

Indian National Telecom Policies: Evolution, Significance and a Perspective



Mugdha Mujumdar, Abhijit Chirputkar, Prasanna Kulkarni, Giri Hallur

Abstract: Purpose: The purpose of this research is to present a comparative analysis of the last two consecutive telecommunication policies of the Government of India (GoI). This paper analyses the commonalities and differences in the two telecom policies released in 2012 and 2018. The research study facilitates some rational perspective on NDCP 18 from digital technology lens. **Design/ Methodology/ Approach:** This is a qualitative study for conducting a comparative analysis of the aforesaid consecutive Indian telecom policies. The primary sources are the final policy documents and industry opinions. To gauge the industry sentiments and expert opinions, various press releases and related news articles are also studied. This study of the two consecutive telecom policies of the government of India aims at finding the fundamental differences between the two policies. **Objective:** Finding the fundamental differences between the two policies and the factors necessitating the replacement of the older policy with a new one. This research sheds light on why and how NDCP 18 differs from rest previous policies and what it has in its bag for both Industry as well as consumers. **Finding:** India has struggled with the implementation of the objectives laid out in the policies. NTP 2012 was launched with an aim to transform the country into an empowered knowledge-based society, using telecom as a platform, and to provide reliable, secure and quality telecom services in remote and rural areas. NTP 12 turned out to be generally successful except for some unachieved targets such as free roaming and maximum broadband reach NDCP 2018 is a new multi-perspective policy leapfrogging the Indian economy as an emerging digital economy. NDCP 2018 was designed in alignment with Digital India initiatives to reduce the Digital Divide; however, for India to emerge as a digital economy prioritization of achievable objectives must be marked out and implementation must be ensured. On the positive side, the overall impact of NDCP 18 is going to be monitored. This research study also reveals important analysis from interviews of telecom expert's. This analysis facilitates unique perspective about NDCP 18 to this research study.

Keywords: Telecom policy, NTP 1994, NTP 1999, NDCP 18

Revised Manuscript Received on November 20, 2020.

* Correspondence Author

Mugdha Mujumdar is a Ph. D. research scholar at Symbiosis International (Deemed University). Her area of research interest are telecom policies, telecom governance, and customer grievance management

Prof...Abhijit Chirputkar is Assistant professor and director at Symbiosis institute of Digital and telecom Management. His research interest is finance, Ill accounts and technology management.

Dr. Prasanna Kulkarni is a Associate professor in Symbiosis Institute of Digital and Telecom Management

Dr. Giri Hallur working as Associate Professor at Symbiosis Institute of Telecom management, a constituent of Symbiosis International (Deemed University), He is Ph. D is Telecom Management from Symbiosis International (Deemed University). His area of research interest are telecom management, telecom and IT governance, and telecom technologies.

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an [open access](http://creativecommons.org/licenses/by-nc-nd/4.0/) article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

I. INTRODUCTION

Every telecom policy consists of two parts Vis: designing of policy and implementation of the policy. Creating circumstances and groundwork which are favorable for policy implementation is critical for the success of any policy.

It was observed that mobile and value-added services had shown better growth in liberalised markets in few countries and not so in countries which were not liberalised. Lack of proper legislation and regulation also became hindrances for continued growth. Worldwide, a decade of 1990 to 2000 was transformational as many countries liberalised their telecom sectors (refer to annexure). Below are the events that changed the industrial scenario and shifted the focus of telecom activities from designing policy to its implementation. WTO agreement on telecom services which directed tariff in 72 countries European policy on full liberalisation

US Telecom Act 1996 for liberalisation of local markets

Indian Telecom Sector, too, has continuously, and significantly evolved post-liberalisation duly guided by the government's telecom policies which aimed at making telecommunication services reliable and available to all public at affordable prices. Indian telecom network is one of the oldest networks in the world. Till 1991, i.e. during the era before liberalisation, the Indian Telecom Sector witnessed a monopoly of government and the main objective of telecom reforms was to increase private investments and to bring transparency in the sector. The telecom sector witnessed private participation post-liberalisation through reforms. National Telecom Policy 1994 (NTP 1994) was critical in the opening of the telecom sector for providing quality services and value-added services at reasonable prices. With the initial objective of making telecommunication available to people through home telephones, PCOs etc.

India's telecom sector has come a long way in becoming the second-largest telecommunication market in the world with 1.2 billion subscribers and about 500 million internet users. The various telecommunication policies of the government were critical in meeting an ever-changing regulatory and technological requirement and the evolvment and growth of the telecom sector. Also, the success factor of the policies reflects in serving the public interest and attending economic objective. The study of consecutive telecom policies can thus indicate the achievement of previous policy and shift in the government's approach towards the sector through a new policy. The fundamental reason for designing new policy is the deficient performance of an old regime or policy framework. Old policies could not undertake challenges as per changing environment in terms of social, economic, and political circumstances.



Indian National Telecom Policies: Evolution, Significance and a Perspective

Dramatic technical changes and changing economic environment are common reasons to breakdown older policies and replacing them with a newer one. NTP 1994 was the opening policy of the Government of India aimed at boosting domestic investments in the sector and initiate foreign direct investments. NTP 1994 was turned out to be a bit disaster as it could not achieve much for sector. Then came NTP 1999 – it changed scenario dramatically hence considered as a milestone in all policies. NTP 2012 was launched with an aim to change the country into empowered knowledge-based society using telecom as a platform and to provide reliable, secure and quality telecom services in remote and rural areas. NTP 2012 turned out to be successful except some targets unachieved/ uncovered like free roaming, maximum broadband reach, and so on. The current telecom

sector continues to reel under acute financial stress which has triggered consolidation of big players (Idea, Vodafone) and exiting of fringe players. Considering the financially stressed telecom sector, new policy NTP 2018 was launched. It is a new multi-perspective policy leapfrogging the Indian economy as an emerging digital economy. NTP 2018 was rechristened as National Digital Communication Policy (NDCP) 2018. The objectives of NDCP 2018 were designed in alignment with Digital India initiatives to reduce the Digital Divide. The Government of India expects the NDCP to act as the pillar for ‘Digital India’. It is envisaged to not only generate revenue but also act as a major socio-economic development tool for the country. The study sheds light on the process of evolution of National Telecom Policies (NTP).

Summary of National Telecom Policies from 1994 to 2011

	NTP 1994	NTP1999	NTP2011 (draft)
Objectives	<ul style="list-style-type: none"> ➤ Provide availability of basic telecom service and telephone on demand ➤ Provide quality services with reasonable prices 	<ul style="list-style-type: none"> ➤ Telephone on demand to all by 2002 ➤ Teledensity of 7, Increase in Teledensity ➤ Achieving telecom coverage of all villages. ➤ Attracting FDIs and more private investments 	<ul style="list-style-type: none"> ➤ Provision of reliable, high quality, affordable converged telecom services, anytime anywhere in India. ➤ Another vision is broadband on-demand and connecting all villages’ panchayats. ➤ Extending the optical fibre network to the village to provide education and health services.
Impact	<ul style="list-style-type: none"> ➤ Teledensity was 0.8 ➤ PCO (STD/ISD) network spread across the country 	<ul style="list-style-type: none"> ➤ Teledensity increased 1.92 and kept increasing at a fast rate. ➤ Significant impact on growth in the telecom sector. 	<ul style="list-style-type: none"> ➤ It recognised the need of telecom sector as a key infrastructure sector. ➤ It encompassed multiple aspects of communication to enhance efficiency, convenience, and access.
Achievement	<ul style="list-style-type: none"> ➤ Could not achieve the target of providing telephone to rural areas due to technical issues and limited financing by the government for improvement of network infrastructure 	<ul style="list-style-type: none"> ➤ Liberal policy framework worked well. It was said to be successful as it could achieve most of the targets though not able to achieve each target. 	<ul style="list-style-type: none"> ➤ It emphasized lack of skilled manpower and R&D, overreliance on imports, long term financing and taxes issues which thwarted the sectors’ growth

II. LITERATURE REVIEW

The following literature review focuses on the fact that telecom policies are not merely policies but they are equally responsible for the economic development of a country.

1) Telecom Sector Reforms and Policies

The progress of communication networks and a massive increase in computational ability has been among major drivers of economic liberalisation and globalization. Telecom sector has led the reform initiatives across the industries which gave new dimensions to various industries globally and changed market configuration. Telecom sector development has propelled development and growth of many other related sectors. Telecom sector’s financial contribution in terms of revenue and penetration rate of services is worth noticing. Benefits accruing from the development and expansion of telecom services has prompted many governments to initiate reforms in the sector. (Prithish & Saxena, 2015)

Liberalisation, privatization, and regulation are the three precursors for the formation of any telecom policy.

Regulatory and financial factors influence the implementation of policies. Policies should be attractive to investors and the government as they are the main stakeholders. Along with reforms, a sound regulatory environment conducive for a majority of participants in the industry is essential for the continuous advancement of the sector. (Paleologos & Polemis, 2013)

In India, the government started reforms in the telecom sector from June 1992 when it invited bids for radio paging services. The government announced its National Telecom Policy (NTP) in May 1994, which intended to introduce privatization in the sector. With aim to increasing Intending to increase teledensity and to imbibe swift technological progress wasn’t achievable with the presence of only monopolistic, government players in the sector. Hence through an entry of private players in the segment, with a backdrop of globalization, the government embarked on the reforms.



It regularly made changes to its objectives and created a regulatory and auxiliary framework for the efficient operation of the industry.(Johnson, 2012)

NTP 1994 fell short of its objectives. It could not gain the support of the Indian Bureau of Intelligence due to security reasons. (A sudden increase in FDI cap was not good for security of the country.) This resulted in sluggish growth of the sector. Service costs were high, and the accessibility was very limited.

Thereafter, NTP 1999 started a new age for Indian telecom, changing landscape of the industry. The government recognized an immense need for a modern policy for the development of the sector and announced NTP 1999. Major goals of this policy were to provide accessible, affordable services, providing equal opportunities to all players, the competitive environment in the sector providing services to both urban and rural areas. Indian telecom sector witnessed substantial growth in subscriber base after following NTP 1999 and the effects of the policy were visible. The introduction of competition in the Indian telecom market along with technological progress resulted in a reduction in prices and significant expansion of the telecom industry in India.(Johnson, 2012)

The comparison of decision-making processes in telecom markets of China and India also indicates fundamental factors affecting decision making and difference in both models. Though both models succeed to some extent, they use different procedures and by involving different interest groups. Developing countries like India and China have faced similar circumstances and challenges when they modernized and developed their telecom infrastructures. In developing countries like China, the telecom policy formation process has a background of political engagement activities, public policymaking processes and government-specific legal systems. In India, like western countries, the de-regulation process started due to insufficient investment funds available for the sector and continuous unachieved development goals.(Gasmi & Virto, 2010)

Previous studies which compared the telecom policies of India and China shed light on the theme of “managed competition”. Promotion of healthy competition is a well-known attribute of the Asian telecom policy. Government do promote healthy competition but are unwilling to remove certain regulations and restrictions.(Jayakar, 2012)

The compatibility of political institutions with a telecom regulatory system is important concerning the economic performance of the sector(Levy & Spiller, 1994)as evident from various countries ‘case studies. Further, there has been ‘Digital Divide’ among rich and poor nations, hence, the adequacy of telecom services and information and computing technologies (ICTs) may be essential for the economic growth of the countries. ICT has offered developing countries a chance to increase productivity and economic growth. High regulations correlate with limited development of the sector.(The & Bank, 2003)

The study of reforms in the telecom sector in the Latin American and Caribbean countries reflects that governments followed many suggestions and guidance of experts while privatizing the sector through the creation of a regulatory environment which promoted privatization. Nonetheless, many governments gave monopoly powers to new private

owners thus limiting the benefits of ownership reforms.(Gual & Jódar-Rosell, 2009)

A study of reforms in developing countries reflects key determinants of some policies that have been at the heart of the reforms of the telecommunications industry, namely, liberalisation, privatization, and the (re)structuring of the regulation(Gasmi & Virto, 2010)

Policymakers in developing nations have faced many challenges as compared to policymakers in developed nations. Some contributing factors were a weak economy, limited resources, big missions and ambitious visions, inferior infrastructures etc. The main question was how to allocate limited resources to many objectives.(Gasmi & Virto, 2010) For any policy to be successful and accountable it should be in sync with political systems of the country. (Gao & Damsgaard, 2007)

Though there had been a study of different telecom policies and their impact analysis and implementations analysed, the study of the transition from one policy structure to others, the latest policy regime is not well presented. The determinants and outcomes of previous telecom policy and its comparison with the new, latest policy could help understand the key monitor able of the new regime. This research gap is being address d in this paper.

2.1 Overview of National Telecom Policy 2012 (NTP 2012)

The government approved the NTP 2012 on 31st May 2012 with few changes in the recommended draft policy of 2011. The policy recognized that telecommunication has emerged as a key driver of economic and social development in an intensely knowledge-driven global scenario where India can play a leading role. ‘Availability and affordability of effective telecommunication for the citizens’ was the core theme of the policy, nonetheless, it also recognized various issues raised in earlier policy and tried to solve the same.

NTP 2012 Vision Statement: To provide secure, reliable, affordable and high-quality converged telecommunication services anytime, anywhere for an accelerated inclusive socio-economic development.

Mission Statements: To achieve the vision, the policy laid down below key missions:

1. To develop a robust and secure state-of-the-art telecommunication network providing seamless coverage with special focus on rural and remote areas for bridging the digital divide and thereby facilitate socio-economic development.
2. To create an inclusive knowledge society through the proliferation of affordable and high-quality broadband services across the nation.
3. To reposition the mobile device as an instrument of socio-economic empowerment of citizens.
4. To make India a global hub for telecom equipment manufacturing and a centre for converged communication services.
5. To promote Research and Development, Design in cutting edge ICTE technologies, products and services for meeting the infrastructure needs of domestic and global markets with a focus on security and green technologies.



Indian National Telecom Policies: Evolution, Significance and a Perspective

6. To promote the development of new standards to meet national requirements, generation of IPRs and participation in international standardisation bodies to contribute in the formation of global standards, thereby making India a leading nation in the area of telecom standardisation.
7. To attract investment, both domestic and foreign. The policy also laid down key objectives and strategies to achieve the set objectives.

2.2 Overview of National Telecom Policy 2018 (NDCP 2018)

A rapid change in telecom sector reflected in India becoming the world's second-largest telecommunication market vide a subscriber base and internet subscriber base was seeing technological shifts in digital communication. With the advent of new technologies like 5G, IoT (internet of things) and artificial intelligence, India needed a policy which can make structured use of these new tools for the development of the country. NDCP 2018 is distinct by its name and with this new policy government set a below-mentioned objective for it to be achieved by 2022:

1. Provisioning of Broadband for All
2. Creating 4 Million additional jobs in the Digital Communications sector
3. Enhancing the contribution of the Digital Communications sector to 8% of India's GDP from ~ 6% in 2017
4. Propelling India to the Top 50 Nations in the ICT Development Index of ITU from 134 in 2017
5. Enhancing India's contribution to Global Value Chains
6. Ensuring Digital Sovereignty

NDCP 2018 Vision statement: To fulfill the information and communication needs of citizens and enterprises through the establishment of a ubiquitous, resilient, secure, accessible and affordable Digital Communications Infrastructure and Services; and in the process, support India's transition to a digitally empowered economy and society.

a) Mission Statements:

It has laid down three key missions to achieve the set objectives

1. **Connect India: Creating Robust Digital Communications Infrastructure:** To promote Broadband for All as a tool for socio-economic development, while ensuring service quality and environmental sustainability.
2. **Propel India: Enabling Next Generation Technologies and Services through Investments, Innovation and IPR generation:** To harness the power of emerging digital technologies, including 5G, AI, IoT, Cloud and Big Data to enable the provision of future-ready products and services; and to catalyse the fourth industrial revolution (Industry 4.0) by promoting Investments, Innovation and IPR.
3. **Secure India: Ensuring Sovereignty, Safety and Security of Digital Communications:** To secure the interests of citizens and safeguard the digital sovereignty of India with a focus on ensuring individual autonomy and choice, data ownership, privacy and security; while recognizing data as a crucial economic resource.

2.3 Research Gap: There is less literature available on Indian national telecom policies. Literature explains about aims, scope, mission, vision statements in policies. Also for old policies NTP 1994 and, NTP 1999, NTP 2012 achieved targets and unachieved targets are segregated however there is very little literature having comparative analysis of consecutive policies and explaining evolution from first policy. This research gap has been tried to fulfill by this research study.

3. A Comparative Study of NTP 2012 and NDPC 2018

	NTP 2012	NTP 2018 (NDCP)
Goal	Provide secure, affordable and high-quality telecommunication services to all citizens	Unlock the transformative power of digital communication networks to achieve digital empowerment and improved well-being of citizens
Vision Statement	Converged telecommunication services for accelerated and inclusive socio-economic development	Emphasize on accessible, affordable digital communication infrastructure and services for transitioning India to digitally empowered economy and society
Analysis	The goal and vision have shifted from providing reliable and affordable telecom services to the public to harness the power of new-age digital technologies for transforming the society and economy. Though the previous policy is credited for bringing telecommunication services to every citizen- reflected in -1.2 billion subscriber base – the new policy aims at connecting everyone digitally and translating the benefit to the whole economy. The timeframe and investment requirements are aggressive in new policy and are sensitive to many external factors.	

Mission	<p>To provide reliable and affordable services with a special focus on rural and remote areas to bridge the digital divide</p> <p>To make a mobile device an instrument of knowledge and socio-economic empowerment of citizens</p> <p>To promote manufacturing, R&D and convergence of communication services</p> <p>Focus on security and green technology</p> <p>To attract investments from both domestic and foreign investors</p>	<p>Creating robust and latest digital communication infrastructure with the help of next-generation technologies i.e. 5G, IoT, AI, Cloud, Big Data etc.</p> <p>Promotion of innovation, investments for new technologies</p> <p>Ensuring sovereignty, safety and security of Digital Communication.</p>
Analysis	<p>NDCP 2018 has carried forward few missions from a previous policy like broadband connectivity, focus on R&D, innovation, attracting investments and maintaining security, the scope of the mission is vast vis-à-vis NTP 2012. Further, the transformation to the digital economy and its increasing contribution to GDP (6% to 8%) remains a challenge given the limited investments on account of recent weak industry performance.</p>	
Objectives	<p>Increase rural teledensity from the current level</p> <p>Broadband-on-demand by the year 2015</p> <p>Promote innovation, indigenous R&D and manufacturing</p> <p>Provide a preference to domestically manufactured telecommunication products</p> <p>One Nation - One License</p> <p>One Nation - Full Mobile Number Portability</p> <p>converged networks Fixed-Mobile Convergence</p> <p>Recognise telecom as Infrastructure Sector</p> <p>Adoption of the green policy in telecom</p> <p>An institutional framework to enhance the pace of human capital formation</p> <p>Policy framework for financing the sector</p> <p>Transition to new Internet Protocol (IPv 6)</p>	<p>Provide universal broadband connectivity at 50Mbps</p> <p>1 Gbps connectivity to all gram panchayats</p> <p>Develop Wi-Fi hotspot</p> <p>Ensure connectivity to all areas</p> <p>Attract USD 100 billion investments</p> <p>Increase contribution to global value chains</p> <p>Creation of start-ups in the digital sector</p> <p>Train/re-skill 1 million people with new-age skills</p> <p>Expand IoT ecosystem</p> <p>Establish a comprehensive data protection regime</p> <p>Develop and deploy robust digital communication network security frameworks</p> <p>Enforce accountability through appropriate institutional mechanisms to assure citizens of safe and secure digital communications infrastructure and services</p>
Analysis	<p>NDCP is extending NTP 2012 to some extent however objectives of both policies are very specific in nature. NTP 2012 provides preference to domestic manufacturing of products and NDCP focuses more on attracting new investments, mainly foreign investments to support the sector.</p>	
Technology	<p>Major Focus on Broadband connectivity in rural and interior parts of the country.</p>	<p>A convergence of technologies in the light of next-generation network like 5G, IoT and cloud to facilitate digital economy and society.</p>
Analysis	<p>Policy NTP 2012 had a basic objective to provide broadband connectivity to all interior parts of the country with a download speed of 2mbps.However; NDCP 2018 considers technologies as a part of the digital economy and is technically progressive to achieve larger goals.</p>	
Spectrum Regulation	<p>Unified License Regime, Restructuring Merger &Acquisition Regime, price of spectrum shall be decided by market-related processes, restructuring of a framework for VAS, Formation of new policies for a new licensing framework.</p>	<p>Restructuring legal, licensing and regulatory frameworks</p> <p>Reviewing of USOF (Universal service obligation funds), spectrum usage charges, license fees</p> <p>Rationalizing taxes on ICT equipment, infrastructure and services.</p>
Analysis	<p>Spectrum regulations are an important aspect of spectrum management. NTP 2012 and NTP 2018 have specific spectrum regulations. Spectrum ‘giveaways’ in every policy and future challenges like validity time period for auction determined prices, ceiling on spectrum holdings, criteria for allocation of spectrum in case of inadequate competition, TRAI will assist for other authorities for the formation of such regulations.</p>	

Indian National Telecom Policies: Evolution, Significance and a Perspective

Spectrum management	Allocation of available spectrum in a transparent manner The liberalisation of the spectrum to provide any service in any technology Spectrum re-farming, assuring periodic audit of spectrum utilization, Preparing a roadmap of additional spectrum	‘One nation one license’ concept for services Separation of license Promoting Cause /secondary use of spectrum. Making available harmonized and contiguous spectrum Liberalizing Spectrum sharing, leasing, and trading regime
<i>Analysis</i>	Spectrum management is important for fair distribution of natural resource ‘spectrum’ with public trust. NTP 2012 spectrum management goals differ from NDCP 2018 goals with some commonalities. NTP2012 formalised ‘market-related processes’ for deciding price at which spectrum will be made available. Though spectrum auction is the most eligible methodology for discovering price and its allocation, liberalising, spectrum sharing, leasing and trading is also an effective way for its fullest utilisation.	
What is there for Consumers?	Revising of broadband speed 100Mbps by 2020, improving number portability, strengthening consumer grievance Redressal mechanism, terminating roaming charges, increasing increase consumer awareness on tariffs, services by regulators	Provision broadband connectivity at 50 Mbps to every citizen Connectivity to all gram panchayats Creation of 4 million new jobs Establishing a strong and secure data protection regime To achieve the goal of digital empowerment and well-being of citizens.
What is there for service providers?	Licenses delinked from the spectrum Permission of sharing of networks Unified licensing regime to provide any service Relaxed M&A norms to allow consolidation.	Optimal pricing of spectrum Sustainable and affordable access to digital communication. Affordable access to spectrum The policy will attract new \$100 billion in investments in the sector.
Overall Impact	NTP 2012 was successful and achieved most of its objectives except teledensity in a rural area	Prioritisation of objectives and ensuring full implementation of the selected objectives is a helpful strategy. Key aspects such as attracting significant investments for the sector and timely implementation of policy mission’s remains monitor able.

III. ANALYSIS OF OPINIONS OF TELECOM EXPERTS IN MEDIA ABOUT NDCP 18

4.1 TV Ramachandran, President, Broadband India Forum

Key focus areas from telecom policies 2018 are: This is the first telecom policy which will go beyond telecom. Previous policies were not talking about apps, OTT, etc. Today the entire ecosystem has changed due to the use of smart phones, internet broadband apps, and innovation. It is gone beyond telecom. Regulations of telecom must adapt itself with changing technology players, apps, and innovations to have a holistic view which was not the case for earlier policies. There are a lot of challenges in this way, but regulators and policymakers must handle it. They should know the importance of satellite communication. India is a diverse country and it is a challenge and there is 70% rural area and laying fiber is a hurdle so satellite communication can be explored more and more. Telecom should not be a tool for tweaking fiscal deficit. Telecom gives millions of benefits to common men, like improvement in productivity and the economy. India has limited resources, so available resources should be channelized for digital infrastructure. Without speed, broadband is nothing and ensuring the quality of service is a challenge. This is a game-changer policy. The digital perspective of policy is very correct. There is a difference between previous policies and this policy. NDCP 18 has evolved by consulting with multi-stakeholders and so this is an incredibly good process of making any policy. This policy is unique and considers telecom levies will be

rationalized with input line credit here people get a value-added tax benefit. The policy mentions ombudsman as a feature which is needed in the sector, as the extremely poor customer experience is not addressed. Key is right levies, right spectrum charges, optimum spectrum pricing through optimal auction design by the process of TRAI consulting. This is a unique policy addressing 5 million Wi-Fi public spots requirement. According to the world norm per 150 persons – there should be 8 million public hotspots, and the government is addressing this. This is a great policy, but implementation has to be followed through effective government directives.

4.2 Rajan Mathews, Director General, COAI

NDCP 18 focuses on data security. This is a good policy document. If digital infrastructure and network are not at-par, issues like speeds will be a real challenge. Good financial health investments are important. For enhancing the financial ability of players, we must bring down license fee to 3% from 8%, spectrum charges from 55 to 1%. GST which is 18% needs to be 5%. Pricing of the spectrum should be considered. For 5G, it is expected that 100 MHz of the spectrum will be needed individually by TSP, so optimization of the spectrum is important. This policy addresses issues in the sector from an industry perspective. It aims at investments, licensing, spectrum, pricing, etc., everything is considered. It talks about customer experience and all stakeholder contribution while making process.



In existing scenario 30 paisa in 1 Rs goes to government from industry. If 20-25% of the money from 30 comes back to the industry it will boost liquidity, FDI.

4.3 Chandrasekhar, President, NASSCOM

Policy goals are not over-ambitious. The policy is positive, however, viability should be strong by investors and how we gain the confidence of investors is particularly important. We must go beyond voice and data.

4.4 Sanjay Kapoor, CEO, Airtel India

The virtual infrastructure is especially important. How we execute this policy is important. We must relook at AGR, taxation, obligation funds, etc. Spectrum pricing and how the base price of the spectrum will be deciding is important. There is the pathetic quality of service; networks don't perform indoors, so this policy talks about the quality of service as an important factor and customer experience. 5G is a different animal. In India, 5G to be viable there is a need for towers to be placed at every 30m/40m distance and looking at economies there is a huge investment for putting millions of towers to be 5G viable. Sharing of infrastructure will make 5G viable in India.

4.5 Aruna Sundararajan, Telecom Secretary and Chairman of Telecom Commission, India

India is the second-largest telecom market in the world. we should have robust infrastructure there three main points:

- i) Regulatory norms for the sector are brought down so there is the ease of business.
- ii) Sector will settle down after stress and will continue growing. We are growing 800% in terms of data there are big steps taken like in-flight connectivity, internet connectivity. There are reforms in the sector. Here, this policy has signaled to rationalize the burden of fees as players are getting little money to reinvest in the business. The government will ensure broadband for all.

4.6 Dr Ram Sewak Sharma, Chairman, TRAI

There is a focus on modern technologies in the policy. It is a consumer-centric policy. It insists on providing an affordable, robust infrastructure for citizens. Three missions this policy is: connect India, propel India, and secure India. Connect India part will be taken care of by the infrastructure building and Ferberisation. It will improve consumer experience with increased infrastructure. The security of digital infrastructure and technologies is also critical. This policy will ensure India's noticeable participation in the global digital economy.

IV. CONCLUSION

The release of the National Telecom Policy has been in accordance with changing scenarios in future trends, and technological and regulatory requirements. NDCP 2018 is significantly grand and ambitious which can act as a boon for financially stressed sector if it delivers huge foreign investments in the sector. It has brought a substantial shift from a previous policy with an aim to make society and economy more digital. This policy stresses on the fact that regulations of telecom must adapt itself with changing technology apps and innovations.

With the planned usage of new technologies, the investment requirements are also huge. The ability to attract investments and achieve a majority of objectives as per new policy remains monitor able. Success or failure of policy will be

judged upon the achievements of policy and objectives which remain unachieved. The targets of policy should be in-sync with the intent of the policy. They should be fixed after considering resources. The best way to achieve targets of NDCP 2018 is to rethink, relook, and priorities realistic targets, and create stretchable realistic targets which can be achieved with efforts. Timely implementation of the policy with a well-defined plan to achieve the objective remains critical for the success of the policy.

NDCP 18 is unique in its nature which will facilitate financial stability to the stressed sector, which includes modern technologies, aims at licensing, customer experience, quality of service and multi-stakeholder consulting approach while making of this policy, makes it different than other telecom policies. NDCP 18 is beyond telecom, which will ensure India's place in the global digital economy. NDCP 2018 is more customer-centric and application-driven policy which is ambitious, propelling huge investments in sectors (\$100 billion till 2022) and increases the sectoral contribution of GDP to 8% from 6%. It considers issues in the sector from an industry perspective as well. It will not only rationalize levies but also focuses on spectrum pricing. Though affordability and reliability of telecom services for all citizens remain critical in each policy the overall vision, mission and objectives change concerning market affairs.

REFERENCES

1. Gao, P., & Damsgaard, J. (2007). A framework for understanding mobile telecommunications market innovation: A case of China. *Journal of Electronic Commerce Research*, 8(3), 184–195.
2. Gasmi, F., & Virto, L. R. (2010). *The determinants and impact of telecommunications reforms in developing countries*. *Journal of Development Economics* 93, 275–286.
3. Gual, J., & Jódar-Rosell, S. (2009). European Telecoms Regulation: Past Performance and Prospects. *Competition Policy in the EU: Fifty Years on from the Treaty of Rome*. <https://doi.org/10.1093/acprof:oso/9780199566358.003.0009>
4. Jayakar, L. (2012). THE EVOLUTION OF TELECOMMUNICATIONS POLICY-MAKING: COMPARATIVE ANALYSIS OF CHINA AND INDIA. *Telecommunications Policy, Volume 36*, (Issue 1.), 1–14.
5. Johnson, J. (2012). *Deregulation of Indian Telecommunication : An Analysis of Customer Benefit*.
6. Levy, B., & Spiller, P. (1994). The Institutional Foundations of Regulatory Commitment: A Comparative Analysis of Telecommunications Regulation Author (s): Brian Levy and Pablo T. Spiller Stable URL: <http://www.jstor.org/stable/764966> The Institutional Foundations of Regulatory Com. *Journal of Law, economics, & Organisation*, 10(2), 201–246.
7. Paleologos, J. M., & Polemis, M. L. (2013). What drives investment in the telecommunications sector? Some lessons from the OECD countries. *Economic Modelling*, 31(1), 49–57. <https://doi.org/10.1016/j.econmod.2012.11.038>
8. Pritish, M., & Saxena, T. (2015). An analysis of the Indian telecom industry. *IOSR Journal of Business and Management*, 17(10), 35–42. <https://doi.org/10.9790/487X-171023542>
9. The, S. W., & Bank, W. (2003). *Regulation and Internet use in Developing Countries*. (March). Retrieved from <http://ccon.worldbank.org>.



Annexure: World Reforms after the 1990s

r. No	Name of country and year	Telecom circumstances
1	Argentina November 2000	The liberalisation of voice long-distance and international telephony offers full competition other than voice such as data competition, offers open competition in mobile telecom services
2	Australia July 1997	Offers unrestricted competition. Permits foreign equity up to 11.7% to Telstra, removed foreign equity limitation of Optus.
3	Bangladesh 1990	Liberalisation started with baby steps from 1989. Commits to full competition in voice and data transmission.
4	Belize 2003	Commitment to allow open competition
5	Bolivia November 2001	Offers competition in domestic as well as international services.
6	Brazil 1999	End of monopoly and introduction of improved commitments of public telecom services.
7	Canada 2000	Scheduled Routing restrictions and foreign equity limits
8	Chile	Offers full competition in the national international market.
9	Columbia 1999	Offers full competition in basic telecom services.
10	Portugal	Liberalised market 1999
11	Spain December 1998	Liberalised in December 1998 and removed 25 % foreign equity restriction
12	Ireland	Liberalised in 1998
13	Greece	Liberalised in 2003
14	India 1994	Reforms through new policy

AUTHORS PROFILE

Ms. Mugdha Mujumdar is a Ph. D. research scholar at Symbiosis International (Deemed University). Her area of research interest is telecom policies, telecom governance, and customer grievance management.

Prof. Abhijit Chirputkar - Prof. Chirputkar is a Chartered Accountant and has a CISA certification from ISACA (USA). His research interest is Finance, Valuation, Derivatives, Audit and Assurance, Risk Management

Dr. Prasanna Kulkarni Experienced Associate Professor with a demonstrated history of working in the education sector. Skilled in Audit, Direct Taxation, and Consultation. Strong Professional Qualification (ICAI) with a Ph D in Management and a Master's Degree in Accounting, Taxation and Auditing from University of Pune.

Dr. Giri Hallur working as Associate Professor at Symbiosis Institute of Telecom management, a constituent of Symbiosis International (Deemed University) His area of research interest is telecom management, telecom and IT governance, and telecom technologies.