

**Spectrum Allocation in India:
A Brief Institutional Analysis**

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BONAFIDE CERTIFICATE

This is to certify that this project report entitled “**Spectrum Allocation In India: A Brief Institutional Analysis**” submitted to Centre of National Policy Research, is a bonafide record of work done by **Tanmay Juyal** under my supervision from 15th May to 30th June, 2021.

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ABSTRACT

As we enter the new status quo of a post-pandemic world where we have witnessed an exponential rise in the usage of the internet, the process of spectrum allocation as an enabler of the same is something that must be recognised, and granted its due importance.

An efficient allocative process is necessary to enable an optimal distribution of the bandwidth available with the government, not only towards generating maximum revenue, but also towards increasing digital penetration and accessibility for a greater section of the society.

This short report examines the historical evolution of Indian spectrum allocation policy, and provides a brief institutional analysis of the current state of the same, comparing the structural frameworks governing the allocation process in both the US and the EU.

TABLE OF CONTENTS

Declaration	3
Abstract	4
Spectrum Allocation	6
Historical evolution of Indian Allocative Process	8
Macro-Structural Comparative Analysis	13
The Way Forward	16
References	17

A Brief Overview of the Institutional framework of Indian Spectrum Allocation

Communication technology, with its rapid advancement and the resulting all-pervasive nature has led to a radical shift in society as we know it, and has come to dominate almost all spheres of human existence, ranging from all kinds of economic activity to the very nature of human leisure; in the twenty first century, effective provision of telecom services is an integral part of any state's institutional machinery.

Consequently, the telecom industry plays a crucial role, which is not only limited to the functioning of a state, but also its economic development and national security. Multiple studies have concluded that a direct, causal correlation exists between the extent of a country's telecommunication infrastructure and its economic development, with a statistical coverage of twenty two OECD countries discerning that on average, a 10% increase in overall accessibility and penetration brought about a 2.8% increase in the GDP (Roller and Waverman, 2001). Further, not only has the sector witnessed exponential growth in the last decade, all prediction models suggest that the trend will continue, with rapid advancements in technology and accessibility. (Ericsson Mobility Report, 2020)

The telecom industries in most countries started as an entirely government owned public sector enterprise, due to three key reasons. First, the technology was in its infancy and the market entry threshold was extremely high due to the need for extensive cables or satellites in orbit, which rendered it unviable for private entities. Second, the nature of the technology

itself restricted its applicability and accessibility, and consequently, there was no large-scale market for telecom services outside of the government, which reduced the profit incentive for potential private players. Third, the technology was vital to the functioning of the government, with the onset of globalisation and radio media as a form of public engagement, and other national security based reasons as well.

There was a shift in this status quo towards the tail end of the twentieth century, with the free market emerging as the dominant global economic ideology towards the end of the cold war, accompanied by a wave of privatisation and deregulation in various different sectors. Further, the technological advances led to an exponential increase in accessibility and penetration among the masses, creating a market and a profit incentive for the entry of private entities, which led to a partial privatisation of the telecom industry in most countries, with heavy regulation by the state in form of licenses and higher entry thresholds.

Spectrum Allocation

Communication waves, the technology that allows any kind of wireless transmission, operates across a broad bandwidth of frequencies, with the variations accounting for different forms of communication ranging from mobile services, internet bands, GPS communications, television and radio waves, and so on. While not a depletable resource, the nature of the technology limits the spectrum and bandwidth available, so to ensure efficient usage allocation and consumption along with a greater penetration and accessibility without compromising national interests and security, optimal allocation frameworks and mechanisms are required..

This paper examines and analyses the institutional mechanisms which dictate spectrum allocation in India, with a longitudinal historical study of how the allocation frameworks and policy developed over time, highlighting the key drawbacks with a comparative perspective, incorporating frameworks from various different countries.

Before proceeding with the analysis, the two most common spectrum allocation models followed across the world are presented.

Comparative Hearing: The Comparative Hearing Model, followed by Canada and a large number of European countries, operates as an administrative allocation model - the government sets out a variety of specifications and prerequisite conditions, which have to be met by the operator in order to make a bid. Once the bids come in, the government analyses the proposals with sectoral experts, taking into consideration several factors like the prior experience of the company in the sector, the technical expertise possessed, the ability to securely deliver upon the proposal and the preconditions, and so on. This allows for significant flexibility for the government to curate and accept proposals, but at the same time, it has been criticised along the lines that it allows for private lobbying, favoritism, and reduces transparency.

Auctions: The spectrum is awarded to the highest bidder following a competitive bidding process, and has some crucial advantages over other allocation mechanisms which has made it the most popular across the world. They include its speed, transparency, and encouragement of efficient usage of the spectrum. However, auctions are only viable when there is a non-insignificant number of bidders in the market.

Historical evolution of Indian Allocative Process

India, prior to its liberalisation and deregulation of major industries, had a strictly governmental regime operating the entire telecom industry. With the onset of

liberalisation, there was a marked shift in the telecom sector as well, culminating into the National Telecom Policy, 1994.

A transition into a market regime for a highly technical sector like the telecom industry is a complex one, which was further exacerbated by that fact that India, as a third-world country that had followed central planning for a substantial period, had governance structures and

regulatory institutions that were ill-equipped to deal with regulation and privatisation on this stage and scale.(Jain, 2014)

National Telecom Policy, 1994

The National Telecom policy acknowledged the fact the government couldn't achieve the broader envisioned objectives without incorporating private entities into the process. As a result, the first allocations were made in 1994 by the incumbent licensing authority and regulatory body - the Department of Telecommunications, following the comparative hearing model, and two entities were awarded licenses for the same. While the market was still in a nascent stage and the model had provisions that ensured the technical capabilities of the entities awarded with the licenses, it was a rudimentary process, which was revised in the following year. From 1995 to 1998, the government invited bids from private entities, and licenses were provided via a single stage auction, with two licenses provided for non-metropolitan cities, while the metropolitans still followed the original comparative hearing model. Further, the government had also realised that with the influx of privatisation and private entities within the telecom sector, there was a need for an independent regulating authority, which led to the establishment of TRAI in 1997.

However, there were several key drawbacks in the institutional process, which didn't account for the nascent market, and the exponential growth of the demand for services. In one instance, a single entity obtained licenses for nine different regions, and eventually failed to reimburse the licensing fees

New National Telecom Policy, 1999

Cognisant of the flaws in the erstwhile framework, along with the rapidly changing nature and demand for the technology, the government came out with the New National Telecom Policy in 1999, which aimed to address some of the key drawbacks of the allocation

process and the resulting distributions. The Act introduced several provisions that aimed to amend a few aspects of the same - transparency was to be prioritised, allocations to each entity was capped at 3 to prevent monopolies, and larger bands were to be made available, in face of rising demands.

While well intended, the resulting changes in the mechanism failed to address the shortcomings - the majority of the bandwidth was still allocated to and hoarded by the Defense ministry, which was criticized to be severely underutilised and mismanaged. Further, the base rates for spectrum available through auctions were high, and sections of the spectrum went unsold. As a result, there was a radical restructuring of the allocation process, and 2001 onwards, the DoT switched to an administrative allocation model, instead of auctions.

Administrative Allocation: 2001-2010

From 2001 onwards, the auctions were done away with and a base level of spectrum was allocated to all license holding entities, with additional bands provided following the aforementioned comparative hearing model, on the basis of a variety of parameters like the zones the entity was active in, subscriber base, type of spectrum band infrastructure available, and so on.

While this approach aimed to rectify some of the institutional issues with the allocation process, the administrative allocation procedure led to a different set of issues, which exacerbated the problem. Transparency, essential to the functioning of any comparative hearing based models, was overlooked, and spectrum was often allocated on a first-come-first-serve basis. Following the introduction of the UAS (Unified Access Services) Licenses in 2003, a long term license proposed by the TRAI, over 200 licenses were granted from 2004-2008 on a first come first serve basis. This eventually culminated into the 2G scam case, which triggered investigations into these cases, and revealed that a number of these entities were ineligible for the licenses due to reasons like lack of technical expertise, existing infrastructure, relevant experience, and so on, and there had been instances of arbitrary allocation favoritism for political and personal reasons.

Further, there was also the issue of the base level of spectrum allocated, which was deemed by most operators to be inadequate. Further allocation was a deeply administrative process, and there was no clear parameter on the basis of which it was to be allocated; eventually, it came to be tied down to the number of subscribers, whereupon the operators began artificially inflating the numbers

National Telecom Policy, 2012

The 2G Spectrum Scam triggered several investigations, with the Supreme Court cancelling a majority of the licenses issued over the period of first come first serve allocations. This culminated into the revision of National Telecom Policy in 2012, which recognised the need for market structures within the telecom sector to ensure efficient allocation and utilisation of the services, and made auctions mandatory. However, some bands of the spectrum continued to be allocated due to technical and infrastructure based reasons

This phase can be labelled as a transitory phase, where the allocation mechanisms became increasingly market oriented, with regular, competitive auctions, coupled with the exponential growth of the sector leading to high earnings for the government. New bands of spectrum were also put up for auction, as technology progressed and the market penetration increased.

National Digital Communications Policy, 2018

While the National Digital Communications Policy replaced the incumbent National Telecom Policy, there was no radical restructuring of the spectrum allocation framework, and was aimed at providing a greater penetration, and tapping into the new rapidly advancing technologies, which had been structurally limited by the previous policy. However, while there has been no structural overhaul of the allocation process, it has been incrementally moving towards a market oriented process with the inclusion of different deregulation mechanisms that had been absent in the nascent stages post the 2012 restructuring.

A few of the key deregulatory changes that signified a shift in the institutional approach towards a market oriented regime are listed as follows.

- **Spectrum Liberalisation**

In both, the legacy National Telecom Policy phase, and the post-2001 administrative allocation phase, the spectrum provided to the private entities was heavily regulated, with strict restrictions imposed upon the usage and transferability of the spectrum provided to the private entities

However, the transitory phase introduced major deregulatory elements into the system, and the spectrum allocated to private entities through auctions was 'liberalized', i.e. The spectrum was tradeable. To the private entities, this provided increased ownership rights to the leased spectrum and greater discretion with respect to the usage of the same. A norm in most market-based developed economies, this was an important step towards deregulation and creating a more efficient market regime in the telecom sector.

- **Defined use with respect to technologies and services**

Similarly, the previous policy frameworks imposed strict regulations with regard to the usage of the spectrum leased - the available bandwidth could be used only with government mandated technologies. While it could be argued that it was a reasonable restriction in the nascent stages of the industry, when technology was limited, it began to act as an impediment to growth and innovation as new communication technologies were rapidly being devised and used globally. It soon became apparent that regulation would be a long term obstacle, and deregulation was the way forward.

The transitory phase removed all regulation with respect to the same, and the operator enjoys maximal discretion with regard to the usage of the spectrum leased to it, providing greater ownership rights towards creating a stronger market system.

- **Unified Licensing**

Spectrum is a collective term used for a wide variety of bandwidth frequencies used by different communication devices - different forms of communication takes places on different frequencies - for example, different bandwidth would be required for 2G internet, 3G internet, cellular calls, GPS devices, television services, radio services and so on. A major regulatory hurdle present in the legacy and the administrative allocation era was the fact that separate licenses were required for all different bandwidth frequencies, making provision of holistic services a long and arduous administrative process. The 2012 policy introduced a single unified license which allowed the license holder to purchase all bandwidth frequencies, exponentially decreasing the administrative and bureaucratic processes involved in licensing, and streamlining and deregulating the process .

- **Transaction Costs**

Mandatory transaction costs required at different stages of the administrative process have been reduced significantly

- **Exit Policy**

An exit policy includes procedures that a private entity would have to follow if it chooses to exit the sector after spectrum has been leased to it. Strict policies incorporate provisions that make it detrimental to any private entities that choose to exit prior to the contractual termination. This not dissuades new entities from entering the market, and promotes exclusivity and closed, regulated markets. Both the legacy era and the the administrative allocation era had fairly strict exit policies, which controlled the market and discouraged greater private participation. With the deregulation in the transitory phase, the exit policy was amended to be much more flexible and adaptable, providing the private entity with a measure of discretion with reward to exiting the sector, which in turn has encouraged a deeper private participation, in turn leading to greater competition.

Macro-Structural Comparative Analysis

The Indian Spectrum Policy has evolved over the years towards a more efficient, market-based model, however, it still suffers from some macro-structural institutional issues that inhibit the proper functioning and development of the same. To contextualise these issues, this paper compares the governance practices and institutions in the European Union countries and the United States with the relevant allocation structures and mechanisms in India.

Disproportionate Defense Allocations

On comparing and contrasting these systems, the first discrepancy brought to attention is the comparative lack of spectrum available to be allocated to private entities, as a percentage of the entire available spectrum. A significantly greater percentage is allocated to the Defense Ministry in India, as compared to the respective parallels in both EU countries and the US. However, it must be acknowledged that India is located in a geo-politically sensitive zone, flanked by nuclear states that have had hostilities with India in the past, and consequently, national security is a priority. Regardless, various analysts and experts have stated that the spectrum allocated to defense is severely underutilised and mismanaged, and more efficient usage would lead to a greater availability for the rest of the country.

As a result, the absolute bandwidth available to the private sector in India is significantly lower and costlier than that in other countries that follow a more balanced approach towards defense allocation, and are cognisant of efficiency benefits accrued from greater involvement of the private sector, which is something India has traditionally lagged behind in.

While there have been recent developments on this issue, with spectrum being freed up from defense and being allocated to the open market, the gap continues to be significant in comparison to other countries, and a balanced approach is absent.

Formulation of Spectrum Allocation Policy Mechanisms

Another important structural distinction between the Indian Spectrum Policy, and that of the US and EU countries, is the frameworks for the creation and development of the same. In India, the policy mechanisms governing the allocation process are created by the Ministry of Communications, the overarching body of Department of Telecommunication, with minimal stakeholder engagement, while the US and the EU have multiple government institutions engaging and negotiating towards creating the body of rules and mechanism, and are often also guided by external agencies.

In the EU, the broader theoretical framework is established by the NATO and the EDA(European Defence Agency) guidelines, and the national institutions meaningfully collaborate with policy groups and relevant stakeholders towards creating a flexible system.

In the US, the policy is joint effort between the Department of Defence, and the Department of Commerce, with significant influence exerted by the Federal Communications Commission

On the other hand, in India, the procedure is largely executed by the Ministry of Communications, with minimal engagement with the Defense Ministry, or any private stakeholder.

Governance Institutions

An important element in a spectrum allocation model is the accountability mechanism, which is often present in the form of an agency that ensures that the stipulated rules and procedures are adhered to during the allocation process.

In most EU countries, this responsibility lies with national agencies who answer directly to the head of the state, which ensures that the agency has the bureaucratic support to intervene in the allocation process. In the US, the FCC is responsible for all commercial spectrum allocations, and the Department of Commerce for the government spectrum allocation - both are eminent bureaucratic bodies that answer directly to the president.

While in India, the Wireless Planning and Coordination Wing of the Ministry of

Communication is responsible for ensuring accountability and adherence to the stipulated policy procedures. However, it occupies a comparatively lower position in the bureaucratic hierarchy, which restricts the interventions it can make in the ministerial negotiations - as a result, there is a lack of accountability in the allocation process.

The Way Forward

While the switch to a market regime for spectrum allocation has certainly improved the efficiency and led to greater revenues for the government, some macro structural issues still remain, which will act as limiting factors as we go forward. This is especially true in the post-pandemic era, with the proliferation of work from home and distance learning models, that has led to an exponential growth in the telecom sector - now, more than ever, the efficiency of spectrum allocation can act as an enabler for economic progress and prosperity. Notwithstanding the probable impermanent nature of the pandemic, it is certain that the changes it brought about in work and labour would be adopted as a norm in certain sectors, and the nature of work will not return to the original status quo. In India, the absolute amount spectrum available for private entities and public consumption is still substantially lower than the international norms, along with higher prices for spectrum. A lack of balance between public and defence allocations has not only rendered it prohibitively expensive, but has also allowed private players with deeper pockets to purchase vast bands of the spectrum and sell it to consumers at highly subsidised rates, towards creating a monopoly. Unless the structural issues leading to scarcity and high costs are not addressed, the connectivity costs to the Indian consumer will inevitably tend upwards, to a point that it might not be affordable in sufficient quantities to the common man.

Consequently, the current model is not sustainable for long term growth, and the institutional drawbacks need to be addressed towards creating a more efficient system

which is not a bottleneck for the development of the Indian state, as it is currently poised to be.

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