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CONTENTS

Sr. No.	TITLE & NAME OF THE AUTHOR (S)	Page No.
1.	CHALLENGES OF INFORMATION & COMMUNICATION TECHNOLOGY (ICT) AS A TEACHING AND LEARNING TOOL IN THE EDUCATION SECTOR IN ZAMBIA: A CASE STUDY OF SELECTED SECONDARY SCHOOLS OF MONGU DISTRICT <i>DR. B. NGWENYA & J. KAUNDA</i>	1
2.	TO MEASURE SIGNIFICANT DIFFERENCE IN FINANCIAL PERFORMANCE OF SELECTED FERTILIZER COMPANIES IN INDIA BASED ON PROFITABILITY RATIOS <i>ANKIT D. PATEL</i>	4
3.	A STUDY ON DEMOGRAPHIC PROFILE AND PROBLEMS FACED BY THE POWERLOOM OWNERS WITH SPECIAL REFERENCES TO COIMBATORE CLUSTER <i>DR. S. SARAVANAN & K. A. RAMYA</i>	8
4.	ANALYTICAL STUDY OF DIRECT TAX CODE TO BE INTRODUCED IN INDIAN ECONOMY <i>DR. MAHESH BHIWANDIKAR</i>	13
5.	NEED OF ICT FOR DIRECT RELATION BETWEEN FARMER AND CONSUMER <i>DR. MANOJKUMAR JYOTIRAM GAIKWAD & PRAKASHKAILASHCHANDRAVYAS</i>	16
6.	FINANCIAL ANALYSIS OF COMMERCIAL BANKS: A COMPARATIVE STUDY <i>DR. ATIYA MAHBOOB</i>	19
7.	EFFICIENCY OF COMMODITY FUTURES IN PRICE DISCOVERY: AN EMPIRICAL STUDY OF AGRICULTURAL COMMODITIES <i>SIDDULA NARSIMHULU & DR. S. V. SATYANARAYANA</i>	22
8.	NON PERFORMING ASSETS MANAGEMENT IN HDFC BANK <i>S. R. PRASAD</i>	29
9.	COMMERCIALISATION OF FOREST RESOURCES: AN EMERGING ISSUE IN ARUNACHAL PRADESH <i>DR. TASI KAYE</i>	33
10.	AN ANALYSIS OF FACTORS AFFECTING ONLINE CONSUMER BUYING BEHAVIOR IN INDIA <i>PRACHI GOYAL & DR. BHUMIJA CHOUHAN</i>	38
11.	EVOLUTION OF INDIA'S TELECOMMUNICATIONS INDUSTRY <i>GAUTAM KUMAR JHA</i>	46
12.	STUDENT AWARENESS OF EDUCATION LOANS AS A SOURCE OF FINANCING – A STUDY OF BELGAUM CITY, KARNATAKA <i>SONAL REVANKAR</i>	55
13.	EFFECT OF CAPITAL STRUCTURE ON PROFITABILITY OF LISTED MANUFACTURING COMPANIES IN SRI LANKA <i>ANANDASAYANAN S & SUBRAMANIAM V. A.</i>	57
14.	AN EVALUATION OF THE ECONOMIC AND FINANCIAL CAPACITY OF INDIGENOUS UNDERWRITING FIRMS FOR MARINE RISKS AND INVESTMENT COVER IN NIGERIA <i>NWOKORO, IGNATIUS A. & NWOKEDI, THEOPHILUS C.</i>	61
15.	HOUSEHOLD SAVING BEHAVIOR IN JIMMA ZONE OF OROMIA REGION, ETHIOPIA <i>TADELE MENGESHA</i>	65
16.	AN EMPIRICAL ANALYSIS OF FACTORS AFFECTING WLB OF EMPLOYEES IN SERVICE SECTOR <i>ANJU CHAWLA</i>	77
17.	PROSPECT AND POTENTIAL OF RURAL TOURISM IN BODHGAYA <i>AJIT KUMAR SINGH</i>	81
18.	VERTICAL PRICE TRANSMISSION BETWEEN CEREALS AND BREAD AND OTHER PREPARED FOODS: DOES PRICE STABILITY IN CEREALS MARKET STABILIZES PRICE OF BREAD AND OTHER PREPARED FOODS? <i>YONAS ABERA MAMO, HABTAMU REGASSA LEMMA & YOHANNES MENGESHA</i>	83
19.	SERVICE MARKETING INNOVATION: A PARADIGM SHIFT (A CASE STUDY OF INDIAN BANKING SYSTEM) <i>AHMAD AZHAR</i>	91
20.	A CASE STUDY OF SAHARA INDIA PARIWAR SCANDAL (WITH REFERENCE TO ETHICAL AND GOVERNANCE ISSUES INVOLVED) <i>NANCY RAO</i>	100
	REQUEST FOR FEEDBACK & DISCLAIMER	104

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EVOLUTION OF INDIA'S TELECOMMUNICATIONS INDUSTRY

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ABSTRACT

Indian Telecommunications Industry has shown a tremendous growth in the past decade. Though most of the growth has come in the mobile industry, it was not always so. The industry was a controlled government monopoly. With the advent of the liberalization regime there was introduction of competition and private players in this segment. Setting up of the regulator further accentuated this process. In this background, this paper attempts to look the evolution of this industry with the changes that have taken place at the policy front. The separation of the incumbent government service provision in the wireline services and the foray of private players in the wireless services has created a unique balance that has helped the industry scale new heights. The tremendous growth of this sector has made it vital for the Indian economy. However, there is still substantial scope for this segment to grow. Though there has been lot of controversy surrounding this sector, primarily due to various political reasons, The National Telecom Policy 2012 can be attributed as a step in the right direction. By creating more competition and looking at the larger public benefit simultaneously, there can be still substantial growth in this segment.

JEL CLASSIFICATION

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KEYWORDS

telecommunication industry, telecommunication services.

SECTION I: INTRODUCTION AND DEFINITION

During the last two decades there have been dramatic changes in most aspects of the telecommunications industry. The industry has become more complex with increasing digitization, introduction of newer products and increasing inter-linkages between broadcasting, information technology and telecommunications industry. However, during most part of the 20th century the telecommunications industry was viewed as a 'natural monopoly'¹. The telecommunications services were provided either by a secure monopolist or by a private regulated corporation or by a public enterprise (as in India).

For the purposes of the present analysis telecommunication services will refer to two-way transmission of information, including voice, text, audio and video, between parties that are not in physical contact with each other. Consumers purchase these services from companies, which include local, long-distance, wireless, cable and internet providers. Telephone services include local and long distance calls, wireless, voice mail, caller ID, directory assistance, etc. Cable services include cable TV services, DTH and IPTV services. Internet includes both broadband and dial-up connections as well as wireless services.

This paper has been further divided into six sections. Section II, charts out a brief history of India's Telecommunications Industry in the pre-reform era. While the telecommunications industry continued to be a government controlled monopoly in the pre-reform period, the industry was opened to competition from private players during the post-reform era. This has been analyzed in Section III. With the introduction of private players in the industry there was an increasing demand of a regulator as the private companies within and outside the industry felt that the provisions within the telecommunications industry were not equitable and heavily skewed in favour of the incumbent. This led to the formation of the regulator and changes in policy governing this sector (Section IV). Section V briefly, discusses changes in the policy, namely the license regime, in the telecommunications industry since the end of the 20th century. With changes in the license regime and a level playing field there was a phenomenal growth in this sector. This has been analyzed in Section VI. With increasing competition within the telecommunications industry an analysis of the market structure becomes imperative. This has been done in Section VII. Section VIII provides the concluding remarks.

SECTION II: BRIEF HISTORY

Telecommunications services in India were governed by the Indian Telegraph Act of 1885. For most part of the 20th century, the Indian telecommunications industry was a Post, Telephone and Telegraph (PTT) model. The Ministry of Posts and Telegraphs and its departments controlled the telecommunication services and the infrastructure. Investments in telecommunications came under the Five Year Plans, which gave low priority to telecommunications and classified it telecommunications utilities as a luxury. It was widely perceived that the 'aam aadmi' had no urgent need for telephones and other telecommunications related services (considered to be elitist) and therefore investments in telecommunications was restricted to serve governments and few other essential needs.

To ensure that the telecommunication equipments came from faultless sources, the Ministry of Posts and Telegraphs set up three subsidiaries: Indian Telephone Industries (ITI) to make telephone equipment, Hindustan Teleprinters Limited (HTL) and Telecommunication Consultant India Limited (TCIL) – a consultancy. These were known as the State Owned Enterprises (SOEs). The long term consequence of this state monopoly was not beneficial for the consumers or potential consumers of telecommunication services. There was a long waiting list for telecommunication utilities and the government was not able to install telephones (Table 1.1). The telephone system began to expand rapidly only in the late 1980s when the ITI-Alcatel factory started delivering switches in larger volumes. In 1984 Centre for Development of Telematics (C-DOT) was set up as an R&D organization to develop electronic switches. In 1984 the government separated the telephone department and created Department of Telecommunications (DoT) on April 1, 1986, currently an arm of the Ministry of Communication and Information Technology.

¹ 'Natural Monopoly' is a type of monopoly that exists as a result of the high fixed or start-up costs of operating a business in a particular industry.

TABLE 1.1: TELEPHONE ADDITION AND WAITING LIST, 1982-1992

Year Ending 31 st March	DELs ^a (million)	Waiting List (million)	Growth of DELs (%/yr)	Waiting List (months) ^b
1982	2.30	0.59	7.0	47.2
1983	2.47	0.66	7.4	46.6
1984	2.67	0.74	8.1	44.4
1985	2.90	0.84	8.6	43.8
1986	3.17	1.03	9.3	45.8
1987	3.49	1.12	10.1	42.0
1988	3.80	1.29	8.9	49.9
1989	4.17	1.42	9.7	46.1
1990	4.59	1.71	10.1	48.9
1991	5.07	1.96	10.5	49.0
1992	5.81	2.29	14.6	37.1

Notes

(a) Dialed Exchange Lines, equivalent to telephones.

(b) Waiting list at the end of the year, divided by average monthly additions to DELs in that year.

Source: Desai, A. V. (2006): "India's Telecommunications Industry".

SECTION III: INTRODUCING COMPETITION

Introduction of competition in the global telecommunications industry is a recent phenomenon. In the Indian telecommunications industry, the introduction of competition has primarily been due to changes in policy objectives i.e. from security to efficiency and from being a luxury item to being a good for mass consumption. The reforms in the Indian telecommunications industry began in 1991 when foreign investment was welcomed and exchange level switch manufacturing was opened to the private sector. Prior to 1991, DoT bought all its equipments from SOEs. In 1986, only customer-premises equipment i.e. handsets and office switchboards, were allowed for private manufacturers. However, the provision of telecommunication services was retained as a state monopoly. This was perceived to be an adequate strategy, keeping in line with the policies being followed globally.

The focus of the policy makers to improve foreign investment in equipment manufacturing did not help in the growth of telephone lines. Even though DoT accelerated the installation of new lines to counter the looming threat of private players, the waiting list failed to shorten as more and more people were encouraged to apply for telephones. Further reforms in the telecommunications industry, in response to this shortfall led to the rejection of emphasis on investments in manufacturing and in favour of enabling private investments in telecommunication services. Furthermore, there was also a change in the public policy as policymakers searched for methods to not only induce private investment but also to reduce costs².

When private players were first introduced in 1992, the objective of the policymakers was not to allow competition in basic services but instead to supplement it by providing premium services, like mobile services, at high prices and value-added services like fax, e-mail and radio paging. The revenue earned from the license fees and other charges on the private service providers was to be used by the state to accomplish the targets of the incumbent in providing universal services and high quality value-added services. DoT invited bids for cellular services in the four metros in July 1992. Applicants had to bid for the lowest rent and no objective criterion was specified. The license fee for the private operators were fixed at high rates (Table 1.2) and with the rentals and the security deposits being kept low, DoT was able to ensure that the call charges of the cellular operators would be a high multiple of wireline call charges³.

Apart from the high license fees, the cellular operators also had to pay charges for carrying calls on the DoT network. They were given only one point of interconnection in a circle. So even if cellular operators had licence for two adjoining circles, their subscribers were charged trunk call rates for local calls between DoT and private operators if the point of interconnection was not in the same city. The interconnection charges created a kind of tariff barrier around the DoT network. However, it should also be kept in mind that the private players bid unrealistically high license bids, which resulted in their total costs exceeding revenues.

TABLE 1.2: LICENSE FEES PAYABLE BY CELLULAR SERVICE OPERATORS ANNUAL LICENSE FEES (Rs million)

ServiceArea	Year 1	Year 2	Year 3	Year 4-6	Year 7 onwards for each year
Bombay	30	60	120	180	240
Delhi	20	40	80	120	160
Calcutta	15	30	60	90	120
Madras	10	20	40	60	80

Source: Dossani, R. and S. Manikutty (2003): "An Institutional View", in R. Dossani (ed.), *Telecommunications Reforms in India*, Delhi: Viva Books, pp 43-71.

The outcome of this bidding process got entangled in legal hassles, with some of the applicants whose applications were rejected going to the courts. This gave DoT the opportunity to delay the entry of private players for some years. The entire legal process ended in October 1994 with the first cellular services in the metros starting in August 1995. On the other hand, the finance ministry argued that DoT's resources needed to be supplemented by private investment in order to improve India's low teledensity⁴. Two committees were set up to study private entry in basic services – one by the finance ministry done by ICICI and another by DoT headed by G. Murthy. The ideology of both these committees formed the basis of the National Telecom Policy announced in 1994.

In January 1995, tenders were invited from private players to participate in the basic services. One of the primary objectives of this was to maximize revenues for the state as the highest bidder was to be chosen. However, arbitrariness was shown by DoT in the licensing process and in the awarding of contracts resulting in multiple court cases. However, neither DoT nor any of its functionaries were held accountable for their mistakes⁵. When the bids were invited the waiting list for telephones was more than two years. By the time the private players could provide service, the waiting list had fallen under a year and was shrinking rapidly (Table 1.3). DoT's investment also rose dramatically from US \$ 600 million in 1991 to US \$ 3 billion in 1997-98⁶. Again the interconnection charges imposed by the DoT were one-sided. Some companies bid very high amounts and secured licenses and later backed out when contracts were awarded. All these taken together meant that the operations of the private wireline service providers had become unviable even before it started. Only two basic operators started functioning by end of 1998 and four by the year 2000.

² For details see The National Telecom Policy 1994, Section 6.³ For details see Desai (2006).⁴ Teledensity is defined as the number of wireline phones in use for every 100 individuals living within an area.⁵ For details see Dossani, R. and S. Manikutty (2003): "An Institutional View", in R. Dossani (ed.), *Telecommunications Reforms in India*, Delhi: Viva Books, pp 43-71.⁶ Chowdhary, T. H. (1998): 'Politics and Economics of telecom liberalization in India', *Telecommunications Policy*, Vol. 22, No. 1.

TABLE 1.3: ROLLOUT OF TELEPHONE LINES (DOT & MTNL), 1990-96

	Financial Year Ending 31 st March						
	1990	1991	1992	1993	1994	1995	1996
Number of lines (000)	4,589	5,074	5,810	6,797	8,026	9,795	11,978
Waiting list (000)	1,713	1,961	2,290	2,846	2,497	2,153	2,277
Number of new lines (000)	415	485	736	987	1,229	1,769	2,183
Waiting list (months) ^d	50	49	37	35	24	15	13

Note (d): New lines installed during the year divided into the waiting list and multiplied by 12.

Source: Desai, A. V. (2006): "India's Telecommunications Industry".

SECTION IV: FORMING OF THE REGULATOR AND NEW TELECOM POLICY

The communications ministry asked ICICI to study the setting up of a regulator in May 1993, with the report being submitted in January 1994. A bill to set up a regulator on the basis of the ICICI report was drafted and passed in January 1997. A five member Telecom Regulatory Authority of India (TRAI) was set up in March 1997 through an act of the Parliament⁷. However, the provisions of the TRAI were ambiguously defined. Though it was given certain functions to perform, precisely how it was to perform these functions was not clearly stated. The functioning and adjuration of TRAI was challenged by both, the incumbent as well as the private players in the courts as and when the respective party was affected by TRAI's adjuration. In several instances the courts ruled that TRAI's powers were just recommendatory and not binding on the government.

The private operators did not pay their license fees. The cellular operators had defaults totalling Rs 20 billion and the wireline operators Rs 7 billion. Among their guarantors were Bank of America, Deutsche Bank, ABM Amro, etc. A solution – either liquidation or relief – was becoming unavoidable. DoT was keen to cash their guarantees and asked the private operators whether their licences should not be forfeited if they did not pay. The government pre-empted this move and constituted the Group on Telecommunications, designed to overcome the monopoly of DoT over telecom policy. It issued the New Telecom Policy, which superseded the National Telecom Policy issued in 1994, on March 31, 1999 (NTP-1999). The government set up a Telecom Disputes Settlement and Appellate Tribunal (TDSAT) to hear appeals against the directions of TRAI and adjudicate disputes. Appeals from TDSAT would go directly to the Supreme Court. The ordinance also freed TRAI and TDSAT from audit by the Comptroller and Auditor General (CAG). It also brought DoT under TRAI's directive powers and gave statutory instructions to the government to consult TRAI on matters relating to licensing. Furthermore, in January 2000 the government introduced an amendment to the TRAI act that changed the institutional structure of TRAI and went a long way in overcoming some of the earlier shortcomings of TRAI, especially in dealing with the incumbent⁸.

TRAI made sweeping changes to the tariff structure of DoT⁹. This allowed for a more level playing field in the provision of telecommunication services, especially the cellular services. In accordance with the NTP-1999, changes were made to facilitate the participation of private players in international long distance telephony, thereby ending the monopoly of Videsh Sanchar Nigam Limited (VSNL)¹⁰. In September 1999 the operational function of providing telecommunication services was separated from DoT into a Department of Telecommunication Services (DTS). Later DTS was corporatized into Bharat Sanchar Nigam Limited (BSNL) in October 2000. Unlimited number of Fixed Service Providers (FSPs) was allowed from January 2001 and was put on par with the state owned incumbent.

One of the important changes that the NTP-1999 made was that it allowed the Cellular Mobile Service Providers (CMSPs) to move from a license fee regime to a revenue sharing regime. CMSP operators were required to pay a one-time entry fee. The entry fee and the basis for selection of additional operators would be recommended by TRAI. Apart from the one time entry fee, CMSP operators were required to pay licence fee based on a revenue share. All circle operators were required to pay 2.8-2.9 years' license fee at the old rates (some operators, who had won extremely cheap bids, were required to pay up to 6.6 times their license fees). Table 1.4 summarizes the license fees that cellular operators had initially bid and what they actually paid. Once the operators had paid this, they were allowed to migrate to a proportional change on their revenue.

Private wireline operators were allowed to give CDMA cellular services¹¹. The call charges of wireline operators were required to be same as that of DoT's wireline services, which was much below than that of CDMA operators. However, by January 2001 the wireline operators' share was made equal to those of cellular operators, when the latter was allowed to give WLL connections¹². The private operators were also no longer required to route intracircle calls through DoT and MTNL. The private operators were allowed to build their own network within their circle boundaries. DoT and MTNL were allowed to enter the mobile business. The price cuts introduced by them intensified the price competition among cellular operators.

⁷ Telecom Regulatory Authority of India Act, 1997.

⁸ The Telecom Regulatory Authority of India (Amendment) Ordinance, 2000.

⁹ TRAI, (1998).

¹⁰ After the formation of DoT the government corporatized two businesses, telephone in the metros and international traffic, as an experiment. Consequent of this, in 1986 two businesses were separated from the ministry – Mahanagar Telephone Nigam Limited (MTNL) was set to manage telecommunications in Delhi and Bombay (now Mumbai) and Videsh Sanchar Nigam Limited (VSNL) to run international telecommunication services.

¹¹ CDMA stands for Code Division Multiple Access and is a technology to provide cellular services. Another form of technology used to provide cellular access is GSM (originally Groupe Speciale Mobile, later abbreviated as Global System of Mobile Communication).

¹² Wireless in Local Loop (WLL) is a term for the use of a wireless communications link as the last mile connection for delivering plain old telephone service (POTS) and/or broadband Internet to telecommunications customers. In the Indian context it was considered as a telephone that was not portable and stayed at the same place.

TABLE 1.4: FEES PAID BY CELLULAR OPERATORS FOR MIGRATION TO THE REVENUE SHARING REGIME, 1999 (Rs. million)

Circle	Name of Operator	License Fee Bid	License Fee Accepted	Years
HP	Bharti Telenet	149.6	149.6	2.9
Gujrat	Birla AT&T	17941	17941	2.9
Maharashtra	Birla AT&T	16577	16577	2.9
Tamil Nadu	BPL Cellular	8360	8360	2.9
Maharashtra	BPL Cellular	14630	16577	2.8
Kerala	BPL Cellular	5170	5170	2.9
Haryana	Escotel	2458.6	2400	2.9
Kerala	Escotel	3848.3	5170	2.9
UP(W)	Escotel	4062.1	4062.1	2.9
Gujarat	Fascel	12292.5	17941	2.8
Karnataka	Modicom	13930	13930	2.8
Punjab	Modicom	12660	12660	2.8
AP	J.T. Mobile	10010	10010	2.9
Punjab	J.T. Mobile	9145	12660	3.9
Karnataka	J.T. Mobile	13200	13930	2.7
Bihar	Koshika Telecom	1365.3	1365.3	0
Orissa	Koshika Telecom	892.2	892.2	0
UP(E)	Koshika Telecom	2108.8	2108.8	0
UP(W)	Koshika Telecom	2582.1	4062.1	0
Assam	Reliance Telecom	13.2	13.2	2.9
Bihar	Reliance Telecom	26.4	1365.3	6.6
HP	Reliance Telecom	13.2	149.6	2.9
MP	Reliance Telecom	56.1	510	2.9
Northeast	Reliance Telecom	13.2	19	6.4
Orissa	Reliance Telecom	26.4	892.2	6.6
WB	Reliance Telecom	420	420	2.9
MP	RPG Cellcom	510	510	2.9
Rajasthan	Hexacom	1610	3820	2.8
Northeast	Hexacom	19	19	6.4
Haryana	Aircel Digilink	2400	2400	2.9
Rajasthan	Aircel Digilink	2100	3820	2.9
UP(E)	Aircel Digilink	2100	2108.8	6.6
Tamil Nadu	Srinivas Cellcom	4500	8360	0.5
AP	Tata Cellular	8580	10010	2.8
Metros				
Delhi	Bharti	--	80-160	6.1-12.3
Delhi	Sterling	--	80-160	4.4-8.8
Bombay	BPL	--	120-240	3.7-7.4
Bombay	Hutchison Max	--	120-240	3.5-7.0
Calcutta	Modi Telstra	--	60-120	2.6-5.2
Calcutta	Usha Martin	--	60-120	2.2-4.4
Madras	RPG	--	40-80	2.6-5.2
Madras	Skycell	--	40-80	2.6-5.2

Source: Desai, A. V. (2006): "India's Telecommunications Industry", Sage Publications, New Delhi.

The cellular operations became profitable as a result of the changes in policy brought about by the NTP-1999. As stated earlier, the price cut introduced by the incumbent in the mobile business intensified the price competition among cellular operators. However, this essentially favoured the large operators who could realize network economies and access to finance to order equipment in bulk. The smaller players operating in one or two circles and those who did not have access to large amount of funds were eliminated. Thus, the market share of those few operators who had the money to buy licenses increased and there was increased concentration in the telecommunications industry. By 2002, amongst cellular operators, five groups – Bharti, Hutchison, Reliance, Escorts and Idea – held 45 of the 55 cellular licenses. Six houses – Bharti, Reliance, Idea, Tatas, Escorts and Hutchison – held 66 of the 84 wireline licenses¹³. Most of the mergers and acquisitions occurred after the telecommunication companies had solved their liquidity problems. Network economies and economies of scale were the primary factors that drove these deals, which meant that a larger network carrier while carrying more of its calls passed on fewer to other networks.

SECTION V: CHANGE IN THE LICENSE REGIME

By the beginning of the 21st century, technological developments were removing the boundaries between different industries – telecommunications, radio, television and Internet – which were separately defined earlier, leading to their convergence. Convergence was something that was not given importance in the New Telecom Policy of 1999. However, in 2000, government drafted a Convergence Bill which was meant to replace the previous legislations and sought to combine the licensing functions of DoT and regulatory function of TRAI under one regulator. The Planning Commission set up a working group on convergence in 2000. But it limited itself to expansion of government intranet and its use for e-governance during the Tenth Plan (2002-07).

Concerns over the conditions under which fixed telephone service licenses would be merged with the cellular licenses created apprehensions over unified licensing. It essentially became a contest between the GSM operators who were dependent on foreign capital and CDMA operators who had their own deep pockets. As per the NTP-1999, wireline operators had been allowed to provide CDMA cellular services within a Short Distance Charging Area (SDCA). In February 2003, the action of the regulator in the Reliance Infocomm's case was in effect removal of SDCA restrictions for an additional license fee. Since, such a removal was unfair to the cellular operators who had entered in the same circle in the 1999 auction, TRAI proposed a penalty for migration to full cellular service¹⁴. The recommendations were accepted by DoT in November 2003 and with their implementation all licenses were converted to combined licenses for wireline, CDMA and GSM cellular. This was the first stage of universal licensing.

¹³ TATAs and Birla merged their cellular networks to form Idea. However, TATA retained its wireline services.

¹⁴ TRAI. (2003b).

The second stage of the universal licensing exercise covered activities of national and international long-distance services¹⁵. An all India license covering basic, cellular, national long-distance, international long-distance, global mobile personal communication by satellite, cable television, direct to home satellite television, Internet telephony and TV and broadcasting services could be purchased for Rs 1.07 billion, plus a component that would vary with the area where the service was being provided. While the basic telecommunications operators favoured high entry barriers to national and international long-distance services, the smaller GSM operators desired lower entry barriers. The GSM operators argued that the proposed long distance fee would not encourage competition. While the previous fee of Rs 1.25 billion was amortised over 20 years, the current fee needed to be amortised over five years. Also bundling of national and international long-distance service fee into one fee preclude smaller operators to opt for either service. GSM operators also wanted the foreign direct investment limit to be raised to 74 percent to allow them the resources to compete with the cash rich single license long-distance operators.

There was a dramatic change in the attitude of DoT as regards favouring competition in telecommunications sector. While earlier DoT was in favour of keeping the license fee at Rs 1,25 billion (GSM operators were arguing against an amount of Rs 1.07 billion), on November 10, 2005, it issued a press statement pronouncing the policy for second round of licensing process, which respected the concerns of the GSM operators¹⁶. The license fee for the national long distance service was reduced from Rs 1 billion to Rs 25 million and the license fee for the international long distance service was reduced from Rs 250 million to Rs 25 million. The licenses for international and national long distance services were unbundled and the total license fee was reduced from Rs 1.25 billion to Rs 50 million. Second, the requirements of net worth and paid up capital, which were Rs 25 billion and Rs 2.5 billion respectively, were each brought down to Rs 25 million. Third, the annual revenue share license fee was brought down from 15 to 6 percent. Thus, the change in the licensing regime was essentially a way to provide GSM operators greater access to finance as this had been the segment that had contributed significantly in the growth of telecommunications sector.

An important catalyst of the growth of the telecommunications industry (discussed in the next section) in India has been the easing of the licensing requirements of the mobile telecommunication operators. With surplus spectrum from defence requirements available for the industry, new licenses were issued for the 2G wireless services and spectrum was auctioned bringing revenue to the government. While TRAI had issued a consultation paper for the issuance of 3G licenses in June 2006, but due to various political reasons the auction got delayed and happened in April 2010. While the auctions added immensely to the government coffers, the spectrum bandwidth auctions are not likely to have a positive impact on the growth of this sector. The 3G auctions also marked the first time that spectrum auctions and issuance of license was separated. There were lots of controversies around this process with matters ending up in different courts of India. As such, this aspect requires deeper analysis, which is beyond the scope of this analysis.

SECTION VI: GROWTH IN THE TELECOMMUNICATIONS INDUSTRY

One of the important reasons for the growth and spread of the telecommunications industry in India has primarily been due to technological advances, especially the advances made in data transfer through fibre optics and increasing and efficient use of wireless technology. As long as transmission was through wires, last mile¹⁷ costs were so high that no competitor could lay a parallel network to compete with the incumbent. Meaning competition in the telecommunications industry arrived after the advent of wireless services and the increasing demand of Internet services. Wireless services removed the last mile hurdle. As the subscriber base increased, the cost of connecting a cellular subscriber decreased to levels much below that of wireline services, under the same circumstances.

India has emerged as one of the fastest growing telecommunications market in the world. With 957.61 million subscribers at the end of September 2014, it is the second largest network in the world after China¹⁸. It is also the second largest wireless network in the world. Most of this growth has been due to the expansion in the provision of wireless services due to their convenience and affordability. Table 1.5 shows the network expansion by the public sector units as well as by the private operators. While there has been a modest growth in the network expansion done by the PSUs, the same by the private operators has been considerably higher. The private telecom network overtook the network expansion done by the PSUs in 2006. The subscriber base of wireline services was 24.41 million by September 2014¹⁹. It has been declining since 2007 as the demand for wireline telephones have reduced due to the increasing shift towards the wireless segment (Table 1.6). As evident from Table 1.6, there has been a phenomenal growth in the wireless segment with the number of wireless subscribers reaching 930.20 million by September 2014²⁰.

The structure and composition of telecommunications growth has undergone a substantial change in terms of wireline and wireless telephones and public-private participation. As stated earlier, the growth in the wireless segment has been phenomenal, with the wireless segment growing at a compounded annual growth rate (CAGR) of around 50% since 2004. The share of wireless telephones has increased from 46.54% in 2004 to 97.14% in September 2014. The private sector is now playing a crucial role in the expansion of telecommunication services. The share of private sector in total telephone connections is now 88.41% in September 2014 as against 5% in 1999²¹.

TABLE 1.5: GROWTH OF TELECOM NETWORK (PSUs + PRIVATE)

Year ending March	PSUs' Telecom Network (in lakh)	Rate of Growth of PSUs' Telecom Network (%)	Pvt. Telecom Network (in lakh)	Rate of Growth of Pvt. Telecom Network (%)	Total Network (in lakh)
1997	145.4	-	3.4	-	148.8
1998	178	22.42	8.8	158.82	186.8
1999	215.9	21.29	12.2	38.64	228.1
2000	265.9	23.16	20.2	65.57	286.1
2001	324.4	22.00	38.5	90.59	362.9
2002	381.58	17.63	68.06	76.78	449.64
2003	431.71	13.14	114.46	68.18	546.17
2004	464.83	7.67	300.56	162.59	765.39
2005	520.88	12.06	462.85	54.00	983.73
2006	610.84	17.27	810.08	75.02	1420.92
2007	713.9	16.87	1344.76	66.00	2058.66
2008	795.49	11.43	2209.43	64.30	3004.92
2009	895.46	12.57	3401.79	53.97	4297.25
2010	1058.71	18.23	5154.09	51.51	6212.8
2011	1206.02	12.21	7203.26	28.45	8483.28
2012	1302.71	7.42	8210.75	12.27	9513.46
2013	1301.66	-0.08	7679.07	-6.92	8980.2
2014	1200.52	-8.42	8129.63	5.54	9330.2

Source: DoT, Annual Reports, Various Years.

¹⁵ TRAI. (2004a); TRAI. (2004b) and TRAI. (2005a).

¹⁶ DoT. (2005).

¹⁷ The last mile is the final leg of delivering connectivity from a communications provider to a customer.

¹⁸ TRAI, Press Release No. 09/2015.

¹⁹ *Ibid.*

²⁰ *Ibid.*

²¹ *Ibid.*

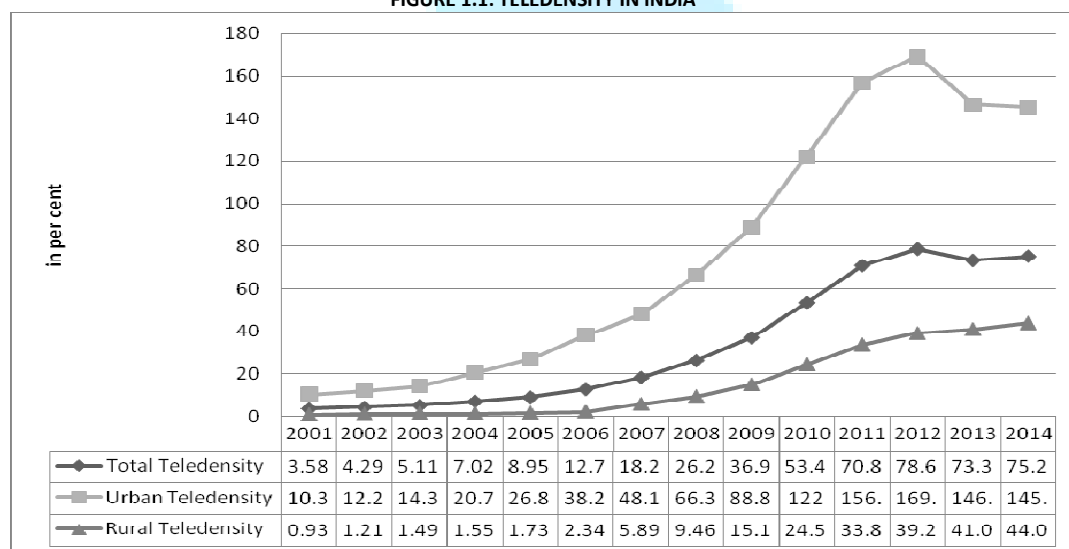
The policymakers have given an important consideration in improving teledensity as an indicator of telecommunications penetration in the country. However, teledensity as a measure of telephone density is not accurate, especially in the urban areas where households and individuals may have access to more than one telephone. However, the policymakers can be excused for this as for the most part of the 20th century teledensity in India was very low (Table 1.7), with some improvements being showed when private players were allowed to provide telecommunication services. Nonetheless, there has been a remarkable improvement in teledensity in the last decade (Figure 1.1), with the values exceeding the targets set by the NTP-199²². However, one glaring fact that comes out of Figure 1.1 is the rural-urban division in telecommunication services' penetration in the Indian economy.

TABLE 1.6: WIRELINE SUBSCRIBERS AND WIRELESS SUBSCRIBERS (in millions)

Year ending 31 st March	Wireline Subscribers	Wireless Subscribers ^a
1997	4.54	0.34
1998	17.8	0.88
1999	21.61	1.2
2000	26.65	1.88
2001	32.71	3.58
2002	38.29	6.68
2003	41.33	13.3
2004	40.92	35.61
2005	41.42	56.95
2006	40.23	101.86
2007	40.77	165.09
2008	39.41	261.08
2009	37.97	391.76
2010	36.96	584.32
2011	34.73	811.60
2012	32.17	919.12
2013	30.21	867.81
2014	28.50	904.52

Source: DoT, Annual Reports, Various Years.

Note (a): Wireless Subscribers includes WLL.

FIGURE 1.1: TELEDENSITY IN INDIA

Source: DoT, Annual Reports, Various Years

TABLE 1.7: TELEDENSITY IN INDIA, 1951-1981, 1991-2000 (percent)

Year	Teledensity
1951	0.04
1961	0.08
1971	0.18
1981	0.31
1991	0.60
1992	0.67
1993	0.77
1994	0.90
1995	1.07
1996	1.28
1997	1.53
1998	1.85
1999	2.20
2000	2.66

Source: Ghosh, S. (2003): "The Policy Agenda", in R. Dossani (ed.), *Telecommunications Reforms in India*, Delhi: Viva Books, pp 25-34.

²² NTP-1999 had set a target of 15 to be achieved by 2010.

SECTION VII: EVOLVING MARKET STRUCTURE

As has been stated earlier, there has been phenomenal growth in the wireless segment of the Indian telecommunications industry. Movement to the revenue sharing regime combined with the increasing price competition in the wireless segment has meant that the smaller players were not able to compete with the bigger service providers and hence most of them sold out. There was thus, consolidation and increased concentration, with a few private operators owning the bulk of the licenses. The introduction of universal licensing regime in the Indian telecommunications industry has resulted in entry of new players in the market. Even then the market share in both, the GSM and the CDMA sections has few players who control the bulk of the market. The service providers have employed different business innovations to keep the loyalty of their customers.

Tables 1.8, 1.9 and 1.10 depict the market share of the wireless service providers, the GSM service providers and the CDMA service providers respectively. The tables show that while there has been an increase in the number of service providers, especially in the GSM segment, the market share of the newer entrants are very low and the bigger players have been able to maintain control of a reasonably high share of the market. This is accentuated more in the CDMA segment. While the market shares of the top 5 wireless service providers have come down over the years (Table 1.8) (top 3 for the GSM and CDMA operators – Table 1.9 and 1.10), they still remain to be quite high. This clearly points out to an oligopolistic kind of market structure. We thus, have an oligopolistic market structure in the Indian telecommunication industry, especially in the wireless segment with intense price competition, resulting in the fact that the tariffs in the Indian telecommunications industry are one of the lowest in the world. Time and again it has been observed that whenever, a new service provider enters the market; there has been a price war among the players leading to further reduction in tariffs. There has been a reduction in the Average Revenue Per User (ARPU²³) in both the GSM as well as the CDMA segments²⁴. In the wireline segment it is the incumbent which has the largest market share. BSNL and MTNL had a market share of 67.67% and 11.45% in the wireline subscriber base by end of March 2013, while all the five private operators have a share of 20.88%²⁵.

TABLE 1.8: MARKET SHARE OF WIRELESS SERVICE PROVIDERS (YEAR ENDING MARCH) (%)

Service Provider ^b		2006	2007	2008	2009	2010	2011	2012	2013
Bharti	Bharti	21.72	22.49	23.74	23.97	21.84	19.99	19.72	21.69
BSNL	BSNL	19.58	18.77	15.62	13.31	11.89	11.32	10.72	11.66
Reliance	Reliance	19.21	16.96	17.54	18.55	17.53	16.72	16.65	14.17
Vodafone (earlier Hutch)+BPL	Vodafone ^c	18.53	16.66	17.4	17.55	17.29	16.58	16.37	17.56
Idea+Spice	Idea ^d	10.32	10.14	10.8	10.98	10.92	11.03	12.26	14.01
Top 5		89.36	85.02	85.1	84.36	79.47	75.64	75.72	79.09
Tata	Tata	5.38	9.7	9.32	8.96	11.29	10.98	8.89	7.65
Aircel	Aircel	2.9	3.34	4.06	4.72	6.32	6.76	6.81	6.92
Others (MTNL, HFCL, Shyam Telelink, Loop, Sistem, Unitech, S.Tel, Videocon, Etisalat, Uninor)	Others	2.37	1.94	1.5	1.94	0.89	6.63	8.58	6.34

Source: Compiled from TRAI, Annual Reports, Various Years.

Note (b): The second column reflects either the acquired or the merged entities.

(c): Vodafone was earlier called Hutch which acquired BPL services.

(d): Idea acquired Spice.

TABLE 1.9: MARKET SHARE OF GSM SERVICE PROVIDERS (YEAR ENDING MARCH) (%)

Service Provider ^e		2006	2007	2008	2009	2010	2011	2012	2013
Bharti	Bharti	28.3	30.83	32.17	31.6	26.66	25.23	22.27	19.72
BSNL	BSNL	24.8	22.77	18.79	15.71	13.22	12.55	11.61	11.32
Vodafone (earlier Hutch)+BPL	Vodafone ^f	24.14	22.84	24.19	23.13	21.07	19.27	18.48	16.37
Reliance	Reliance	2.75	2.81	3.64	6.73	9.69	11.51	11.91	16.65
Idea+Spice	Idea ^g	13.44	13.9	14.64	14.47	13.33	12.82	13.85	11.03
Aircel	Aircel	3.77	4.57	5.51	6.22	7.7	7.05	7.69	6.81
Other (MTNL, Loop, Tata, S.Tel, Videocon, Etisalat)	Other	2.8	2.28	3.24	2.14	8.32	11.57	14.19	17.61
Top 3		77.24	76.44	75.15	70.44	61.06	57.32	54.60	52.74

Note: (e), (f) and (g) same as (b), (c) and (d) respectively.

Source: Compiled from TRAI, Annual Reports, Various Years.

TABLE 1.10: MARKET SHARE OF CDMA SERVICE PROVIDERS (YEAR ENDING MARCH) (%)

Service Provider		2006	2007	2008	2009	2010	2011	2012	2013
Reliance	Reliance	73.56	55.15	56.71	55.71	53.06	48.27	53.33	52.44
Tata	Tata	23.15	35.89	35.58	37.16	36.95	37.47	27.56	27.49
BSNL	BSNL	2.34	7.95	6.7	5.76	5.82	4.92	3.81	3.66
HFCL	HFCL	0.29	0.34	0.44	0.41	0.31	0.25	0.24	0.24
MTNL	MTNL	0.53	0.45	0.41	0.32	0.29	0.21	0.03	0.02
Other (Sistema, Shyam Telelink)	Other	0.14	0.22	0.16	0.6	3.57	8.88	15.03	16.15
Top 3		99.05	98.99	98.99	98.63	95.83	94.62	95.92	96.08

Source: Compiled from TRAI, Annual Reports, Various Years.

SECTION VII: CONCLUDING COMMENTS

The contour of reforms in the Indian telecommunications industry was essentially one where the new players were allowed to provide services in an entirely new segment – the wireless segment, which did not come in conflict with the incumbent's provision of basic services. Segregation of market segments of the incumbent and the private players is one of the important features of the reform process. The reforms in Indian telecommunications were designed to build an oligopolistic form of market structure. The number of players who were issued licenses in different circles was kept small so as not to challenge the monopoly of the incumbent. Thus, while the incumbent was initially limited to the wireline segment, the private players were more concentrated in the wireless segment (even though they had licenses to provide wireline services, the business was not perceived to be profitable). This has continued in the present scenario, albeit in a different form. Even though the licensing conditions have changed, the private telecommunication companies have to incur huge investments over the years in garnering licenses and radio spectrum in different circles. Moreover, there is duplication in setting up of infrastructure. These investments are huge sunk costs

²³ ARPU is a measure used primarily by consumer communications and networking companies, defined as the total revenue divided by the number of subscribers.

²⁴ TRAI, Performance Indicator Reports, Various Issues.

²⁵ TRAI, Annual Report, 2013.

that are undertaken by the private players. They are often inclined to create excess capacity in providing network services (equipped capacity) in order to be competitive in this oligopolistic structure.

One important aspect of the Indian telecommunications industry has been the disparity between the rural and the urban areas. It is starker when we look at the penetration of internet and broadband services and availability of value added services compared to the urban areas. The recently announce National Telecom Policy 2012 looks to rectify such differences. The objectives of the NTP 2012 aim at creating a balance between the different segments of this sector. The main thrust of NTP 2012 is the focus on the multiplier effect that growth in the telecommunications sector will have on the Indian economy with due importance being given to the development and availability of telecommunication services at cheaper rates in the rural areas. With a saturation coming in most of the metros with respect to the growth of the telecommunication services, the semi-urban and rural areas have become the main focus of the private operators. However, it still remains to be seen how far NTP 2012 will help in the proper diffusion of telecommunication services throughout India.

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