailed survey of the literature as the first item in this study. Even though studies relating to mobile telephony are of more recent vintage, the theoretical frameworks developed and used for analysis of 'fixed telephones' form a seam less continuum of research,, and it is important to understand the conceptual framework that informs most socio-economic exploration in the sector.

2.11 A logical next step would be to collect data relating to

a) characteristics of telecommunications development with specific focus on mobile telecommunications, such as number of subscribers and service providers service-area-wise, maintained by the Department of Telecommunications of the Government of India (DoT), the Telecom Regulatory Authority of India (TRAI), industry associations such as Cellular Operators Association of India (COAI) and Association of Unified Telecom Service Providers of India (AUSPI) and individual service providers, and
b) general economic variables and country/State GDP/GSDP from the Census of India, and Central Statistical Organisation.

2.12 In view of the 'paradigmatic' change in mobile phone penetration rates post-2005, the data collection will be limited to the period after 2005.

2.13 The data so collected will be subjected to simple statistical analysis to search for evidence of correlation between GSDP and mobile teledensity so as to arrive at a comparative picture of different States.

2.14 The quantitative analysis would be supplemented by a survey of media and other sources to identify the socio-cultural dimensions of the impact of mobile telephony, and to gather evidence / case-studies that would help deepen the analysis. For this purpose, primary data collection by means of unstructured interviews is proposed and has been conducted in two cities – Delhi and Hyderabad (February, 2009), and on study tours in Jodhpur Division of Rajasthan State (November, 2008) and to Amritsar city (December, 2008) in Punjab State.