180Degrees CONSULTING SRCC

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NATIONAL TELECOM POLICY 2012

A Research Initiative

TABLE OF CONTENTS

BACKGROUND

State of Telecom Pre-Independence, On The Eve of Independence & 1991

Since the inception of postal services in India to 5G and IoT (Internet Of Things), the telecom sector has been under continuous evolution and is still evolving. This involves a large number of policies, acts, and legislations around the sector. The foundation of the communication system in India was first laid down by the East India Company (EIC), which was later developed by the British Crown and eventually came under the control of the central government. All the following services were first introduced in the major cities like Calcutta (Kolkata), Bombay (Mumbai), Madras (Chennai), and Ahmedabad, and were later expanded throughout the country.

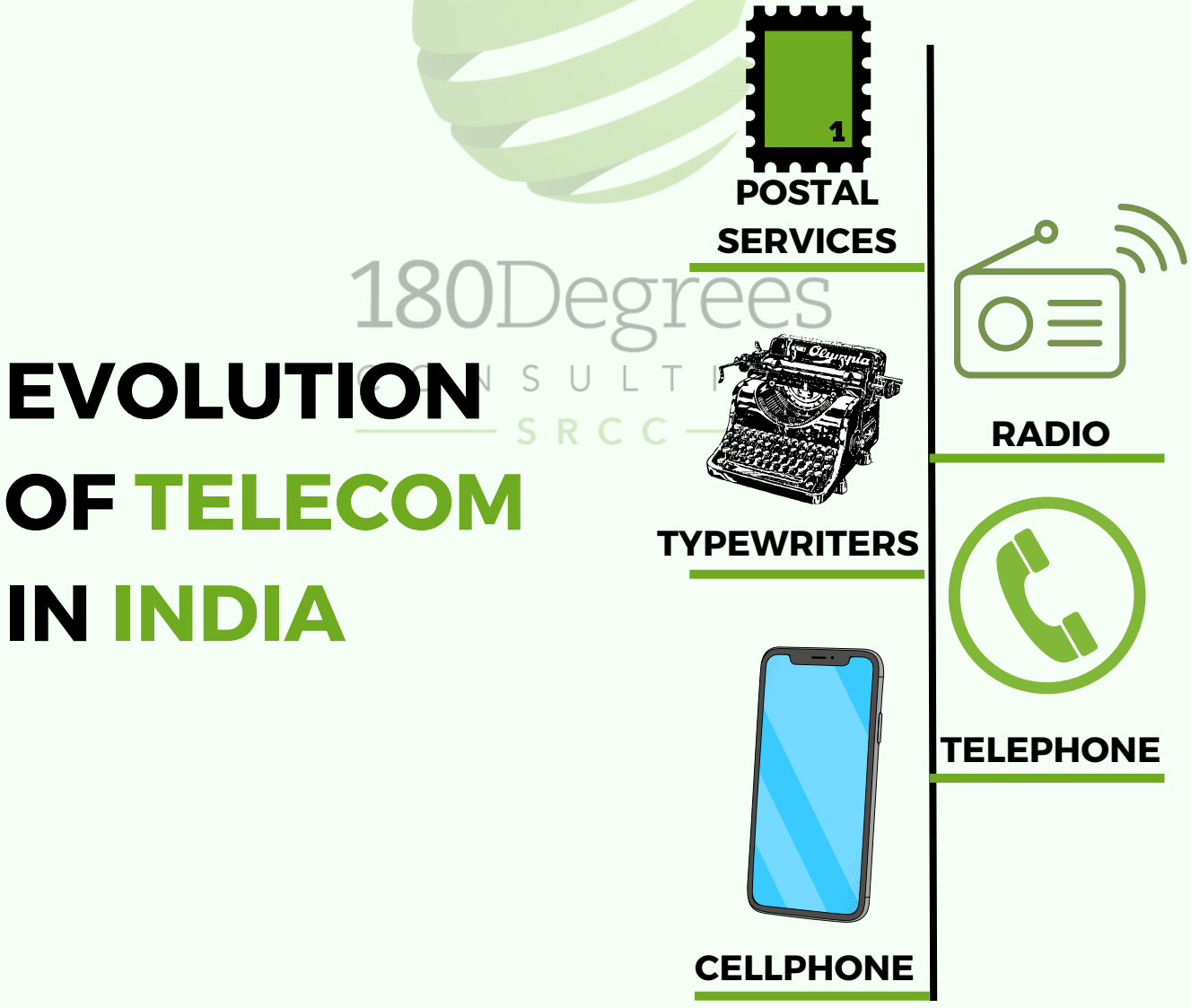
Till 1850, postal services were the only means of communication in the country. Way back in 1833, Research in the domain of telegraph started in India. But it was only in 1847 when Lord Dalhousie was appointed as the Governor-General of India, that the first electric telegraph line started between Calcutta and Diamond Harbor (southern suburbs of Kolkata). Until 1854, its use was restricted with EIC. With the implementation of the Electronic Telegraphs Act of 1854, it was made available for public use but EIC retained exclusive rights of establishing telegraph lines in India. The telegraph system also played a crucial role in suppressing the 1857 mutiny revolt by providing rapid means of communication to EIC for the mobilization of its troops. Post this the Electronic Telegraphs Act of 1854 was repealed and the Telegraph Act of 1860 was introduced to shift the power from British EIC to the British Crown.

In 1881, private players were finally granted license to open telephone exchanges. A significant development took place in 1902 when India radically shifted from cable telegraph to wireless telegraph, radio telephone and radio telegraph. During this period, all major cities were linked with telephones. The years 1923-24 witnessed the emergence of radio broadcasting. During this period, there was daily broadcasting of about 2-3 hours. Despite a wide audience, most of these faced liquidations due to insufficient funds within 3 years of establishment.

On the eve of independence, there were over 7000 telegraph offices and about 300 state-owned telephone services, across the country. Also, there were 6 All India Radio stations at Delhi, Bombay, Calcutta, Madras, Lucknow and Tiruchirapalli, with 18 transmitters, among which six were on the medium wave and rest on short wave. Hence, the British regime did not only help India in laying the infrastructural foundations of communications, but it also helped to develop a legal regime governing the same. This legal regime is still operational, with certain amendments aimed at adopting the dynamic nature of technology

Post Independence

In 1975, the Department of Telecom DoT was set up, which was responsible for telecom services in the entire country. This was followed by the opening up of private investment in the 1990s and the establishment of the Telecom Regulatory Authority of India in 1995, which further reduced government interference in decision-making.

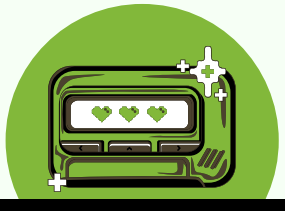


Growth of the Telecom Sector from 1991

The liberalization of India's telecommunications sector in the early 1990s was the result of economic reforms promulgated by the Indian government to align the economy with the global economy. Among all the developing countries, India has shown the 2nd highest growth rate (next to China) of 27% of telephone subscribers from 1991 to 2007 .During the reform period, Despite the lack of infrastructure in various industries, there was a remarkable advancement in the telecommunication sector. Various telecom services like e-mail, cellular mobile telephone and data services were privatized.The key factor responsible for the growth in telecom sector was wireless technology.

WIRELESS TECHNOLOGY

Wireless technology was introduced in India for telecom in the 1990s after the government initiated the liberalization and privatization of the telecom sector.



PAGER SERVICES

Pager services were introduced in India in the mid-1990s and were popularized as a status symbol, reflecting the potential of the Indian telecom market.

Wireless Technology

Due to the accessibility, and wide coverage of wireless technology, it has absorbed the entire increase in telephone subscribers. Consequently, it is now highly influencing the Indian telecom sector. This resulted in a Drastic fall in wireline services. The following are some of the wireless communication which was used widely

Pager Services

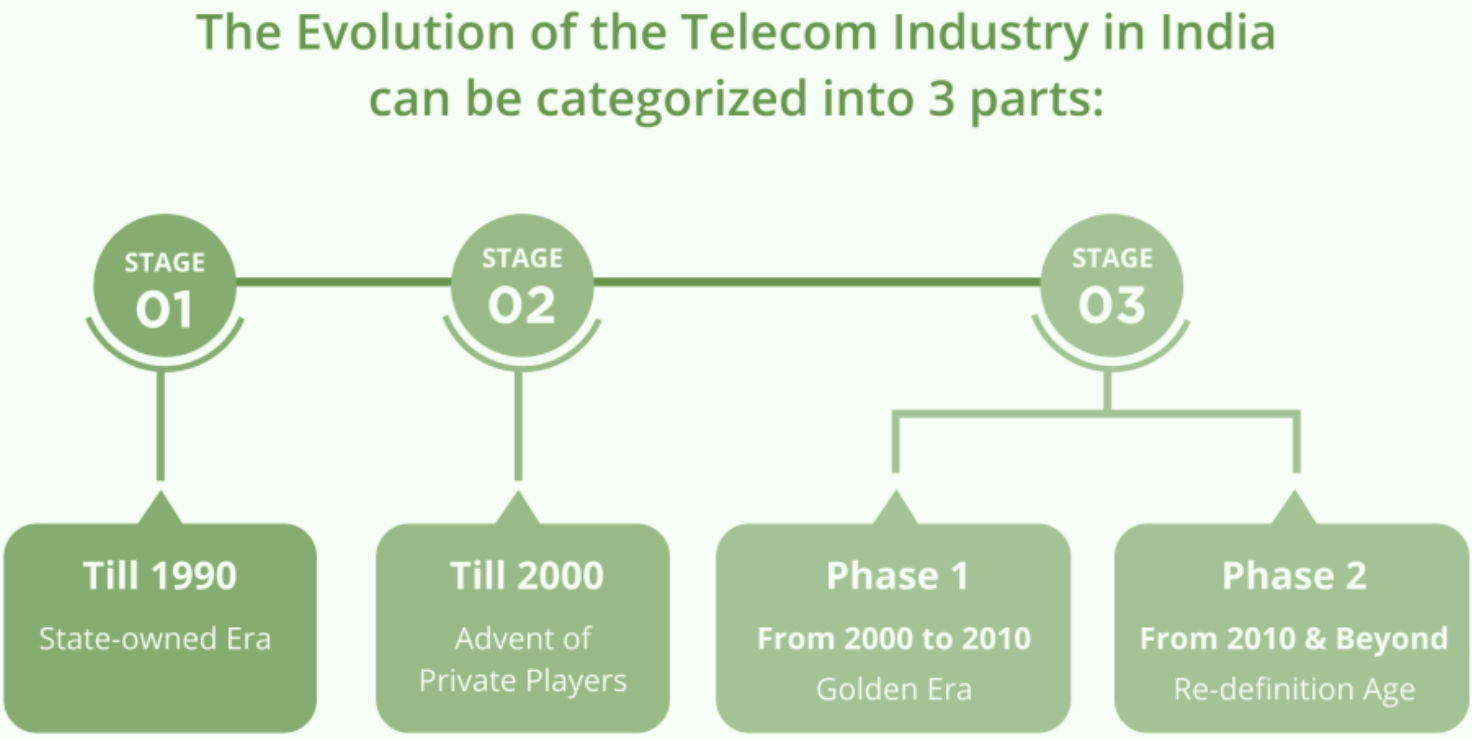
The launch of pager services was a revolution toward big change that came in 1995 after the economy opened up in 1991. It was a period between landlines and cellphones where business needed flexible transmission of information. More than 75% of the market share was with Motorola, and the remaining was with Mobilink, page link, BPL, Usha, Martin telecom, and easy call. The advent of mobile phones ruined the pager industry, which made Motorola stop its operations in pager services in 2002 and establish itself in the cell phone industry.

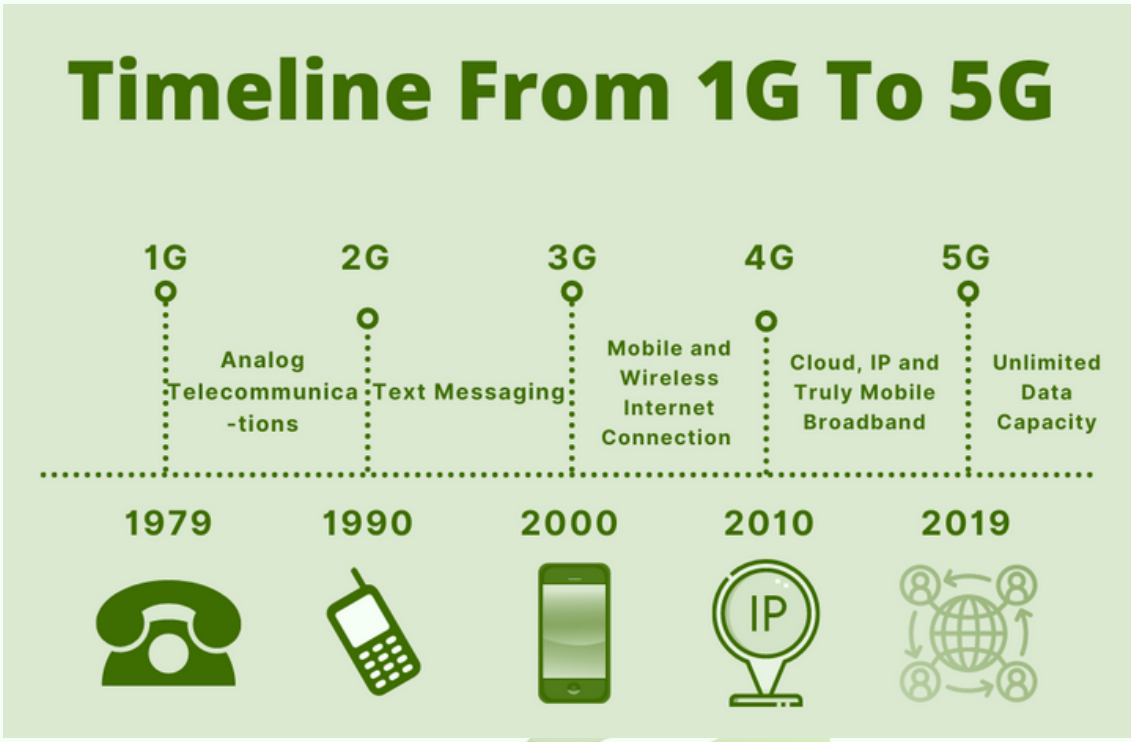
Broadband Communication

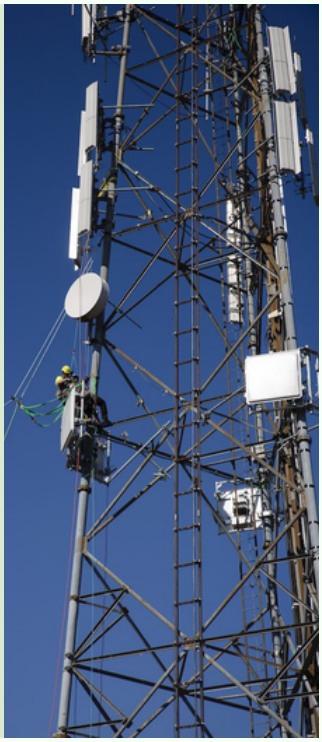
Accelerated growth in internet penetration and personal computers make the Department of telecommunication under the ministry of communication and information technology formulate the Broadband policy 2004. The implications of this policy made India stand as the third largest internet user next to us and Japan. Due to complicated tariff structure, metered billing, high charges, lack of domestic content, and non-implementation of local-loop unbundling, the development of broadband to high speed as compared to other countries was blocked.To comply with the International average speed, the government declared 2007 as “the year of broadband”.

Indian Satellites

Indian Space Research Organization (ISRO) established the Indian National Satellite System (INSAT) in 1983 having 9 operational communication satellites in orbit of our planet, making it the largest domestic communication satellites systems in the Asia-pacific region. This created a revolution in India’s telecommunication sector. Advancement in satellite Technology has given rise to a healthy satellite service sector that can provide service to various other services like broadcasting, and Internet Service Providers (ISP).







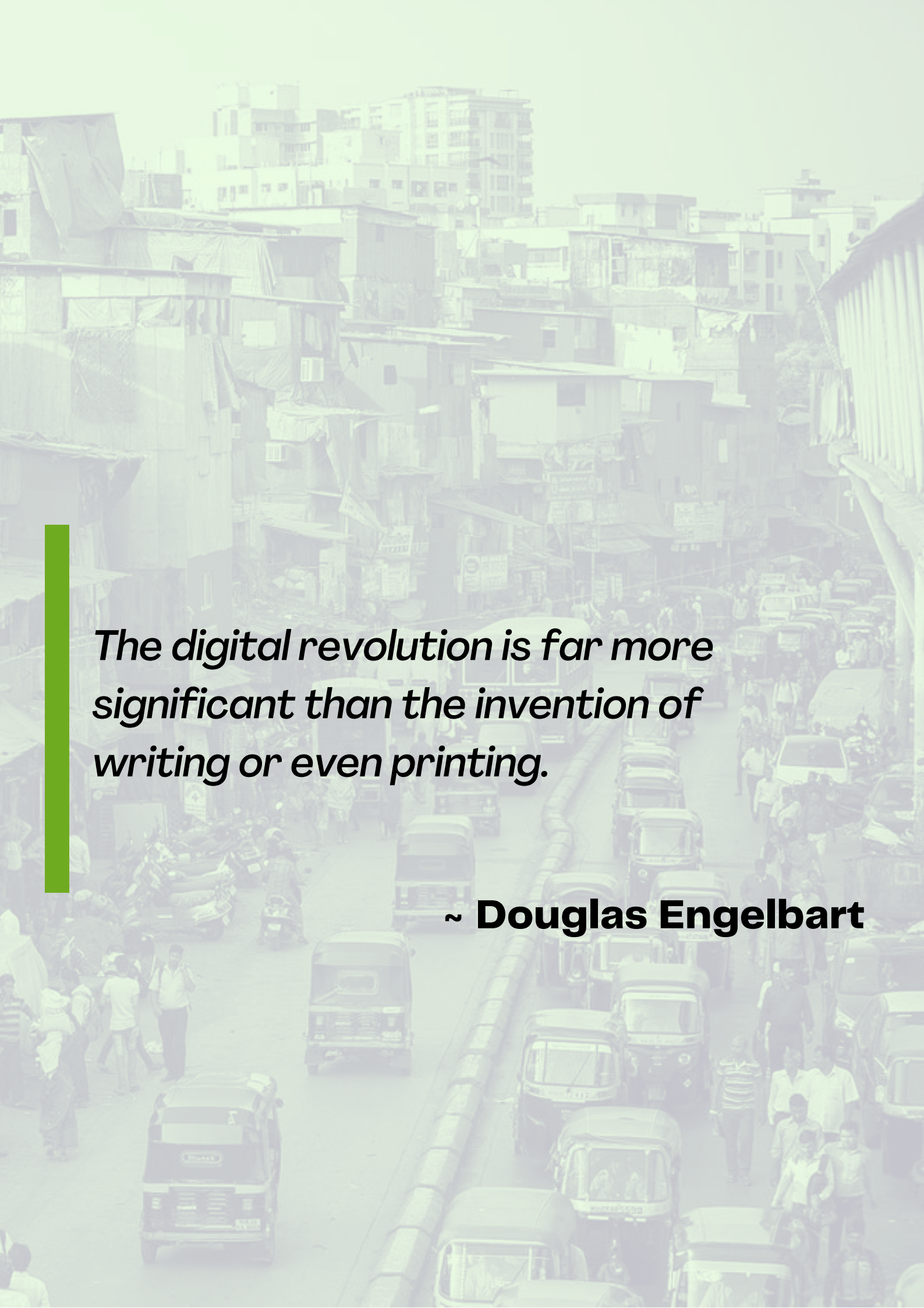
CURRENT TELECOM SECTOR IN INDIA

Due to the advancement in technology supported by affordable tariffs, wider availability, roll-out of mobile number portability (MNP), expanding 3G and 4G coverage ,evolving consumption patterns of subscribers and various government's initiatives made india's telecom industry to be the 2nd largest in the world and telecom sector to be 3th largest sector in india.

There was a tremendous increase in mobile tower,mobile base transceiver stations, and rural telecommunication density has also ,increased.Having highest consumers of data per day, India climbs across various ladders in different arenas like 2nd rank in 'Mobile broadband internet traffic within the country' ,'International internet bandwidth' and 3th in 'Annual investment in telecommunication services' ,'Domestic market size'.During the budget session of 2022, the budget highlighted spectrum auctions(5G services) ,PLI scheme and Bharat net.

Recently Government has successfully ended the auction for 5G spectrum for deployment of 5G services within the country..By 30th november 2022, 50 towns in various states/union territories are accessible with 5G services.During the period between 2023-2040,it is believed that the advent of 5G has the potential to tap $450 bn to the economy.

In order to promote telecom and networking products manufacturing in india, PLI (PRODUCTION LINKED INCENTIVE) scheme under Atmanirbhar bharat was introduced by Government in 2021.the scheme is expected to disappear disabilities like inadequate infrastructure, inadequacies in skill development , to increase manufacturing of mobile phone and establish India at the global level in electronic sector.



The digital revolution is far more significant than the invention of writing or even printing.

~ Douglas Engelbart

NATIONAL TELECOM POLICY 1994

Overview

We have seen the entire telecommunications landscape from its inception in India to the present day. Let's move on and look at the policies that have governed this environment over time.

During 1992, The number of telephone connections in India was lower than in other developing countries such as China, and Pakistan.In order to increase the size and development of the telecom sector in India and to provide it at an affordable price, the government formulated the National telecom policy in 1994.

The main aim was to ensure India is a manufacturing hub for various telecom equipment and provide excellent telecom services through foreign direct investment .It is expected that development of the telecom sector can protect the defense and security interests of India. The Government also expected to raise telecom services in India to international standards and to have telephone services to all villages and to have a minimum of five hundred public call offices in urban areas by 1997. Removal of consumer complaint and dispute resolution with public interface was also given focus.

Since the resources that were required for meeting the targets were well over government sources of revenue generation, private investment was encouraged.

Year	Indian population	Telephones in use	Teledensity (phones per 100 citizens)
1947	340,000,000	100,000	0.029
1964	464,000,000	580,000	0.125
1984	728,000,000	2,00,000	0.357
1991	842,000,000	5,100,000	0.606
2001	1,036,000,000	37,000,000	3.571
2011	1,240,000,000	900,500,000	72.581
2015	1,280,000,000	1,002,000,000	79.670

NTP 1994 OBJECTIVES

MANUFACTURING HUB

AFFORDABILITY

GLOBAL STANDARDS

WIDER ACCESS

Implementation

After realizing the importance of privatization ,the Government invited the private players initially to bid for various value added services such as pager services and Cellular Mobile Telephone Services.Companies that have great potential to provide standard services at affordable prices and good track record like security interests and adequate technology were granted licenses. As a result, licenses were awarded to various CMTS, BTS and paging operators in various metros, city circles and state circles.after, Government also commenced licencing for Internet Service Providers (ISP) and Global Mobile Personal Communications by Satellite,in fact it came up with a separate policy to govern Internet Service Providers(ISP).Also licenses for Very Small Aperture Terminal was issued to private sector in which nine of fourteen operators become serviceable.

Some of the targets like setting up minimum five hundred public call offices in urban areas was met by setting up five hundred twenty two public call offices.

Problems

However, some of the objectives of NTP 1994 have not been fulfilled, there have also been far reaching developments in the past in the telecom, IT, consumer electronics and media industries world-wide. Many cellular and basic operators found their revenues falling short of their projection.Also fixed license fees imposed under NTP 1994 was also a burden on companies. As a result, privatization was not completely sufficient for meeting the objectives of NTP 1994.

NTP 1994 followed different licenses for different industry structures like cellular, ISP, cable TV operators, etc. and had different terms and conditions for effective governance.However, Certain operators were providing services to other operators which were not reserved for them.This led to formulation of the New Telecom Policy 1999. There was a need to separate policy formation and service provision which later in 2000 resulted in formation of Bharat Sanchar Nigam Ltd. and to separate regulatory department and dispute settlement roles ,which later resulted in formation of Telecom Dispute Settlement Appellate Tribunal.

NATIONAL TELECOM POLICY 1999

Overview

In an attempt to overcome the problems faced post-implementation of National telecom policy 1994 as well as to facilitate India's vision of becoming an IT superpower and developing a world-class telecom infrastructure, National telecom policy 1999 was announced by the Atal Bihari Vajpayee government. The primary aim of the policy was to boost economic growth with greater connectivity, associated with the slogan 'Roti, kapda, makaan aur telephone'.

While the 1994 policy was a license fee model, NTP1999 suggested a revenue-sharing model, which brought down the per line (subscriber) costs & tariffs and enhanced the Minutes Of Usage (MOU) from 60 (1994) to 400 (2012) and Tele-density from 1 percent in 1994 to 82 percent by 2012 and contributed to the economy & GDP roughly by 2 percent for every 10 percent growth in tele-density. The policy provided for the separation between policy formulation and service provision, which resulted in the birth of Bharat Sanchar Nigam Ltd (BSNL) in 2000. Alongside, the 1999 NTP separated the Department of Telecommunications' (DoT) regulatory and dispute settlement roles too, with the formation of the Telecom Dispute Settlement Appellate Tribunal.

The specific targets to be achieved under the policy include achieving telecom coverage of all the villages in the country, providing Internet access to all district headquarters by the year 2000, providing reliable media to all exchanges, providing high-speed data and multimedia capability using technologies including ISDN to all towns with a population greater than 2 lac by the year 2002.

Availability, affordability and efficiency were at the core of the vision and goal of the policy. The key focus area was the uncovered areas, which weren't under service yet such as rural areas. This also included encouraging the development of telecommunication facilities in tribal, hilly and remote areas of the country. while at the same time striving to achieve the capability of servicing high quality services to meet the needs of the economy as a whole.

BSNL was formed in 2000 as a result of the restructuring of the Department of Telecommunications (DoT). BSNL is one of the largest telecom service providers in India with a large customer base.

The Telecom Dispute Settlement Appellate Tribunal (TDSAT) was established in 2000 It was established to provide a forum for the speedy resolution of telecom disputes and to promote competition in the telecom sector.

Implementation

The policy is focused on creating an environment that will attract investment and enable the creation of communication infrastructure. The major domains under the same include V-SAT-based Service Providers, Radio Paging Service Providers, Public Mobile Radio Trunking Service Providers, National Long Distance Operators, International Long Distance Operators and Other Service Providers.

From an economic viewpoint, NTP 1999 is considered a huge success that revolutionized teledensity and economic activity in the country

Despite the best intentions of the government, telephone services are yet to reach more than one-third of the villages. Most of the rest are covered with unreliable technology that does not work most of the time. Private sectors also haven't entered these areas yet.

INTRODUCTION

The telecommunications sector has today emerged to be one of the key propellers for economic prosperity. Not only economically but it also takes the centre stage in social development and security, putting greater focus on an increasingly knowledge-intensive global outlook. The National Telecom Policy, 2012 is designed to make sure that India keeps up in the global race and that there is inclusivity in the socio-economic development of the country. It does so by putting emphasis on affordability and accessibility of telecommunication services offered by various operators across the country.

The NTP-2012 endeavours to create an investor-friendly atmosphere in the Indian telecommunications sector. By pushing domestic manufacturing, increased focus on R&D, simplification of regulatory procedures and heightened consumer protection, the telecommunication sector is bound to see a radical change in its operations.

CAUSES

- **Telecom Provenance**
- **Spectrum Rules**
- **Low Teledensity**
- **Cost Cut**

Causes for Introduction of the National Telecom Policy 2012

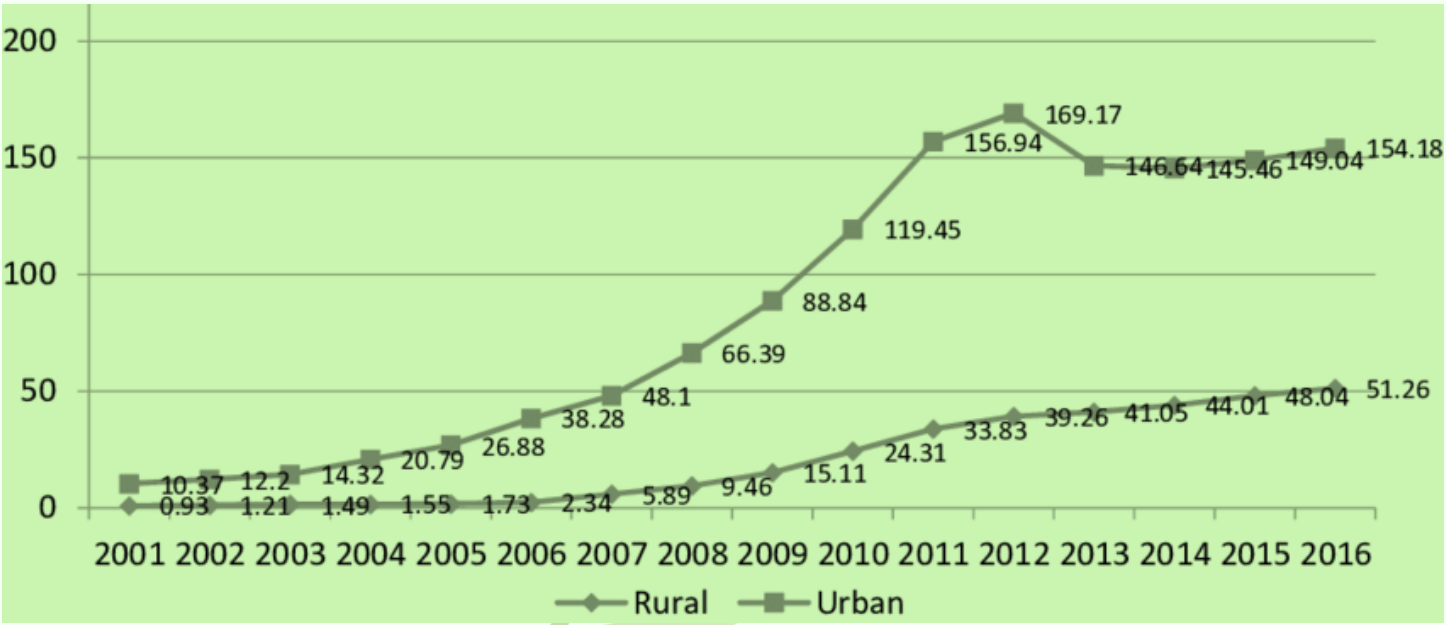
- **A Small proportion of telecom equipment used in India came from domestic producers -** For a long time, India has lagged behind in research and development and creation, promotion and protection of intellectual property rights. These two aspects of any equipment contribute to 80% of its cost. Until 1984, the telecom industry was completely operated by the government. For a long time, India has lagged behind in research and development, and creation, promotion and protection of intellectual property rights. These two aspects of any equipment contribute to 80% of its cost. Until 1984, the telecom industry was completely operated by the government. However, the government wanted to boost the domestic production of such equipment which had security implications or could be of its own use.

Keeping in line with the government objectives, in 1984, the telecom-equipment manufacturing sector was opened up to private players. Given the prevailing import-centric status of India with regards to telecom-equipment procurement (telecom equipment including mobile phones, parts and telecom cables, worth Rs. 543146 million was imported into India in the year 2011-12), policy-makers wanted to make this industry export-oriented.

- **Regulations in the allocation and use of spectrums -** Prior to the implementation of the policy, there were restrictions on the use of spectrums by telecom operators. Spectrums belonging to a particular band could only be used for a specified purpose. Moreover, the earlier policies aimed at regulating the price of spectrums instead of letting the market forces determine it. There were limitations on the freedom to lease or share the spectrum or trade the rights granted by the licence.

- **Extensive licensing procedure for spectrums -** Before 2012, there were two types of licences - Unified Service License and Unified Access Service License. The pre-existing licensing framework restricted operators' freedom to use the spectrum at their discretion. For example, if an operator had possessed a licence for 2G services, it would have been allotted a spectrum in the 900 Mhz or 1800 MHz bands. The existing modus operandi thus established a linkage between the licences and the spectrums belonging to the operators.

- **Low rural teledensity and penetration rates -** Teledensity refers to the number of telephone connections for every hundred individuals living in an area. India had over 700 million active mobile phone connections as of October 2012, catapulting the telecom penetration rate from less than 3% in 1999 to over 70% as of October 2012 and was fast closing in on developed world standards, though still far behind. Although some rural areas show impressive growth in teledensity, a wide disparity across regions was observed. Assam and Bihar were the worst performing states in terms of total teledensity - 45.85 and 47.16 respectively. As of March 2011, according to a study conducted by TRAI, a very small percentage of the Village Panchayats located in the North-Eastern Regions or other hilly terrains like Jammu & Kashmir and Himachal Pradesh had access to broadband.



- **Reducing cost for consumers -** Before the introduction of the National Telecom Policy 2012, customers would be required to pay roaming charges. Roaming charges are the additional cost that the consumers were required to pay for use of internet or mobile services when they travel outside their home network. Roaming charges generated around Rs. 14,000 crores in revenue for telecom operators. Before 2012, the country was divided into 22 zones and the telecom companies held 22 permits, one for each zone. Moreover, different licences were required for providing different services like mobile, telephone services, Internet and 3G services. This added to the cost of the telecom operators which was eventually pushed to the consumers. Additionally, there were also costs involved on the part of the consumer to port from one operator to another.

An efficient telecommunications network is the foundation upon which an information society is built.

~ Talal Abu-Ghazaleh

Amendments To The National Telecom Policy 1994

Amendments made in 2012 with respect to older policies were:

Technology

- Broadband (even in rural areas)- Providing high-speed and high-quality broadband access to all village panchayats using a combination of technologies along with progressively expanding optical fibre network to all villages and habitations was thought of in the 2012 policy.
- PCOs- NTP 2012 did not set any goals for PCOs or landline services, as opposed to older policies that either increased their availability or converted them into multimedia-equipped Public Teleinfo Centers.
- Expanding the Horizons of existing devices- The policy aimed at repositioning the mobile phone from a mere communication device to an instrument of empowerment that combines communication with proof of identity, fully secure financial and other transaction capabilities, multi-lingual services and a whole range of other capabilities that ride on them and transcend the literacy barrier.
- Teledensity- As part of the 2012 policy, the goal of reaching complete rural teledensity by 2020 was added to the 1994 goal of only having access to telecom. Conversely, the old policies had to strike a balance between providing high-level services and providing services and infrastructure to remote areas. We had come a long way by 2012 in the sense that, just two decades before, we had to balance the provision of high-quality services to urban areas with providing access to remote areas. When the policy was made i.e. in 2012, rural teledensity didn't seem like an unachievable goal.

Legal & Environment

- Consumer Protection- Promoting informed consent, transparency, and accountability regarding the quality of service, tariffs, and usage in order to protect consumer interests. As opposed to older policies, where only better customer services through efficient complaint-redressing systems and dispute-resolution mechanisms were mentioned, NTP 2012 envisioned better customer services.
- Environmental Impact- Unlike previous policies, enhanced and further adoption of green policies in telecom was envisioned, as well as using renewable energy sources to encourage sustainability.

- Amendments Intellectual Property- The policy set the objectives to develop and establish standards which were to meet national requirements, specifically for Intellectual Property Rights (IPRs).

Economy & Government

- E-governance- In contrast to NTP 1994, where such possibilities were not even considered, the 2012 NTP placed special emphasis on areas like banking, governance, and skill development.
- Security and Defence- No special emphasis was laid on national security, unlike previous policies.
- Institutions and Human Capital- Strengthening the institutional framework while also enhancing the pace of human capital formation and capacity building by assessing and addressing the educational and training needs of the sector was also not considered earlier, but given ample importance in the amended policy.
- Spectrum Management- In this regard, the most recent policy advanced by focusing on adequate spectrum availability as well as regular audits, as opposed to earlier policies, which were solely concerned with achieving efficiency and transparency in spectrum management.
- Administrative Changes- Amendments such as Recognizing telecom as the Infrastructure Sector to realise the true potential of ICT for development and Addressing the Right of Way (RoW) issues in setting up telecom infrastructure were introduced.
- Creating and adhering to standards- Developing and establishing standards to meet national requirements, generate IPRs, and participate in international standardisation bodies to contribute to the formulation of global standards, thereby making India a leading nation in the area of international communications, which was a part of the 2012 policy. The earlier policies did not consider this dimension of globalisation and only aimed at making Indian telecom players and the market globally competitive. Another step towards this standardisation was the aim to achieve One Nation - Full Mobile Number Portability, and work towards One Nation - Free Roaming.

SCOPE

VISION

a. "To provide secure, reliable, affordable and high quality converged telecommunication services anytime, anywhere for an accelerated inclusive socio-economic development."

b. The Government by way of the National Telecom Policy envisages mitigating the existing urban-rural digital divide by increasing the telecom infrastructure and laying a special emphasis on providing affordable and quality telecommunications in rural and remote areas. The policy's vision sheds light on the idea of convergence of technologies which was never before spoken about in the earlier policies. Convergence can be viewed both from the perspective of Licensing and integration of Communication Technologies. Convergence of licensing implies a unified and refined licensing framework for corporates engaged in Broadcasting, IT Services and Telecom thus overcoming the hurdles of segregation in registration and regulatory mechanism.

WHAT DID THE NTP 2012 ENVISION?

- **Secure, affordable, quality telecom for socio-economic development.**

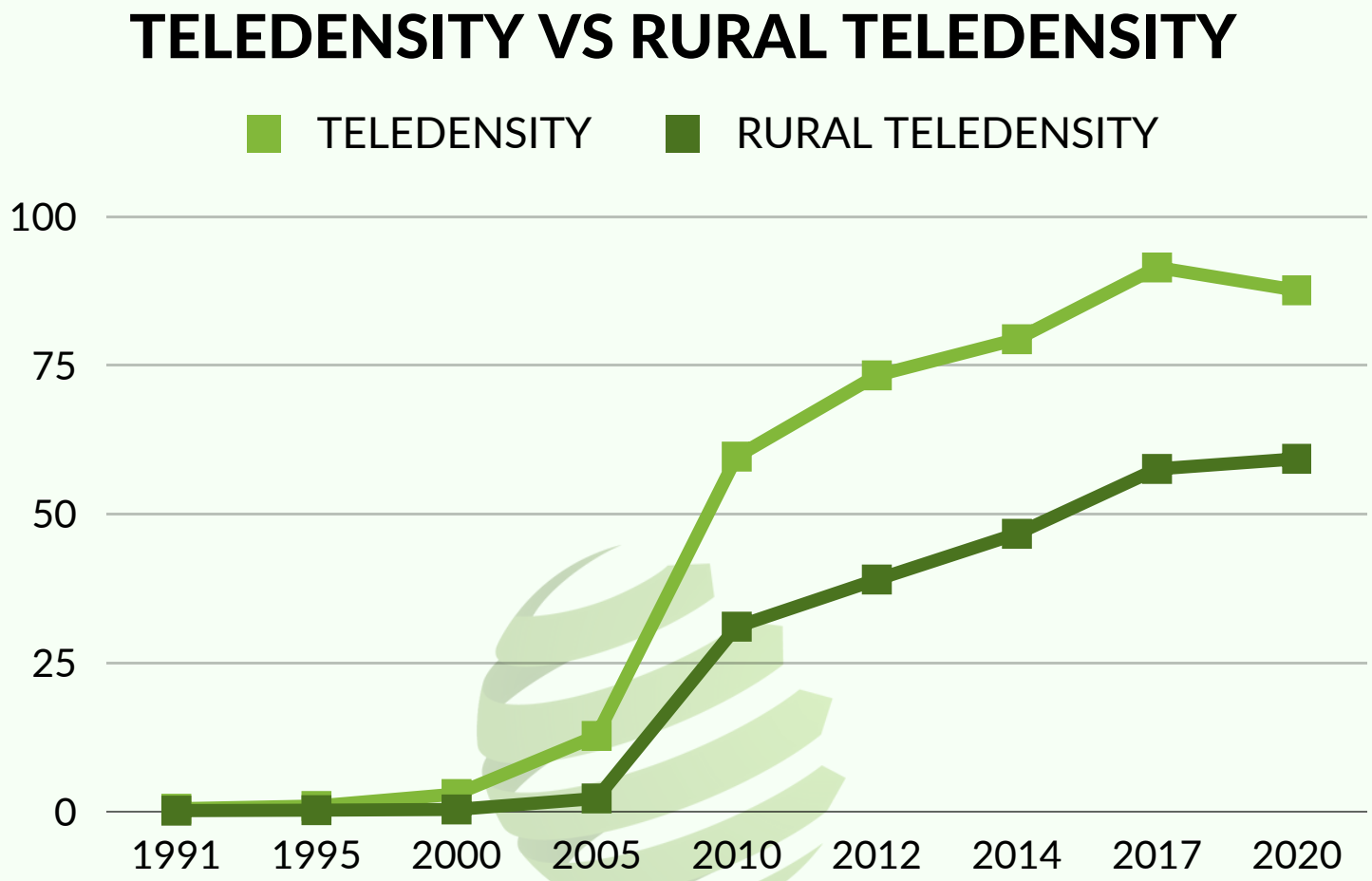
- **Mitigate urban-rural digital divide with increased telecom infrastructure.**

- **Emphasize convergence of technologies for unified licensing framework.**

MISSION

a. Repositioning mobile phones as a "Tool of empowerment" and creation of a knowledge-based society. The Government envisioned mobile phones not merely as a device to communicate but as an instrument of empowerment that gives a thrust to socio economic development. It required a paradigm shift on the views, perceptions and opinions about mobile phones.To achieve this the Government planned to engineer platforms that enable participation of the citizens via E-governance and M-governance in key social sectors like education, health, agriculture, skill development thus instilling a sense of participative democracy. It was a drastic change from the previous policy as mobile phones were now being envisioned as devices that can facilitate secure financial transactions and as devices that can be used to authenticate identity.
b. Transforming India into a global hub for telecom equipment manufacturing and a centre for converged communication services. Converged Communication refers to the delivery of voice, video and data in a consolidated format through the digital channel. The concept of converged communication arises after a shift from analog to digital, requiring a confluence between various services, networks, platforms, technologies and overcoming the existing segregation of licensing, registration and regulatory mechanisms in these areas to enhance affordability, increase access, delivery of multiple services and to reduce cost. Furthermore, the idea of self sufficiency incorporated the need for scaling up telecom equipment manufacturing. The policy aimed in attracting foreign and domestic investments towards establishment of telecom infrastructure, Innovation and research, Equipment manufacturing units. A robust manufacturing sector implied massive employment generation for the country's masses.
c. Developing state of the art telecom infrastructure specifically in rural and remote areas to mitigate social divide and accelerate socio-economic development.

Telecommunications was struggling to grow in rural areas as it accounted for only 34% of the total connections at that time and it was felt that enhanced broadband connections and better telecom infrastructure would help rural people in tapping the untapped potential of E-Commerce and the Web Economy. For this reason the policy attempts to recognise telecom as a basic necessity like education and health.



OBJECTIVES

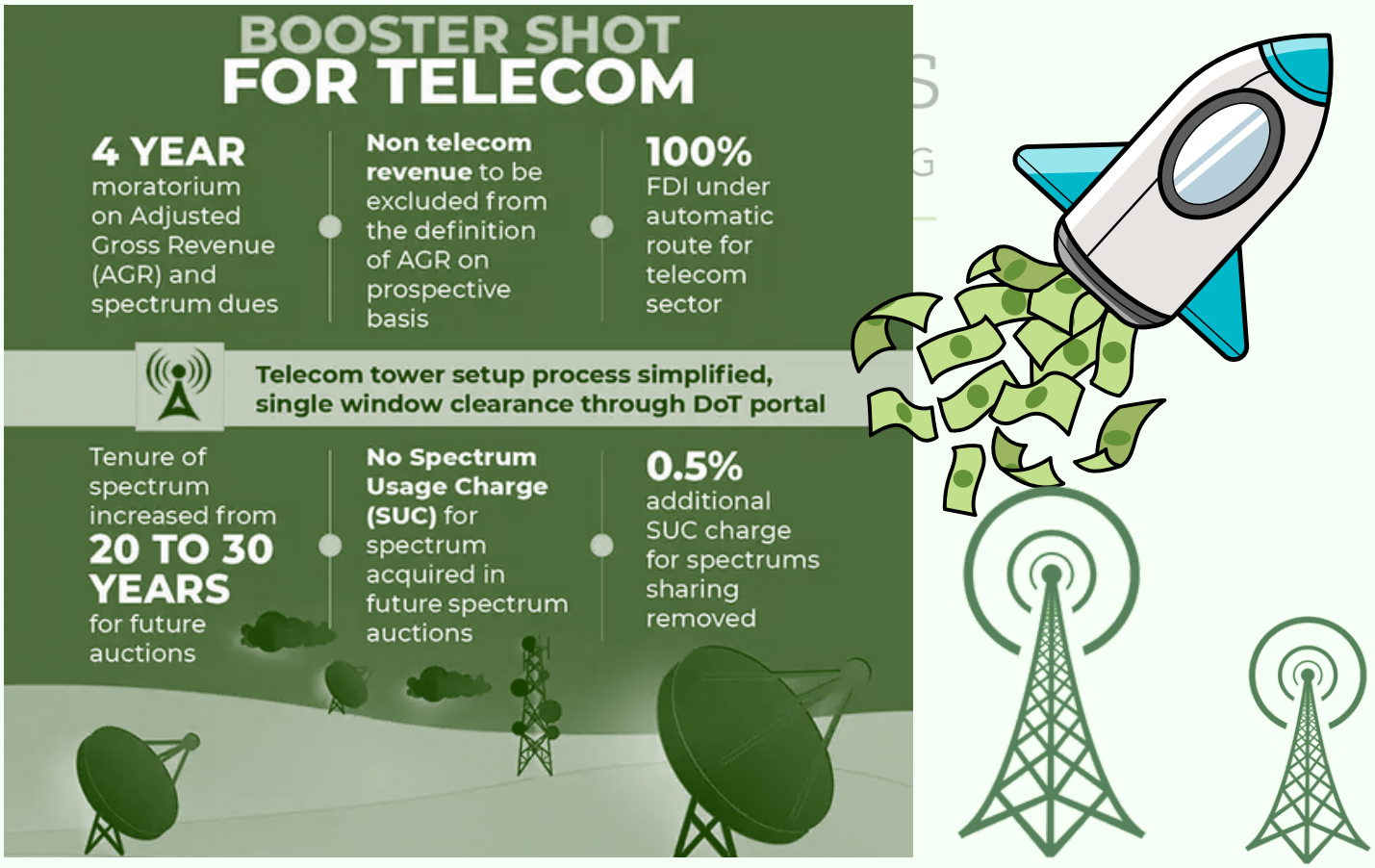
- **Increasing rural teledensity-** Teledensity is the number of telephone connections per 100 individuals in a specific area. Telephones in this context mean both Wired(Landline) and Wireless(Mobile) voice and data connections. In present times voice communication has become a basic necessity and an essential part of daily life. The rural teledensity was abysmally low at just 39% in 2012 which the government aimed to improve to 70% by the year 2017.

- **The Govt aimed to provide all village panchayats with high-quality broadband access by 2014 and to all villages and habitations by 2022-** The Government aimed to deliver broadband services by a combination of optical fibre, wireless and VSAT (Very Small Aperture Terminal) technologies. USOF or the Universal Service Obligation Fund would be used for this purpose to lay optical fibres at the panchayat level. USOF or the Universal Service Obligation Fund is a fund that is created by levying a charge from all telecom operators on their adjusted gross revenue(AGR). The fund is basically meant for the purpose of providing quality and affordable communication, digital and mobile services in rural and remote areas.

- Promoting innovation, indigenous R&D and manufacturing in domestic telecom equipment manufacturing. The strategies employed to achieve the same were as follows:-
  - Mandating testing and certification of all telecom products
  - Creating suitable testing infrastructure for carrying out testing, certification and to aid in development of new products and services.
  - Providing appropriate incentives to the Indian product manufacturers

- **Simplify the licensing framework-** The Government intended to create a licensing framework that would enable it to achieve its ambition of delivering converged communication services. The move was initiated in alignment with the broader goals of establishing a unified licensing regime.

- **Achieve One Nation: Full Mobile Number Portability**- Mobile Number Portability is a facility which enables a user to retain their mobile number when he moves from one operator irrespective of their geographical location if they are not satisfied with the services of their operator. This was a major relief because a mobile number also played some other crucial roles as they were used for delivering OTP messages regarding internet banking, e-commerce etc and a lot of users were hesitant to switch to other operators prior to the implementation of Mobile Number Portability.



STRATEGIES & IMPLEMENTATION

The following are some of the strategies which the policy-makers envisioned to cover under the ambit of the National Telecom Policy 2012:

BROADBAND, RURAL TELEPHONY AND UNIVERSAL SERVICE OBLIGATION FUND (USOF):

NTP 2012 had the vision Broadband on Demand and envisaged leveraging telecom infrastructure to enable all citizens and businesses, both in rural and urban areas, to participate in the online economy thus playing a part towards equitable and inclusive development across the nation.

The steps taken in this area will expand the footprint of these services and thus foster an atmosphere of participative democracy delivery model that is truly citizen-centric.

The objectives which the strategy aimed to attain were:

- The Government will develop an ecosystem for broadband and recognise telecom as a basic necessity while working towards the goal of universalising broadband. Also, laying special emphasis on providing reliable and affordable broadband access to rural and remote areas.
- Expansion of Fiber cables throughout the urban markets for telecom in the country.
- Incorporating enabling provisions in the current regulatory framework so that existing infrastructure is optimally utilised for extending high-quality broadband services in rural areas also. Also, establishing an appropriate institutional framework to coordinate with different government departments/agencies for laying and upkeep of telecom cables for rapid expansion of broadband in the country.

In 2020, the Supreme Court declared access to the internet a fundamental right. A

government cannot deprive the citizens of fundamental rights except under certain conditions explicitly mentioned in the Constitution. In India, Kerala had become the first state in 2017 to declare access to Internet 'a basic human right'.

This not only signifies the direction the government wants to go in but also how far we have come with respect to telecommunications technology in the sense that it was hard to imagine access to some form of technology being declared a right. The expansion of fiber cables in India has been implemented to a large extent and today, India is set to become one of the largest fibre broadband markets in the world by the end of 2020s. This shows the progress we have achieved till now thanks to the telecom policies. Moreover, the licence norms have been amended to allow infrastructure sharing among telecom operators along with enabling the use of satellite connectivity to provide backend connectivity for mobile networks.

The Universal Service Obligation Fund aims to provide for quality and affordable mobile and digital services across the rural and remote areas of the country; allowing non-discriminatory access to mobile and network services along with equitable access to knowledge and information dissemination, leading to rapid socio-economic development with improved standard of living.

All India	Urban	Rural
100% Mobile Phones	100% Mobile Phones	100% Mobile Phones
17% PC	22% PC	13% PC
6% Others	7% Others	5% Others
* Tablet, Streaming Device, Smart Speaker, Smart TV etc.	* Tablet, Streaming Device, Smart Speaker, Smart TV etc.	* Tablet, Streaming Device, Smart Speaker, Smart TV etc.

R&D, MANUFACTURING AND STANDARDISATION OF TELECOM EQUIPMENT:

NTP-2012 aims to provide a roadmap for India to become a leader in state of the art technologies through R&D and creation and incorporation of Indian IPRs in global standards.

This is why the policy incorporates measures for boosting entrepreneurship and creating a major global manufacturing hub for telecommunication equipment to achieve self-sufficiency while squarely addressing security and strategic concerns. At the same time establishing processes and standards for protection of the environment.

The objectives which the strategy aimed to attain were:

- Creation of a council consisting of experts from Telecom Service Providers, the Telecom Manufacturing Industry, Government, Academia and R&D institutions. The Council would carry out functions like forecasting product development, monitoring and implementing indigenous research, Intellectual Property, among others.
- Creating a fund to promote indigenous R&D, Intellectual Property creation, entrepreneurship, manufacturing, commercialising and deployment of state-of-the- art telecom products and services.
- Promoting the setting up of the Telecommunications Standard Development Organisation (TSDO) as an autonomous body with the effective participation of the government, industry, R&D centres, service providers, and academia to drive consensus regarding standards to meet national requirements including security needs.

The policy called for greater push for R&D and manufacturing of telecom equipment to bolster the domestic industry for both private and government use.

Universal Service Obligation Fund (USOF), a body under the Department of Telecommunications, officially launched Telecom Technology Development Fund (TTDF) Scheme on 1st October, 2022. The fund aims to fund R&D in rural-specific communication technology applications and form synergies among academia, start-ups, research institutes, and the industry to build and develop the telecom ecosystem. Along with this, promoting technology ownership and indigenous manufacturing, create a culture of technology co-innovation, reduce imports, boost export opportunities and creation of Intellectual Property is one of TTDF's main goals.

The Telecommunications Standards Development Society of India was set up and is recognised by DoT (Department of Telecommunications) as National Telecom Standards Development Organisation (SDO). Its main goals include reflecting India specific requirements in various global standards forums so as to ensure addressing of these requirements in global standards, such as the 5G technologies. TSDSI (Telecommunications Standards Development Society of India) governing council consists of 21 elected, 8 Government nominated members and 1 Special Invitee from DoT. It is the apex decision making body of TSDSI.

The Government has also started providing incentive for domestic telecom equipments manufacturing such as PLI(production-linked incentive scheme). For instance, the production-linked incentive (PLI) scheme for telecom & networking products was announced with an outlay of Rs. 12,195 crore (US$ 1.65 billion) for a period of five years until FY26.

LICENSING, CONVERGENCE AND VALUE ADDED SERVICES:

One of the main targets of the telecom policy was to implement a unified licensing regime. Under this system, a telecom operator who has received such a licence will be able to provide any service it desires. This move of the government aimed to liberalise the sector and allow more freedom to private players. The objective of the government was to facilitate the optimal and efficient use of spectrums which will lead to optimisation of investments in the most productive

avenues. The policy addressed and enabled the coordinated action to respond to the dynamic needs resulting from confluence of telecom, broadcasting and IT sectors, particularly when it comes to removing the legal barriers which once hindered the growth of this budding, yet crucial sector.

The objectives which the strategy aimed to attain were:

- Moving towards a Unified Licence regime and facilitating delinking of the licensing of Networks from the delivery of Services to the end users and efficiently utilising their networks and spectrum by sharing active and passive infrastructure. Also, Spectrum shall be made available at a price determined through market-related processes.
- Putting in place a liberalised merger and acquisition policy with necessary thresholds, while ensuring adequate competition. Also, facilitating resale at the service level under the proposed licensing regime – both wholesale and retail.
- Focussing on standardising and simplifying telecom throughout the nation for customers by extending the Intra-circle mobile number portability facility on a nationwide basis so that the users can retain their mobile number while shifting from one service area to another, irrespective of the service provider. Also, reviewing roaming charges with the ultimate objective of removing the roaming charge across the nation.

Over the years, there has been an increasing trend of convergence in Telecom, Media and Technology (TMT) sectors as companies have realised the benefits of providing auxiliary services. In the direction, TRAI (Telecom Regulatory Authority Of India) has issued regulation on domestic carriage charges. By virtue of the reforms made in the telecom sector in recent years and partly due to increased competition, almost all of the telecom operators have removed roaming charges for outgoing and incoming calls as well as SMS and data usage within India. On top of that, there is a major difference for the consumer on ground as India is now known throughout the world for being home to one of the lowest priced data plans in the world.

The telecom industry reaches into every corner of our economies, societies, and private lives, and it is one of the greatest drivers of economic growth and human equality the world has ever seen.

~ Borje Ekholm

SPECTRUM MANAGEMENT

Spectrum Management refers to the process of regulating the use of the electromagnetic spectrum, which is the range of frequencies of electromagnetic radiation that can be used for communication and other purposes. This includes assigning specific frequencies or frequency bands for different uses, such as television broadcasting, mobile phone service, and satellite communication. It also involves coordinating the use of the spectrum to avoid interference between different users and ensuring that the spectrum is used efficiently. The goal of spectrum management is to maximise the benefits of the electromagnetic spectrum for society while minimising the negative impacts, such as interference with other users.

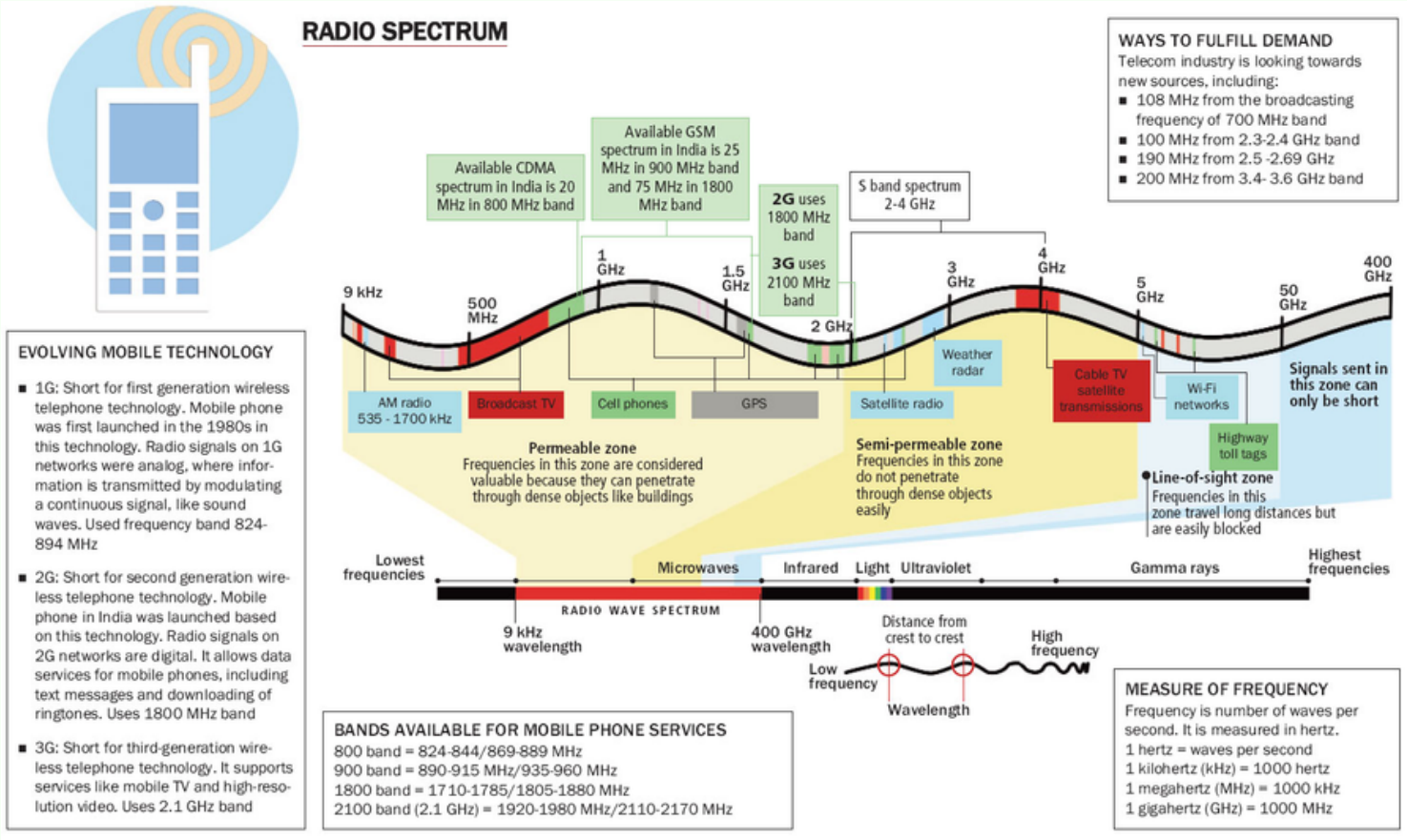
Spectrum management defines allocations and technical specifications for broadcast services and ensures that service and technology formats work in a given country. So you can set the pace for the deployment of such technologies. As new technologies enable a number of applications to use a wider range of frequency bands, the demand for access to multiple segments of the spectrum is increasing.

The objectives which this strategy aimed to attain were:

- The main objective is to establish and strengthen the Institute of Advanced Radio Spectrum Engineering and Management Studies (IARSEMS) as a Government Society for undertaking policy research in radio spectrum engineering, management/radio monitoring and related aspectsIt also aims to Pool, share, and later trade spectrum to allow spectrum to be used on any band to provide any service on any technology, and to optimise spectrum use through appropriate regulatory frameworks. To do this, move toward spectrum liberalisation as soon as possible is required.

- The target is to encourage use of white space in low-power devices without harmful interference to licensed applications in specific frequency bands using Software Defined Radio (SDR), Cognitive Radio (CR), etc.

The Telecom Regulatory Authority of India (TRAI) provisionally liberalises spectrum at the government's proposed auction price and promises companies to adjust the rest of the price when the actual auction takes place. Spectrum liberalisation will allow operators to use any technology to provide mobile services such as 3G and 4G, as well as spectrum sharing and trading. This development will see Reliance Communications (RCom), led by Anil Ambani, liberalise bandwidth that was not available at market rates at Rs 13 billion in four states such as Kerala, Karnataka, Rajasthan and Tamil Nadu.



A visualisation showing the various frequency bands and spectrums available to telecom operators in India.

TELECOM INFRASTRUCTURE/ ROW ISSUES, GREEN TELECOM, CLEAR SKYLINE, MITIGATION EFFORTS DURING DISASTERS AND EMERGENCIES

The objectives which this strategy aimed to attain were:

- Recognition of telecom as an Infrastructure Sector for both wireline and wireless and extension of the benefits available to infrastructure sectors to telecom sector also, to realise the true potential of ICT for development.
- Working towards making infrastructure for telecom more efficient, reviewing and simplifying sectoral policy for Right of Way for laying cable networks and installation of towers, etc. for facilitating smooth coordination between the service providers and the State Governments/ local bodies. Review Standing Advisory Committee on Frequency Allocation (SACFA) clearance process for faster and simplified site clearances.
- Facilitating increased use of alternative sources (Renewable Energy Technologies) of energy for powering telecom networks through active participation of all the stakeholders. Also promoting the use of energy-efficient equipment including low-power wireless devices in telecom networks and adopt measures for the reduction of carbon footprint in the telecom sector.
- To undertake periodic reviews of EMF(Electro-magnetic field) radiation standards for mobile towers and mobile devices with reference to international safety standards.
- Facilitating an institutional framework to establish a nationwide Unified Emergency Response Mechanism by providing nationwide single access numbers for emergency services.

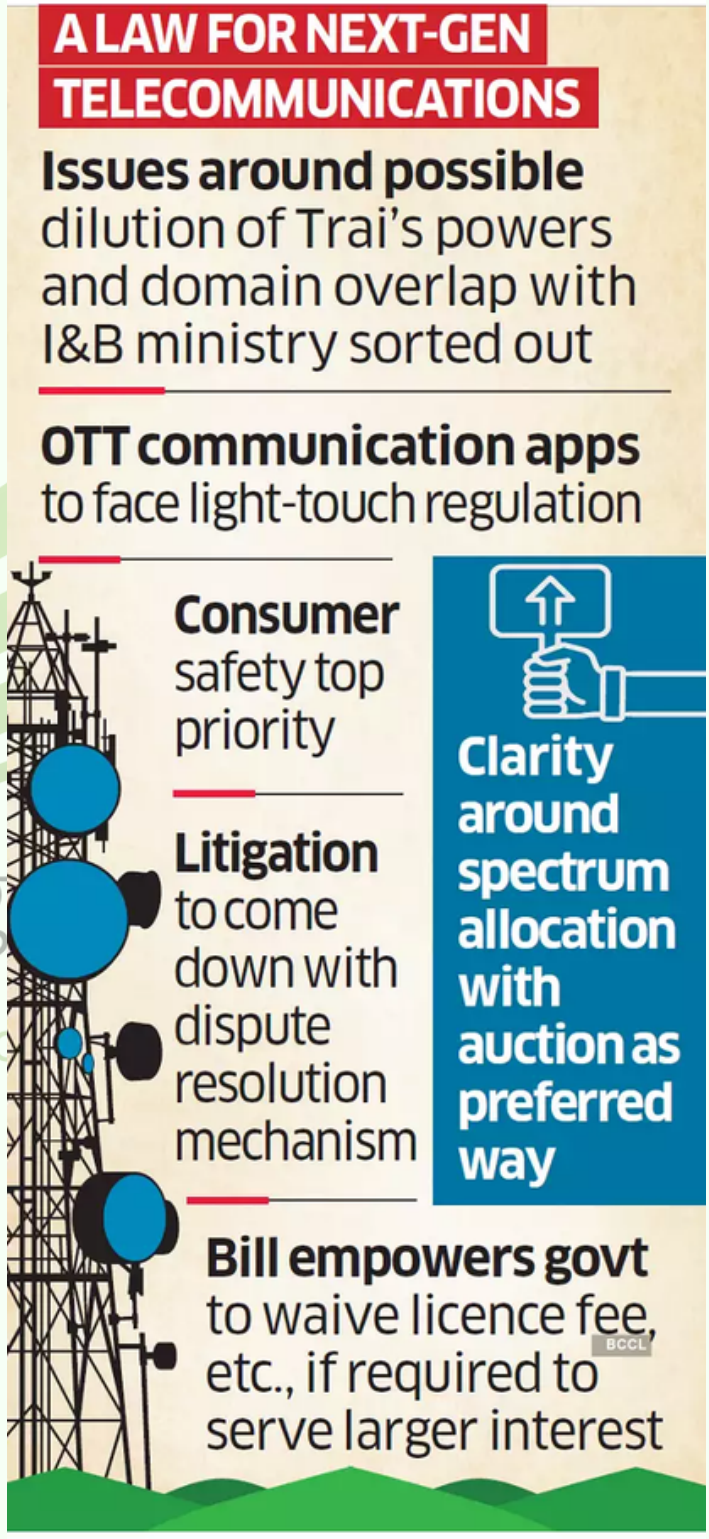
With a view to make processes easier, the Government has launched Gati Shakti Sanchar Portal to Streamline the process of Right of Way (ROW) Applications and permissions Across the Country. The portal acts as an enabler for “Ease of doing business” for telecommunications infrastructure works. Moreover, now many processes like clearance for installing towers shall be through self-declaration/automated time bound approvals on Saral Sanchar Portal of DoT in order to make bureaucratic processes more efficient for the telecom sector.

QUALITY OF SERVICES AND PROTECTION OF CONSUMER INTEREST

It is a measure of the effectiveness of a network in providing a good service to its users. QoS is important in a variety of contexts, including voice and video communication, online gaming, and other real-time applications that require a certain level of performance in order to function properly.

There are a number of factors that can affect QoS, including the type and amount of traffic on the network, the available bandwidth, the distance between the sender and receiver, and the amount of interference on the network. To improve QoS, network administrators may use a variety of techniques, such as prioritizing certain types of traffic, using Quality of Service (QoS) markings, or using traffic shaping to manage the flow of traffic on the network.

This strategy aims to establish authority with legislative power to disagreements between consumers and service providers.It aims to institute the National Mobile Property Registry, in order to reduce thefts and address security issues-establishing rules and regulations



relating to sales and marketing communication.it also targets to support and give powers to the Telecom Regulatory Authority of India relating to performance standards and improvement in consumer awareness.

Civil society organisations which are voluntary non-governmental organisations that operate primarily on a non-profit basis were established.In general, a CSO's primary focus is service delivery, specifically access, quality, and accountability. They play an integral role in the triple crown functioning of the democratic system of government and are active stakeholders in social, economic and cultural activities.it helps in the assessment of regulations pertaining to QoS.it results in Auditing, publication of QoS reports, and bringing out light the challenges in QoS.

SECURITY

Security refers to the measures taken to protect the confidentiality, integrity, and availability of information transmitted over a communication channel. This can include measures such as encryption, authentication, and access controls to prevent unauthorised access or tampering with the information being transmitted. It is important to maintain communicational security in order to protect sensitive information, prevent data breaches, and maintain the trust of users in the security of communication systems.

The main objective is to Build standards in all possible areas of functionality of the communication standards and ensure effective enforcement of the law, the establishment of national capacity in areas relating to telecom network security.In order to fulfil the security needs of the country, the establishment of communication assistance to LEAs through regulatory methods and procedures should be implemented.it aims to Construct a regulatory framework to ensure that service providers undertake steps regarding security and telecom networks with safe-to-connect devices.

FINANCING OF THE TELECOM SECTOR

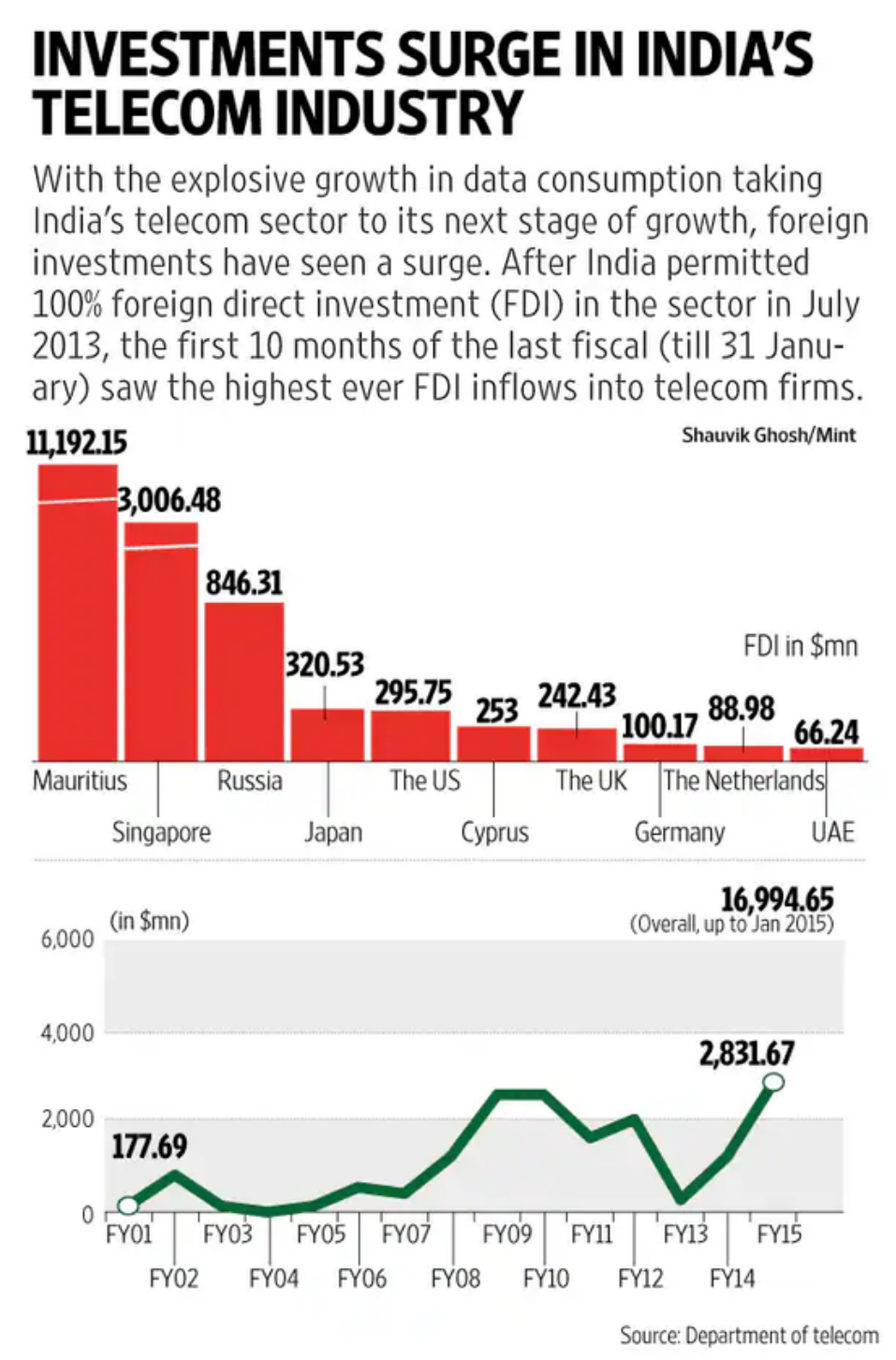
Telecommunications companies often rely on a combination of funding sources to

finance their operations, including debt financing, equity financing, and government grants. Debt financing involves borrowing money from banks, financial institutions, or other lenders and repaying it over time with interest. equity financing involves the sale of ownership stakes in the company to investors in exchange for capital. Government grants are financial awards provided by government agencies to support the development of telecommunications infrastructure or the implementation of new technologies.

In addition to these traditional sources of financing, telecommunications companies may also seek funding from venture capital firms, private equity firms, and other investors. They may also engage in partnerships or joint ventures with other companies to share the costs and risks of certain projects

The target is to create a solid fiscal regime that aims to revive investments and facilitate services at a low cost through rationalisation of taxes, duties, and levies relating to telecommunication.For effective channelisation of finance and to facilitate investment in the telecom sector, Telecom Finance corporation should be created.this strategy also aims to undertake telecom sector projects within the ambit of financing from existing entities.

As an outcome of the 12th Five-year plan, the Government has approved the formation of the Telecom Finance Corporation, the telecom commission has evaluated the standing of the national optical fibre network and conducted various meetings and completed all formalities for Telecom Finance Corporation.



MOBILE NUMBER PORTABILITY

Mobile Number Portability (MNP) is a service that allows customers to keep their existing mobile telephone number when switching from one mobile network operator to another. This service is typically implemented by creating a central database that stores information about the mobile numbers and their associated network operators. When a customer wants to switch operators, they request a

port of their number to the new operator, and the central database is updated with the new operator information. This allows the customer to retain their existing mobile number, while switching to a new operator with different plans, prices, or coverage. MNP is available in many countries around the world, with varying levels of implementation and success.

MNP Clearinghouse Manager maintains a central mobile number portability database that keeps a record of all numbers that have been moved. In addition, the operator also maintains its own MNP database called the Local Number Portability Database. The originating network performs a number portability database query to obtain the site routing number and routes the call directly to the receiving network. A site routing number is a unique four-digit number assigned by the DoT to all mobile operators in each county to identify each network. All calls to ported numbers are routed based on the site routing number . So when the MNP database receives a query for a mobile station's specific International Subscriber Directory Number (MSISDN), the database will return her MSISDN starting with Location Routing Number

The DoT has divided the whole country into two zones for MNP—north-west zone and south-east zone—and awarded licences to two vendors to work as MNP clearing house administrators. The north-west zone comprises Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Maharashtra, Punjab, and Rajasthan, UP (East), UP (West), Delhi and Mumbai. The south-east zone comprises Andhra Pradesh, Bihar, Assam, Karnataka, Kerala, Madhya Pradesh, North East, Orissa, Tamil Nadu and West Bengal.


Step by Step Process on How to Port Mobile Number Operator
SMS
Send an SMS - PORT followed by space <Mobile number you wish to port> to 1900.
01
You will receive an 8-digit UPC (Unique Porting Code) from the existing mobile number operator.
02
Connect with your nearest service operator & submit the 8-digit UPC number and the documents required for the mobile number portability.
03
The new operator will send a request to the old operator for background verification of your mobile bill payments.
04
After approval, the new operator will notify you with the time and date for the mobile SIM port process via SMS.
05
Insert the new SIM card, your mobile number will get activated with the new network service
06
Paytm

NDCP 2018 & THE DRAFT TELECOM BILL 2022

NATIONAL DIGITAL COMMUNICATIONS POLICY 2018

The National Telecommunications policy was renamed as the National Digital Communications Policy 2018 after the approval of the union cabinet on 26th September 2018. It is preferable to perceive NDCP 2018 as a step ahead rather than an amendment to the NTP 2012.

In its core the policy has a wide range of strategies in its ambit that strives to make the country and its citizens future ready. This also included strengthening the Digital security framework to face potential threats that may befall the country.

The policy set some well defined goals and objectives which it envisaged to achieve by the year 2022. These objectives were broadly categorised under the ambit of 3 Missions.

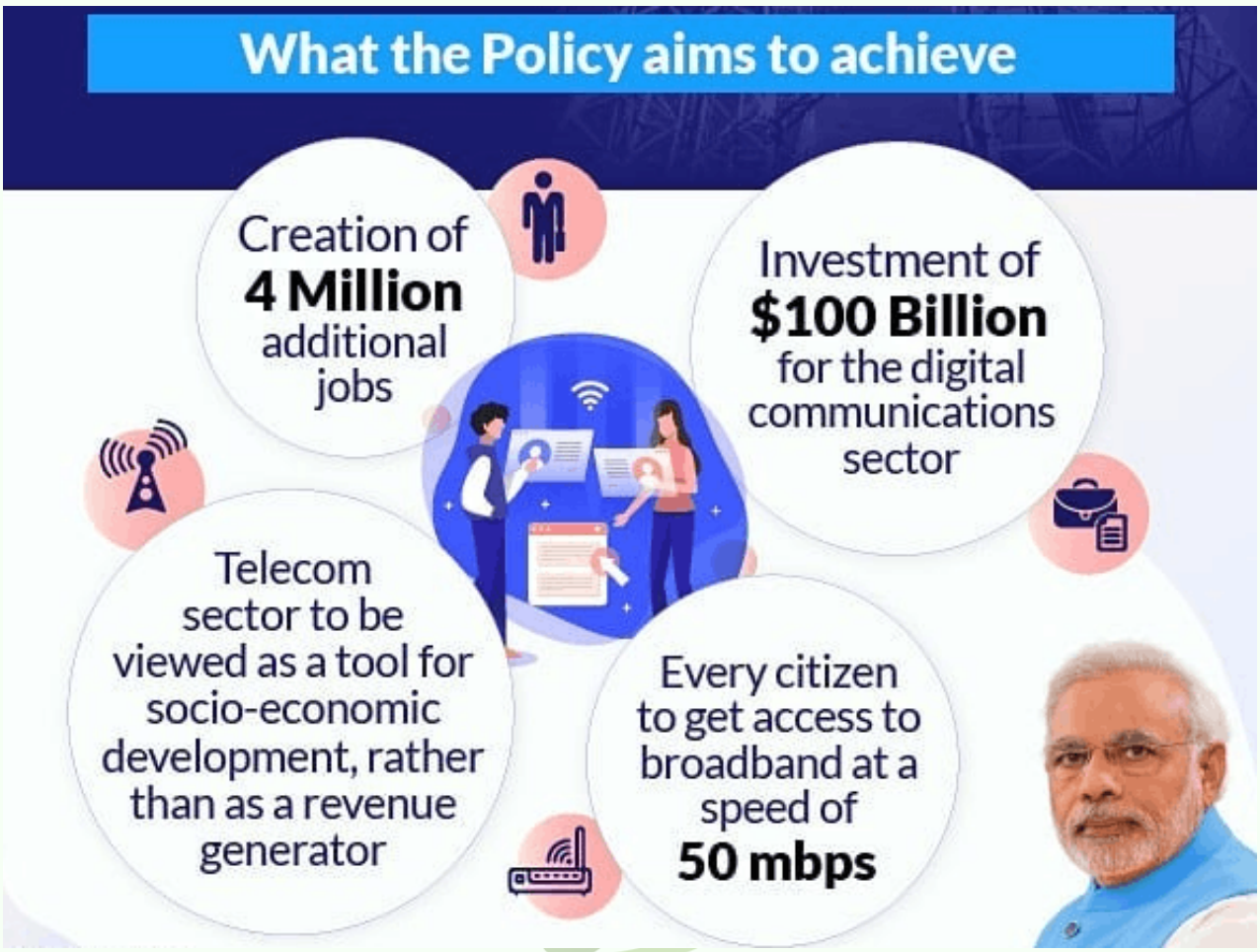
The mission of the policy was as follows:

- *Connect India:* Fundamentally based on the idea of "broadband for all", this initiative if implemented in an effective way would be a game changer because according to estimates an increase in the broadband penetration rate by 10% can potentially lead to over 1% increase in the GDP. The strategies included the establishment of the - "National Broadband Mission" which consisted of initiatives like *BharatNet*, *GramNet*, *JanWifi* which focussed in connecting gram panchayats and rural areas with Wifi Hotspots and Internet Connection. *NagarNet* was a similar concept exclusively for Urban Areas. The mission also encompassed the "Fibre First Initiative" which aimed at the accelerated deployment of optical fibre cables at homes, enterprises and key developmental institutions in rural clusters and Tier I, II and III towns. The initiative set lofty goals of achieving at least 60% fiberisation of the telecom

towers. Fiberisation refers to the connection of telecom towers via optical fibres which would allow full utilisation of the network capacity and forms the prerequisite for the faster rollout of 5G technology. Further there was a plan to increase the establishment of mobile tower infrastructure by providing incentives and exemptions for the erection of telecom towers.

- *Propel India:* The NDCP 2018 was a future oriented policy with an outlook for Next-Gen technology, this is reflected by the degree of emphasis laid on incentivising investments, Promoting innovation and creation of IPR in enabling Next-Gen Technology and services. The Communications infrastructure was recognised as a key connectivity infrastructure just like roadways and railways in an attempt to lower the cost of financing and to increase the flow of investments into the sector. The policy aimed at creating an end-to-end online portal for approvals and clearances to reduce the chances of red-tapism. Further there was the intention to simplify the licensing procedure as well. Removing such hindrances would help improve the ease-of-doing business thus making the communications and digital sector appealing to the investors.It aims at reducing the entry barriers for start-ups especially for new and innovative segments and services.

- *Secure India:* The concept of Digital Sovereignty forms the base for the Secure India Mission. Data is a powerful resource which has the power to jeopardise national security if its not properly safeguarded, hence this mission was initiated with a broad range of strategies in it that marked the advent of the data protection regime in India. If the government planned to trickle down the usage of digital communications it also had to assure its citizens of their security and privacy in the digital economy. Safeguarding the interests of the citizens including their privacy, autonomy and choice is of utmost importance. The government's decision to formulate a policy for data retention and encryption was taken on the same grounds. To create a tangible change, Programs to increase the awareness of the citizens regarding security related issues concerning Devices, Digital Communications networks were also planned. In addition, The government planned to develop security standards for equipment and devices that aligned with global security standards and a comprehensive security certification framework.



NDCP 2018: KEY FOCUS AREAS

- Greater emphasis on innovation
- Comprehensive coverage
- Increased focus on securing data privacy

INDIAN TELECOMMUNICATION BILL 2022

With the emergence of technology and the convergence of media, communication and technology, the government issued the draft of the Indian Telecommunication Bill 2022 under the Ministry of Communications. It seeks to merge the major three acts governing the telecom sector- Indian Telegraph Act 1885, Indian Wireless Telegraphy Act 1933 and the Telegraph Wires Act 1950. The four pillars on which the policy is primarily based include efficient utilisation of spectrum, bringing in efficiency in policy making, supporting innovation and ensuring security for the end user.

Regulatory Reforms

The bill gives certain powers to the central government. It proposes to dilute the watchdog function of the Telecom Regulatory Authority of India (TRAI) and reduce it to the position of a recommendatory body. Further, if an entity possessing spectrum undergoes bankruptcy or insolvency, it will come under the control of the central government. Lastly, it can waver any fee for any registered entity under the rule.

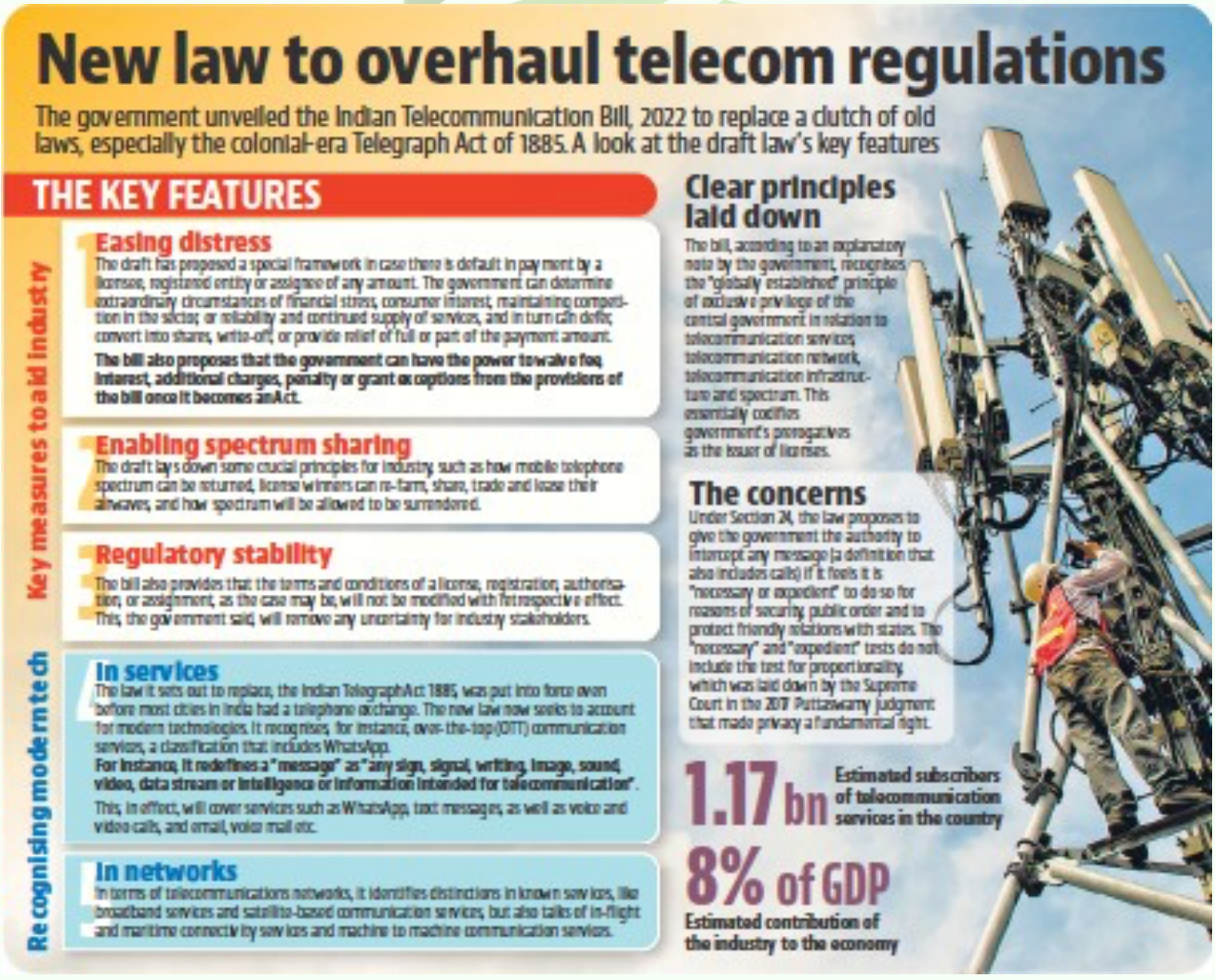
The bill has also brought about changes in ways of spectrum allocation. Except for government use, auction preferred ways of airwaves allocation shall be used. The government may also relax rules around trading, leasing and surrender of spectrum.

Provisions for Consumer Protection

In an attempt to rescue consumers from ever-increasing spam calls and frauds, the bill provides for a very significant change. Under this, every communication under the telecommunication services requires the name of the sender be available to the receiver. So, in case of a phone call, the receiver will get the name of the dialer along with the phone number. Further, user authentication is necessary in case of any commercial communication such as for advertisement and promotional intent.

Impact on the OTTs

The bill poses a major threat to the Over The Top (OTT) platforms. Telecom Service Providers (TSP) have argued that these platforms cut into their sources of revenue without having to deal with licensing and infrastructure costs that TSPs undertake. In response to their demand for a level playing field, the current draft proposes to include OTT communication services in the telecommunication services. As a result, they will also be faced with licensing conditions as TSPs. This will bring along a host of regulatory requirements such as allowing access to their networks and equipment to the government, adhering to encryption regulations and abiding by KYC formalities.



CRITIQUE & RECOMMENDATIONS

LICENSING FRAMEWORK AND SPECTRUM MANAGEMENT

Critique

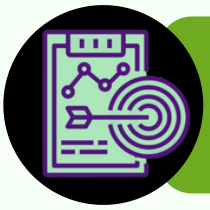
From the legal perspective, the 2012 telecom policy addressed a range of issues out of which the strategies relating to only a few have been implemented-

- For instance, upon getting recommendations from the Telecom Regulatory Authority of India (TRAI), the Govt. implemented the Unified Licensing Regime which has achieved its primary objective of simplifying legal regulations for telecom operators, up to some extent.
- Another goal set by the policy was to remove roaming charges through the introduction of some regulations. Even though this goal was achieved it was not done by the government. regulations but increased competition.
- Apart from these, an objective mentioned in the policy, particularly concerning licensing, has not even been implemented, such as putting in place a liberalised merger and acquisition policy with necessary thresholds.
- Moreover, if we look broadly at the introduction of supply-side reforms for the telecom sector, we see some progress in spectrum management. This helps in developing healthy competition for one of the world's last few growing telecom markets.
- However, such reforms are only incomplete if not continued gradually as per the requirements, particularly the requirements of new technologies like 5G which can transform our lives as we know them.
- In the line of supply-side reforms, the launch of “Gati Shakti Sanchar” Portal to Streamline the process of Right of Way (ROW) Applications and permissions Across the Country shall not be forgotten. This is a major step in improving Ease of Doing Business.

- Recent developments have shown the government's progress as TRAI recently slashed reserve prices for the 5G spectrum auctions which took place in 2022 by an average of 40%. Though this step was not mentioned in the 2012 policy explicitly, it is in line with the broad goal of making business easy to start and run in telecom.

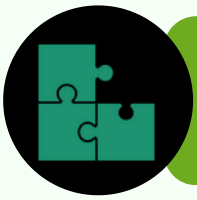
Objectives

Goals set by the 2012 telecom policy to improve the legal and regulatory framework of the telecom sector.



Strategies

Implemented measures like the Unified Licensing Regime and the removal of roaming charges through increased competition.



Omissions

Objectives like liberalized merger and acquisition policy and licensing requirements have not been implemented yet.

Developments

Recent steps like the Gati Shakti Sanchar Portal and TRAI's slashing of reserve prices for 5G spectrum auctions show progress in supply-side reforms for the telecom sector.

LICENSING FRAMEWORK AND SPECTRUM MANAGEMENT

Recommendations

- Liberalisation in areas such as mergers & acquisition and licensing should be implemented since it would help the existing businesses in the market become more competitive which is relevant in the highly competitive telecom industry as today.
- Many supply-side reforms had been taken care of in the previous policies, however, there is now a need for demand- side reforms which focus on improving demand for and universalising newer technologies and trends like IoT, cryptocurrency, 5G etc.
- The telecom operators in India have considerably reduced in number since the implementation of the previous policy. Hence, this creates a need for new regulation which promotes competition and makes operation and entry easier for new entrants. This would help avoid a situation of monopoly or duopoly in the Indian Telecom Industry.

- National Security was not given much importance in the previous policies, it must be given importance. Special attention must be given to ensuring the security of the data relating to national interest along with the data of important persons like Heads of State, Members of Armed Forces etc.
- Considering that 5G is now being rolled out throughout the nation, first through the metro cities, there is a need to introduce regulation for the potential applications that may arise from 5G. This will help the market avoid any unwanted consequences relating to those applications. eg.
- For administrative purposes, use of newer technologies like cloud computing can be incorporated for better efficiency and simplification of government processes. This is in line with the existing policy but must go a step further so as to utilise maximum potential of the available technologies.

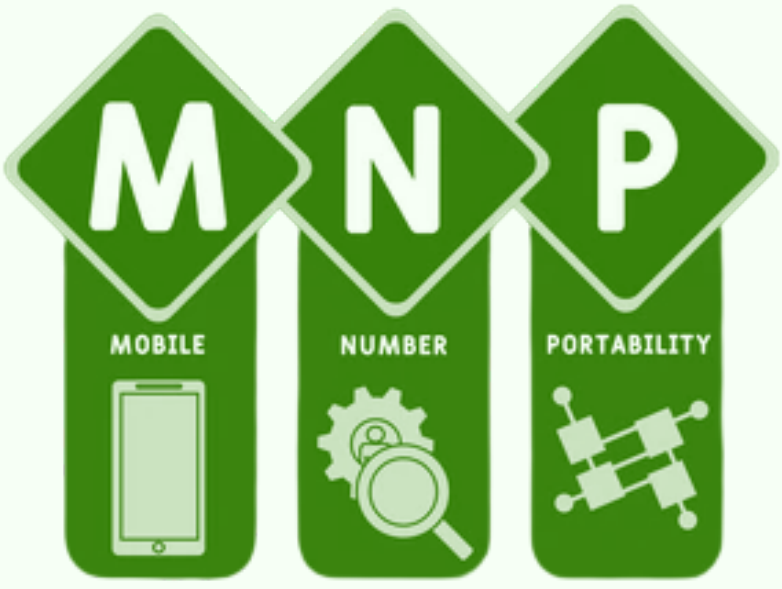
RURAL TELEDENSITY

Critique

- As mentioned in the policy, Increasing rural teledensity was one of the most fundamental objectives that the policy had set. In statistical terms the rural teledensity was at 40.54% in November 2012, the year when the policy was formulated. In a span of five years the policy set lofty goals to achieve a teledensity of almost 70% by 2017. But according to the 2017-18 Annual Report of the department of Telecommunications, the rural teledensity stood at 56.58% as of November 2017. Only half of the set growth objectives could be achieved.
- At the same time the urban teledensity stood at a whooping 167.5% in November 2017, which meant that there were almost 167 Telephone(Landline and mobile) Connections for a population of 100 in urban areas. This sheds light on the fact that urban-rural Divide in basic communications infrastructure existed even after the setting of Rural Development Centric objectives for the five years from 2012-2017.
- Furthermore, the government had planned for achieving 100% rural teledensity by 2020, but the rural teledensity was just 59.08% in November 2020.

Recommendations

- Private telecommunication service providers haven't contributed significantly in boosting the tele-density (landline and mobile) in rural areas because there aren't stringent regulations that pressurise them to do so.
- It is highly recommended to create a mechanism that enforces regulatory pressure so that corporations not only work on their business priorities but contribute in building the rural economy as well.
- The problem with increasing rural tele-density is that the population to be catered to is extremely dispersed and sparse, hence enhancing the network connectivity is expensive which acts as a hindrance to private investment. Although USOF(Universal Service Obligation Fund) has been established to fund public-private partnerships that help building the rural telecom infrastructure, a much more transparent window is sought to which ensures that the funds are utilised in an efficient and targeted manner. This is a dire need because there are still 25,000 villages in India without mobile connectivity.
- As per the 2017 Annual Report of the DoT, out of the total 1186.22 million telephone connections(landline and mobile), 1058.85 million connections were provided by the private sector which turns out to be a whooping 90%. Thus private sectors have been driving the telecom sector at present, the share of public sector has been a meagre 10%, this requires a major turnaround.Leveraging Telecom PSU namely BSNL and infusing it with enough financial and human resources to spread its reach is highly recommended because it has the potential to connect people in all unconnected corners of the country, moreover being a government undertaking it can provide mobile network connectivity to remote and rural Indians in a much lesser price than private telecommunication service providers. This can help mitigate high tariffs/prices of Private Telecom Service as a reason of not having a mobile phone connection.



MOBILE NUMBER PORTABILITY

Critique

- Mobile number portability was implemented using a centralised database approach. The process of MNP is initiated by the customer by sending an SMS or making a call to a designated number provided by the new service provider. The customer will then receive a unique porting code which is used to verify the customer's identity and authorise the transfer of their mobile number to the new service provider. Once the porting process is complete, the customer will continue to use their current mobile number with the new service provider.
- On March 8, 2006, the Telecom Regulatory Authority of India (TRAI) published draft regulations to facilitate the portability of mobile numbers in India and submitted its recommendations to the Department of Telecommunications (DoT). The DoT recommends service provider number portability, including service portability (portability between GSM and CDMA) for all mobile operators. For mobile number portability, it was decided to implement an all-call query approach.
- The government of India aimed to abolish roaming charges across the country and facilitate nationwide (inter-circle) mobile number portability, i.e., one-nation-one number with free roaming. This will allow users to change the operator without changing their mobile number even if they move from one circle to another. DoT has been asked to start nationwide MNP implementation and it is expected that the inter-circle MNP.
- As per a report the total number of mobile number portability requests as of October 2022 stood at 759.92 million. The cumulative MNP requests since the implementation of MNP stood at 645.54 million as of October 2021 as per a press release of the TRAI (Telecom Regulatory Authority of India). This indicates a year on year increase of 17.7%. The telecom industry is one of the most competitive industries and mobile number portability has created a very volatile market. The exponential rise in MNP requests every year indicates that Customers who are dissatisfied with an operator now shift to substitutes immediately. The prevalence of subscribers migrating to other mobile network operators can also be said to be the consequence of the Work-from-home phenomena due to which a lot of people who relocated to their hometowns are preferring the best suited network operator in their area.

Recommendations

- The porting process takes several days to complete, and delays can occur due to various reasons such as technical issues or errors in the customer's documentation. During the porting process, the customer's mobile service was disrupted, and they experienced a temporary loss of service or reduced call quality.In some cases, the customer accidentally initiated the porting process for the wrong mobile number, resulting in the loss of service for that number. Customers received unsolicited calls and messages from telemarketers after initiating the porting process, as their contact information is shared with third parties during the process.The customer could not be able to port the number if it has already been ported to another operator.Some service providers charged a fee for the process of MNP, which was a deterrent for some customers.
- The technical option that can solve these problems is Onward Routing.it refers to the process of directing a call or message to the new service provider after the mobile number has been ported. Once a customer initiates the MNP process, their mobile number is transferred to the new service provider.However, the routing information for the number may still be present with the old service provider. To ensure that calls and messages are properly delivered to the new service provider, the routing information must be updated to reflect the new service provider. This is known as onward routing, which ensures that calls and messages are properly delivered to the new service provider after a mobile number has been ported, minimising service disruption for the customer.it minimise service disruption and ensuring that calls and messages are properly delivered, onward routing can help to increase customer satisfaction with the MNP process. It can also be used to direct calls to the most efficient or cost-effective service provider, reducing costs for both the customer and the service providers. It enables to route calls to the best available service provider, improve call quality and reduce dropped calls.
- A Query On Release is another technical technique that can be used in Mobile Number Portability (MNP) that allows a customer to check the status of their porting request by sending a query to a designated number or short code. The query will return information such as the current status of the porting request, the estimated time until completion, or any issues that may be delaying the process. This feature can be useful for customers who want to stay informed about the progress of their porting request and resolve any issues that may arise.

- This feature provides transparency to the customer about the current status of their porting request, which can help them to plan accordingly and make informed decisions.it provides customers with the ability to check the status of their porting request and resolve any issues, the query on release feature improves customer service and increases customer satisfaction with the MNP process.it keeps customers informed about the progress of their porting request, the query on release feature can help to reduce dissatisfaction with the MNP procedure. This feature allows customers to identify and resolve any issues that may be delaying the porting process more quickly, which can help to speed up the overall porting process.

BROADBAND ACCESS

Critique

With the introduction of the National Telecom Policy 2012, one of the key areas policymakers laid emphasis on was enhancing the accessibility to broadband in every part of the country. Most telecom services like Internet access and media depend on the availability of broadband. NTP envisioned Broadband on Demand which is essentially making available internet and other telecom services accessible and affordable to every citizen to ensure participation in the web economy. The objective of the policy was to establish 175 million broadband connections by the year 2017 and 600 million by the year 2020 at a minimum 2Mbps. It also aimed at providing high quaifty and affordable broadband access to village panchayats, as well as bolstering demand for broadband application and services. The intention of the policymakers was to generate synergies between broadband and government schemes like MGNREGA, AADHAR, etc.

Since 2012, there have been radical changes in technology having a direct impact on the implementation of policy objectives with regard to broadband. A critical evaluation of the same first warrants a brief mention of the implementation measures such as:

- One of the major strides taken by the Government is the implementation of the BharatNet project. This initiative is directed towards providing fast internet and broadband access. According to the Government, as of November 2022, broadband infrastructre in more than 1.5 lakh Gram Panchayats were established. To enhance last-mile connections, the government instituted Fiber To The Home (FTTH) connections and has set up WiFi hotspots as well.
- To increase connectivity across the country, keeping in mind the objectives of National Digital Communications Policy - 2018, the government initiated the National Broadband Mission in 2019. Under this, one of the objectives outlined was to develop a Broadband Readiness Index (BRI) to judge the current state of broadband infrastructure and ecosystem in a state or union territory. The mission also aimed at incrementing the optical fibre network by 30 lakh km and increase the density of tower from 0.42 to 1 per thousand of the population by 2024.
- In order to increase the speeds offered to both household consumers and industrial users, the government is taking incremental steps to roll out 5G and pushing to roll out 6G by 2030. According to an Ericsson Mobility Report of November 2022, by the end of 2028, there will be around 690 million 5G subscriptions in India. As of now 5G servies have been rolled out in 50 cities by Reliance Jio and Bharti Airtel. To facilitate the roll out of 5G, approximately 2500 base stations are being set up every week.

The critical evaluation of this policy necessitates a detailed inquiry into all the major users of such BroadBand strategies.

- As of June 2021, according to NITI Aayog's Sustainable Development Goals (SDG) Index, out of every 100 Indians, 55 people had access to internet, improving from 2020. According to Anushka Jain, a policy counsel at the Internet Freedom Foundation, India's score on the index was "excessively low".
- There exists disparity on a regional level as well. While Delhi had the highest score in terms of number of internet connections and mobile phone users, Bihar had the worst score. While Delhi reported 199.8 subscribers per 100 of the population, Bihar had a meagre 30.99 per 100.
- With the implementation of the National Broadband Mission, approximately 94% of the villages in the country have access to broadband.

	Subscriber Base(Millions)		
Year Ending	Rural	Urban	Total
Dec-17	499	668	1167
Dec-18	528	647	1176
Dec-19	507	643	1151
Dec-20	524	629	1153
Dec-21	521	633	1154

Recommendations

There is still a stark divide in broadband access in rural and urban India. Moreover, broadband access to men and women are not at par, as well. Aggravated by the COVID-19 pandemic, as India moved online and everything from education to shopping took place in the digital world, the condition of those already digitally isolated took a turn for the worse. India had the widest gender disparity with respect to internet usage. A mere 15 percent of women had access to the same against 25 percent of men. Thus, there was a gender gap of 40.4 percent. To counter this, the government can come up with schemes targeted towards women which enable them to procure mobile phones, SIM cards and other auxiliary broadband services at a subsidised cost. The government can hence integrate thousands of women who have predominantly been restrained, into the formal technological environment and provide better services through the linkage of bank accounts (using telebanking) and AADHAR.

- There have been several regulatory hurdles while setting up broadband infrastructure in India. Moreover, due to red tapism and lethargy in the public offices, the telecom sector has failed to unlock its potential and elevate India digitally to where the government envisions it to be. As per a World Bank estimate, a 10% increase in broadband penetration bolsters economic growth by nearly 1.38%. A detailed and comprehensive framework needs to be brought into effect which strikes a balance between preventive measures and an economic environment which encourages competition.

- Traditionally, the telecom sector has been one with extreme entry barriers in terms of capital investment and licences. Encouraging the influx of smaller players by lowering such barriers will not only bring down the price, making it more affordable for every citizen, but also push all the players the quality of their services. The barriers can be lowered by allowing small players to use a shared licence which can be rented from the government. This rent shall then become a recurring revenue source for the government.
- The decision to increase the broadband infrastructure is one which involves a high risk with respect to the capital investment undertaken. The government can come up with appropriate measures which financially incentivizes operators to undertake this investment. This can be in the form of loans at lower interest rates, restructuring of debt owed to the government, etc. Although this involves a high upfront cost on the part of the government, the expansion of the broadband infrastructure will have a multiplier effect and disperse economic and social benefits to all sections of the society.

SECURITY CONCERNS

Critique

The policy lays emphasis on communication security and network security.The following measures were to be accomplished under the policy. Telecom service providers must take adequate measures; to ensure security of the communication send and received through their networks. The service provider will adopt contemporary network security standards

- Telecom service providers must provide communication assistance to law enforcement agencies. Telecom service providers must assist law enforcement agencies within legal framework and also keeping in view the individual privacy and also following international practices to the extent possible for fulfilling national security needs.
- Regulatory measures to ensure that safe to connect devices are inducted on to the network. To build national capacity around security standards, security testing, and interception and monitoring capabilities.

However it has been found that our nation still faces security concerns in the area. Recent instances for the same include AIIMS Delhi cyber attack in December 2022 as well as IRCTC data breach.

Recommendations

Cyber Security is today more critical than ever. This creates an ever growing need for a cyber safety framework for the Internet in our country which does not invade the privacy and violate human rights of Indian citizens.

In India, telecom security concerns include issues such as unauthorized access to networks, theft of sensitive customer data, and disruption of service due to cyber attacks. Given the high rates of cyber threats and crimes, the policy should include major focus on ensuring security of the people. The government should establish regulations that protect the privacy and security of personal data of telecom consumers, thus ensuring trust and confidence in the sector. The following could be adopted for correction of the same:

- Implement robust network security measures: Network security is a critical aspect of telecom security. India should invest in firewalls, intrusion detection and prevention systems, and other security technologies to protect against cyber threats.
- Enhance data encryption: Encryption is an essential tool for protecting sensitive data and communications. India should implement strong encryption standards to protect data in transit and at rest.
- Improve security of mobile devices: Mobile devices are increasingly becoming a target for cybercriminals. India should encourage mobile device manufacturers to implement security features such as biometric authentication, remote wipe capabilities, and encryption.
- Monitor network traffic: Network traffic monitoring is a crucial step in identifying and mitigating cyber threats. India should invest in tools that can detect and respond to unusual network traffic patterns in real-time.
- Train employees on security best practices: Employee awareness and training are essential to maintaining a secure telecom infrastructure. India should invest in regular training programs for employees on cyber security best practices.
- Collaborate with other stakeholders: Telecom security is not just the responsibility of the telecom operators. India should establish partnerships with other stakeholders such as regulators, law enforcement, and other industry players to share information and best practices.
- Conduct regular vulnerability assessments: Regular vulnerability assessments are essential to identifying and addressing potential security vulnerabilities. India should invest in regular vulnerability assessments to identify and mitigate potential risks.

Research and Development

The National Telecom Policy 2012 (NTP 2012) is a policy framework created by the Government of India to provide a roadmap for the growth and development of the telecommunications sector in the country. One of the key focus areas of the NTP 2012 is research and development (R&D) in the telecom sector. The policy aims to encourage R&D in areas such as next-generation networks, wireless communications, and broadband technologies, with the goal of making India a global leader in telecom R&D. Additionally, the NTP 2012 also seeks to establish a National Telecom R&D Fund to support R&D activities in the sector, and to establish a National Telecommunications Research and Development Center to coordinate R&D efforts across the country.

A major goal under the head was development of infrastructure. The World Trade Organisation (WTO) forbids member nations from making distinctions between indigenous and imported goods. With regard to providing preference to domestically produced telecom devices and equipment, the Draft Policy ran afoul of this particular WTO duty. This has since been changed, and the policy now solely aims to favour indigenous communications equipment in cases involving the government and national security. This is a smart step because it improves security for private government communications. However, it gives no guidelines about the manufacture of such secure telecom equipment or the requirements for the equipment's security. Furthermore, there aren't any standardised security requirements in existence. The NTP'12 aims at transforming India into a 'global manufacturing hub'. However, it neither mentions deadlines for achieving such goals nor it lays down any framework to achieve such goals.

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