Book Chapter Summary

Chapter-1

Consumer adoption and usage of technological advancements promote the research and development of an industry. The need for better mobile services and technologies led to the invention of several mobile generations, and a sector once only voice centric started providing basic data services which eventually propelled the industry & academic circles to come up with better standards with the potential to make mobile communications truly ubiquitous.

0G systems used radio communication which were half duplex and are considered to be pre-cell phone mobile technologies. 1G networks facilitated two way full duplex communications and 2G systems fostered the use of data services. 3G systems supported high speed data and video services. Video on demand became possible with 3G networks. Seamless roaming and making the mobile a one stop portal for all conceivable digital needs is the aim of the 4G networks. Partnership projects such as 3GPP & 3GPP2 have played a key role in establishing the new generation telecommunication standards.

ITU is an international body that monitors telecom growth and helps in the development of standards for the sector. In this chapter we looked at key telecom statistics among the 6 regions as classified by ITU, which helps in monitoring the growth of the sector every year. Technology map helps us in understanding the level of technology adoption & market growth in this sector across the globe.

In the next chapter we shall use this ITU classification of regions and understand more about the growth in telecom sector from the year 2000-2011. We shall also look at top 30 telecom firms in terms of brand value and present you the information about the market, telecom acts & governing bodies in telecom sector worldwide.

Chapter-2

Chapter-3

The Indian telecom industry is capable of providing world class services to subscribers with the latest technological standards at affordable rates. Remarkable improvements have led to an increase in the subscriber base, and quality standard, due to favourable policies that promoted competition and fair practises in the sector. The new paradigms for the industry are greater access to information, growth of broadband and empowerment of the individual. Privatisation and liberalization have enabled faster rollout and improved quality of services. NTP-1994 has liberalized the sector enabling the growth and with NTP- 1999 put into effect the sector over performed in terms of mobile subscriber growth which eventually drove the industry to become the 2nd largest region in terms of mobile subscriptions in the world. The establishment of independent bodies such as TRAI & TDSAT enabled the adoption of fair practises by all industry players and also helped build investor confidence in this sector.

With industry forecasts of future growth driven by data services, many operators started providing mobile internet services. The Government introduced the Broadband Policy in 2004 and Broadband Plan in 2010 with the aim of connecting the entire nation through broadband. NTP-2012 focuses on empowering the citizen and making mobile the one stop resource for all information and communication needs. With the mobile assuming an important role in the life of the ordinary citizen and the launch of 4G services in India, it is now extremely important to ensure full utilization of spectrum for mobile services. The growth trends in subscriber base, teledensity and HH index present the overall picture of Indian telecom sector. The next chapter focuses on the need for spectrum management and existing policies and recommendations on spectrum allocation and its efficient utilization.

Chapter-4

Spectrum management and planning is an important activity for the ministry & regulator. in planning the future . Protecting the interest of industry players and subscribers is of critical importance, and technologies that can potentially benefit subscribers must not be prohibited on account of scarcity of spectrum. Several methods such as spectrum refarming and trading have been suggested as efficient ways of managing spectrum.

Spectrum auctioning and licensing has been discussed in this unit leaving the readers with three key factors the authorities must consider - frequency bands, minimum reserve price and auction design. From the regulatory and policy perspective, spectrum auctions ensure efficient usage by allocating it to those entities that value it the most, while also generating revenues for governments. However, auctions may lead to unexpected outcomes as, for example, when regulatory agencies have inadequate market information, there may be a mismatch between expected and actual bidder behaviour or auctions may be poorly designed. The key challenge before regulatory agencies is to design auctions in such a way as to meet the objective of fostering competition while, at the same time, ensuring that bidders can effectively use the spectrum for their business. 3G spectrum auctioning process in India was a successful process where the activity rules and eligibility conditions resulted in true market price for the spectrum. The 3G auction process also put a check on collusion and avoided speculation to the greatest extent possible.

In the following unit we shall present an overview of 4th generation mobile technology standards and the technology ecosystem in detail.

Chapter-5

Supported spectrum bands and device eco system play a very important role in the adoption of any technology. It may be conclusive to say that both HSPA+ and LTE will grow and adopted by the masses in the near future. However, the inherent advantage of LTE i.e. higher spectral efficiency, scalability and compliance to IMT – Advanced will make it the technology of future and we will see a large number of operators around the world directly migrating their networks from 2G to 4G.

In the next chapter we introduce Mobile Virtual Network Operators (MVNO) as a new business model for the Indian Telecom Sector.

Chapter-6

A detailed analysis of the global emergence of MVNOs — time of entry, evolution of the business models, impact on the mobile market and regulatory standpoint — has been presented. This has been mapped to the current Indian cellular market. The authors analysed the pros and cons (impact) of the guidelines proposed by TRAI after reviewing the comments from all stakeholders in terms of need, timing, infrastructure requirements and regulatory role and offered some suggestions.

A different approach is needed in metros and rural areas due to contrasting market conditions in terms of competition and penetration. In metros, due to the strong retail competition, MVNOs should adopt a niche strategy and produce product discrimination instead of employing a discount strategy, which tends to compete with the host MNO. Only then can they have a long-term sustainable business model and voluntary relationships can be made, although the regulator needs to maintain a watchdog position.

In rural areas, MVNOs can start with low price strategy but regulatory support is required for both MNOs and MVNOs because of capital intensive networks and low revenues. The principle of separating the service segment from network development has to be employed. This avoids disincentives for facility based operators and regulators could consider mandating open access to MVNOs. Some prerequisites such as number portability, numbering scheme and development of a wholesale market have to be in place to support MVNOs. With regard to the infrastructure, all types of MVNOs should be encouraged in the market which will support the innovation, consumer welfare and MVNO growth. Different MVNO value propositions and regulatory approaches in urban and rural areas and tackling entry barriers are the authors' suggestions for successful MVNO entry in India.

Chapter-7

The transformation in telecommunications has accomplished what our socialist policies couldn't achieve. There is a cost for any service and understanding it is very complex. But the service provider has to recover the cost and remain in business. The telecom sector's objectives cover a wide canvas including enhancing efficiency and flexibility of operation, financial viability of the sector, promoting investment and innovation, stimulating demand and competition, addressing unfair competition, providing high quality service to consumers and meeting social objectives such as universal provision of telecom network services at fair and reasonable rates. At the same time flexibility to offer innovative plans and respond to competitive pressures would be in the interest of service providers and consumers. One can easily conclude that the trigger point for the telecom revolution in India originates from introducing cost orientation to tariff by the Regulator. Regulators seek to achieve three primary objectives namely:

1. **Financing Objective:** ability of operator to achieve sufficient revenue to finance ongoing operations and future investments;
2. **Efficiency Objective:** Efficiency is achieved when prices equal marginal cost of producing the service and/or when increased levels of output are realized through unchanged levels of input;
3. **Equity Objective:** Equity objectives generally relate to the fair distribution of welfare benefits among members of society. Operator-operator equity and Consumer- consumer equity is desirable.

From a Public Policy point of view, the price (tariff) need to be economically efficient, ensure any to any connectivity, provide the right entry signals to investors, ensure fair cost recovery by an efficient operator and must reflect the closest approximation of Price in a fully competitive telecom market. From the various pricing theories and practices prevalent today, only Forward Looking Long Run Incremental Cost (FLLRIC) methodologies meet these criteria and have been met with consensus from policy-makers and regulators.

Chapter-8

An evolution of the way in which the telecommunications business is conducted is imminent, and needs to be embraced by all stakeholders. The future growth of the telecommunications industry hinges on a new system of cooperation and coordination between these stakeholders. It will also be of critical importance to keep business models flexible enough to exploit new opportunities. In April, 2014, Microsoft announced a drastic shift in its business model. For an organization clearly driven by its Operating system for most of its existence, to renounce market mechanisms and declare free distribution of its OS for devices with screen sizes less than 9 inches, is a bold move in the least. In an effort to increase Windows' market share in mobile devices, this strategy is slated to give competition (iOS and Android) a run for their money.

Operators, equipment and device manufacturers, content providers, regulators, and infrastructure providers need to work together to enhance the value created at every stage of the telecommunications value chain, all with the view to enhance value for the customer, and in pursuit of this target, improve the overall health of the industry as well as individual stakeholders. What will this new world of cooperation and coordination look like? Only time will tell.

Chapter-9

The Indian Telecom sector has been a huge success story so far. The sector has witnessed unprecedented growth and in no time, has climbed to world's second largest telecom network in terms of number of subscribers. The credit very deservingly goes to the approach of the regulator and the Government who have involved the telecom service providers in the decision making process. The regime has been built on transparent, fair and just principles with a nondiscriminatory approach. As a result, the consumers are enjoying one of the lowest telecom tariff in the world.

However, there are some glitches, which remain to be addressed. In line with the Government of India's resolve to facilitate ease of doing business, there is a need to mandate a Nationwide Right of Way policy which streamlines the procedures and prescribes a nominal fee for laying of fibres, ducts and rolling out telecom towers. In this context, the sector will also be immensely assisted in case the Government comes up with the campaign to address the fears in the mind of public regarding radiation from towers. There is need to reduce litigation by introducing clarity in the revenue share principles and the slabwise penal norms in case of license violation, which should be dependant on the seriousness of violation. The other aspect which needs immediate attention is the rationalization of various fees in terms of spectrum usage charges, license fee and Universal Service Obligation fund – due to reasons elaborated in this chapter. With the ever expanding growth in the demand for data services, The Government and the regulator may also come up with a comprehensive 5 year plan to release sufficient spectrum for the telecom sector.

Chapter-10

In an era where services/applications over the internet are substituting public telephony and to a large extent even broadcasting, it is becoming increasingly important to take note of what has so far made the latter platforms successful in their respective spaces, and to apply the principles that made them affordable for the consuming public.

The modern Net neutrality agenda promotes a one size fits all approach that ignores the economics of internet access. This is apparent in the case of countries where Net Neutrality legislation exists and because of it, operators have been discouraged from offering free Internet; a result that seems at odds with the goals and intent of the principle. Strict Net Neutrality, which would ensure that interconnection between stakeholders/networks is predicated on similar speeds, similar traffic and similar QoS would in a sense lead to the militarization of the internet, and lead to the end of the democracy that has been fundamental to the development of the modern Internet. At the losing end of the battle would be consumer welfare, and as demonstrated by many scholars such as Becker et.al (2010), the interrelationships in the current internet ecosystem are more complex than claimed by net neutrality proponents and do not provide a compelling rationale for regulation.

Chapter-11

There is a paradigm shift in Telecommunication world with the evolution of mobile devices, education becoming more social , video has started playing more dominant role be it for downloads or uploads or for collaboration. Virtual world has a telling impact on the real world. Networks need to handle bandwidth flood to the tune of Peta Byte/ Exa Byte/ Zeta Byte because of the afore-stated paradigm shift. IP is in the center of everything and Telecom Networks are evolving to IP ready Access, Aggregator and Core for better Application level sensitivity management. Telecom Networks are also expanding to provide 100Gig connectivity with better network resilience models.

Telecom Service Providers are coming-up with innovative products and solutions for moving-up in the value chain by leveraging the modern day Telecom Networks. It may be in the form of Hard Bundles of modern day networks, devices and managed services e.g.: Managed Video Conferencing Service (A Bundle of Highly Resilient MPLS Network, Video Conferencing Equipment and Bridge Services). OVCC (Open Visual Communications Consortium) is another example wherein Video Networks of multiple Telecom Service Providers and created a Global Video Conferencing Exchange. SLAs for such services are in the form of continuity of High Quality Video Conference (Telepresence) to the users, which is derived from various ingredients from Networks, Equipment and Bridge. Another example is Video Carriage Networks which provide high quality of service for High Definition Television Broadcast from remote locations for events and news from various last mile access mediums. Tele-Education and Tele-Medicine solutions are some other examples wherein such interplay of modern day networks and technology (equipment) is visible globally.

In the mobile world, solutions like Vehicle Tracking Solutions, Point Of Service Kiosks, real time Inventory management, Video Surveillance, Mobile Valet are some other examples of such innovations. Telecom Service Providers are betting on innovations spreading over modernization of Telecom networks, IP ready platforms, new products & services to emerge as a catalyst of change which would enable them to stay ahead of new entrants i.e., OTT operators and likes of Google, Microsoft & Apple, in their domain.

Chapter-12

Improved data speeds by 3G & 4G technologies which are being used by the subscriber enabled the adoption of several value added services on mobile. The quality of life is improved through quicker information delivery & use of plethora of applications on mobile platform. Both the consumers and the application industry had benefited by the changes in the sector. Regulatory concerns exists as a result of changing telecom business environment by the entry of OTT players. This emphasize the important of having proper regulatory framework to overcome any unhealthy scenario for the business environment and promoting technology & innovation in this sector. Organizations have brought friendly policies such as BYOD so that the users can benefit the flexibility the policy offers. Every technology is not void of the negativity it bring with it and mobile platform is not exception in this case. Every user has to be aware of possible threats due to improper usage practices with the mobile. Industry has made considerable progress in mitigating the risk through Identity Management solutions. But equal action from the user through best practices is required to ensure both the device & data safety.