FEASIBILITY AND VIABILITY ANALYSIS OF ENHANCEMENT OF MOBILE SPECTRUMS (WITH SPECIAL REFERENCE TO 2G, 3G, 4G AND PROPOSED 5G)

[1]SHREY KUMAR, [2]GURENDRA NATH BHARDWAJ

[1]Student, B. Tech (ECE). 2013-17, NIIT University, Neemrana, Rajasthan. (INDIA)
[2]Associate Professor& Deputy Registrar (Academic Operations), NIIT University, Neemrana, Rajasthan. (INDIA)

Abstract- The growth of telecommunication leads to the economic growth in manifold for the country. In recent years when the user's demand has changed significantly, the composition and structure of telecommunication industry has also changed a lot. It directly contributes in GDP, Government Revenue, and Employment, by lowering transaction costs, by providing faster access of information; it improved various services like health care, education, banking, insurance aviation, transport and other sub sectors of the economy.

On the other hand, it has forward and backward linkage with mainly Data Intensive Industries, IT hardware and software, electronic equipment industry, and infrastructure industry etc.

Change in technology and user's demands at micro and macro levels have also brought technological advancement in the telecommunication industry. Therefore, enhancement of mobile spectrum from 2G to 3G, 4G and beyond has created various opportunities and threats to different economic, social and technical segments.

The present study is an attempt to examine the mobile feasibility of spectrum enhancement from multi dimensional aspects. The study will also focus on present and future challenges of this sector.

Keywords- Spectrum, Secondary Trading, Mobile Eco System, Data Intensive Industries.

INTRODUCTION

The Telecom industry has experienced humungous changes in the last decade: from 15% in 1999 to 70% in 2009 of people had access to telephone. Telecom sector is improving day by day. We can say that in the coming years the telecom sector is going to increase very rapidly because the industry is developing at a faster pace. The global revenue of the telecommunication industry has reached $2.1 trillion in 2012 with an expectation of a rise to $2.7 trillion by 2017.

As per the report of GSM Association on developing markets, during 2008-2011, 10% shift from 2G to 3G, the GDP growth increment of 0.15% was observed. The main parameters on which the telecom sector affects the GDP of India are:

(i) Teledensity.
(ii) Market Penetration.
(iii) Innovations (You can say that, if innovation in this area is more, teledensity will be more).
(iv) Policies made by the Government
(v) Mobile Data Consumption.

Efficient spectrum must include right amount of allocation to specific classes of users, assignment of usage rights and adjustment of established policies as technology and market evolves overtime. (Bauer 2008). Now due to change in customer's preferences (retail and institutional), the telecom service provider need to rebalance the spectrum usage assignment to optimize the cost and to maintain constant growing profit figures.

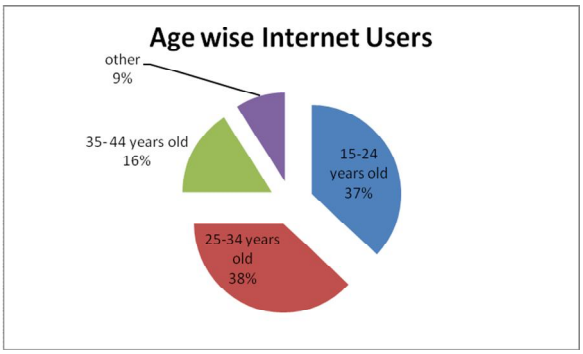
Govt. of India invested Rs 7000 crores for high speed wifi in country over the next three years. (Government of India has invested a huge amount to supply 2500 cities and towns with high speed wifi and government areas such as railway station, hospitals etc.). Govt. has now allowed 100% FDI in the telecom sector. Union cabinet of India invested Rs 64,840 crores for the largest ever telecom auction.

This trend may continue as the consumers in this industry are continuously multiplying. It is predicted that India will have the largest number of internet users by 2025 according to a Microsoft report.

In telecom sector, the migration is taking place gradually from 2G to 3G/4G; therefore many service providers are maintaining all three levels of spectrums. Presently the penetration of 2G is decreasing gradually worldwide replaced by 3G/4G. The pace of migration is so fast that while 3G took about 10 years to reach out to half of the population, 4G will get the same milestone in nearly 8 years in context to India. The migration and current multiple level of network like 2G, 3G and 4G involves huge capital and operating cost to serve all types of customers. As per the Mobile Economy (2015) GSMA, Low level of technical awareness about spectrum enhancement creates a lot of challenges because the capable buyer has little knowledge of all these operations due to age and other factors, while technically sound youngsters who love to enjoy higher bandwidth but are not so financially sound because of their high financial dependence on their parents. However, US and European people start earning at a very young age, learn the technology faster than other users and enjoy the benefits of higher spectrum. However, at the global level, 2G

expected percentage of covered population is always higher than the percentage covered under 3G/4G.

Graph#1

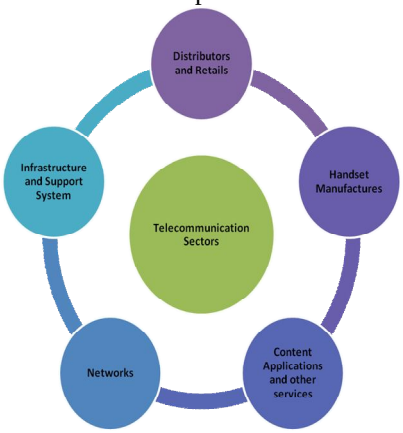


Source: PWC report on e-Commerce in India Accelerating growth February 2015.

As shown in the above graph of age wise internet users, it is very clear that majority of the users (75%) belong to the age group 15 to 34 years. In the past 10 years, the various factors affecting our modes of communication have improved dramatically. Better networking and computing, faster connections, cheaper costs, etc., all would have been impossible without this renaissance of technology.

The industry also has forward and backward linkage with other industries as depicted in following graph.

Graph#2



And the results are clearly visible. The numbers of mobile users have grown by an exorbitant 1800 % from 2004 to 2014.

Review of Literature:

Do Van, Do H. and Chakka, 2012, model spectrum renting policies and call admission to control the spectrum wastage in a realistic manner. Queuing model incorporates exponentially distributed call duration to evaluate the performance of mobile cellular network. Spectrum users use renting of unused spectrum for its efficient use.

Hwang and Yoon, 2009, explain that because of scarcity of spectrum and increase in the value of spectrum, its efficient management became more complex. Every approach is blended with its advantages and disadvantages, therefore, the present study shows current situation and propose mixed strategy for efficient spectrum in Korea. With little role of market forces, Korean policy makers believe in command and control concept. The present study has examined the various attributes which are dependent on technology, survey characteristics and wireless communication market. It addresses issues related to property rights approach by allowing secondary trading, unlicensed approach and spectrum sharing approach with international trends by comparing all approaches SINR Utility Function Model and Welfare Model.

Jho, 2007, presents a case of standardization in telecommunication in Korea. It also highlights the linkage between technological development and its benefits with sense of understanding of the government to make it migration to 2G and 3G networks after understanding of market forces by the state actor and it becomes a very relevant factor.

Yan, 2004, describes issues and challenges while adopting 3G licensing in Hong Kong. The study examines the impact of Hong Kong's 3G license schemes on licensing policies and ancillary industries. In Europe and U.K., the government generated huge license fees through 3G spectrum auction, but due to negative reaction on stock exchange again it brought down the license fees.

Bykowsky, 2003, discusses the steps to enhance market liquidity by secondary trading of spectrums. The transaction and other costs could be reduced in the presence of central brokers. Secondary trading also exposes liquidity risks and performance risks. The efficiency of secondary market will be dependent to minimize transaction cost and maximize trader's surplus.

Hazlett and Muñoz, 2006, study the relationship between spectrum policy and efficiency in output market. The price system is mainly based on the following 3 parameters like Beauty Contest, Saving the cost of re-assignment and generation of revenues for public use. It discriminates among spectrum allocation, license assignment and retail market. Spectrum license created and market structure rules come under spectrum allocation, license assignment includes auction rules and retail market comprises of prices, output and tax savings.

Cave, 2002 highlights the drivers of spectrum demands mainly space science, radar, business mobile, radio and broadcasting. The high speed data transfer by emergency services has also increased additional the spectrums demand.

Gandhi, Sorabh, Buragohain, Chiranjeeb, Cao, Lili,, Zheng, Haitao, Suri, Subhash, 2007 propose the

design of conflict free spectrum allocation to get higher revenue and efficient spectrum utilization. The action price of spectrum must be determined considering the local demand for spectrum and its availability. By using Fixed Power model and simple distance based interface model, the study has examined two pricing models.

Objectives of the Study:

- To assess the GDP contribution of telecommunication.
- To examine the usage of telephone services.
- To Understand the impact of spectrum enhancement on telecom industry

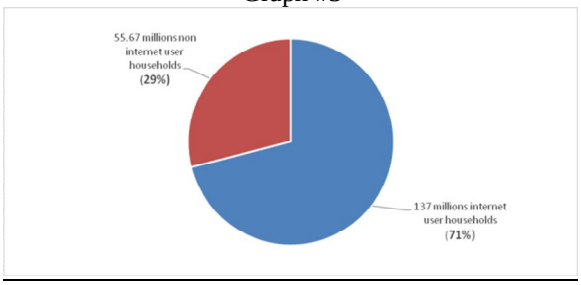
RESEARCH METHODOLOGY:

The study is an exploratory research to establish the relationship between spectrum enhancements, change in the business of network companies leading to economic growth of telecom sector. In the present study secondary data collected has been through various published and unpublished sources various reports, and relevant articles.

DATA ANALYSIS:

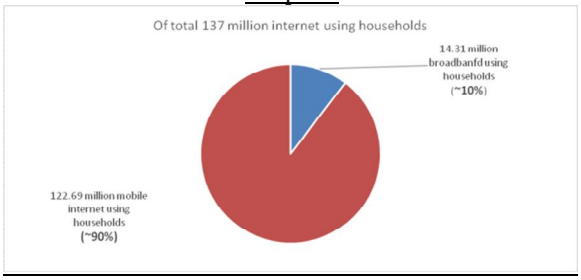
When assessing global presence of mobile and internet connections, it has been observed that the population of internet users is far more than non users as shown in the following graph#3.

Graph #3



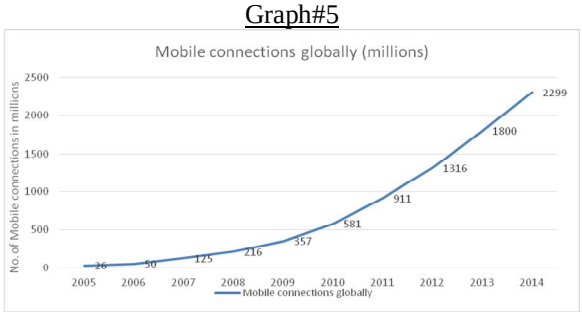
Further the access point of internet needs to be discussed, which is clearly visible from the following graph that only about 10% population uses broadband services.

Graph#4



However, it is also clearly visible (As depicted in graph#4) that the number of mobile connections has grown tremendously in the last decade, which was the main reason of increase in the demand of 3G and 4G services.

Graph#5



Not only mobile connections have increased, but this growth has also been translated into revenue. As shown in the following graph #5, that global revenue of telecom sectors has increased from 851 Euros to 1216 Euros in last decade.

Graph#6



Because of the improving network technology, the number of subscribers have reached 77.56% at the end of year 2014. It has an increase of 14.58% from 62.98% in year 2000.

The proportion of population using the internet is increasing at tremendous rate. Especially due to the fact that the number of ISP are increasing in the country and the access is now easy and cheap.

According to TRAI, Total revenue generated in 2014 was around USD 33,350 million. Total telecom subscribers were recorded as 970.97 million. Interestingly, the number of fixed line subscribers is mere 27 million were about 2.78 %. While rest is accounted by the mobile subs. Monthly telephone additions sum up to 5.8 million. Around 10.2% of all Indian households have access to internet, which is 137 million households. Of these 137 million, 14.31 million or 1.18 % have broadband internet.

As far as internet penetration is concerned, India is lagging far behind from other countries. As per the India@digital.bharat, 2015, in 2014 the India's internet penetration was 19% in comparison to 50% in China, 54% in Brazil, 61% Russia. As far as urban and rural distribution is concerned, it is estimated that 216 million urban and 138 million rural populations will be using internet in June 2015.

- Data traffic of 3G (third generation) services increased by 46% during 2013.

- Smartphone market has grown by 71% in 2013.

FINDINGS:

Now a days the major problem that telecom industry is facing is competition. It is global market therefore loss faced buy one company in particular country forces it to expand or shift its business from one place to another, which ultimately increase the cut throat completion among the carries in developing economies like India. Now telecom companies are struggling to raise the tariff on value added services to improve their cash inflows. Especially, the tariff related to uses of smart phone, because the consumer of smart phone is more tech savvy and time saving and is ready to pay higher amount on any value added service which saves his or her time.

CONCLUSION

To improve the telecom industry further so that it contributes more towards the GDP, more concern should be laid on how to improve market penetration in rural India as even today most of India lies in villages. Seeing the current trends of investment and business done in Telecom sector, it seems to be a sector of great opportunity and growth. With coming of age technology, communication has become fast and efficient like never before. It continues to fulfill demands of the people and will continue to do so.

REFERENCE

[1] Hazlett, Thomas W., Muñoz, Roberto E.,2006, A Welfare Analysis of Spectrum Allocation Policies, SSRN, George Mason University School Of Law

[2] Bykowsky, Mark, 2003, A secondary market for the trading of spectrum: promoting market liquidity, Telecommunication Policy.

[3] Abdi, Ali, Barger, Janet A., Kaveh, Mostafa, 2002, A Parametric Model for the Distribution of the Angle of Arrival and the Associated Correlation Function and Power Spectrum at the Mobile Station, IEEE Transactions On Vehicular Technology, VOL. 51, NO. 3, MAY 2002.

[4] Do, Tien Van, Do, Nam H, Chakka, Ram, 2012, A New Queuing Model for Spectrum Renting in Mobile Cellular Networks, Computer Communications 35, 1165–1171

[5] Hwang, Junseok , Yoon, Hyenyoung, 2009, A mixed spectrum management framework for the future wireless service based on techno-economic analysis: The Korean spectrum policy study, Telecommunications Policy 33, 407–421.

[6] Bauer, Johannes 2002, M., "A comparative analysis of spectrum management regimes", 30th Research Conference on Communication, Information and Internet Policy, Alexandria, VA, September 28-30, 2002.

[7] Jho, Whasun, 2007, Global political economy of technology standardization: A case of the Korean mobile telecommunications market, Telecommunications Policy 31, 124–138.

[8] Technology Digest, Bulletin of Telecom Technology, Issue 20, April 2013.

[9] The Mobile Economy, 2015, GSMA, Intelligence.

[10] Report for A Group of European communications sector companies titled Economic Impacts of Increased Flexibility and Liberalisation in European Spectrum Management, prepared by London Economics April 2008

[11] 4G license allocation: Government, says no favours to Reliance Jio, article published in the Economic Times dated March 27, 2015.

[12] Yan, Xu,2004, 3G licensing in Hong Kong: The debate, Telecommunications Policy 28 213–226.

[13] India@digital.bharat, Creating A $200 Billion Internet Economy BCG, Internet and Mobile Association of India.

[14] Cave, Martin, 2002, An independent review for Department of Trade and Industry and HM Treasury

[15] Gandhi, Sorabh, Buragohain, Chiranjeeb, Cao, Lili,, Zheng, Haitao, Suri, Subhash, 2007,A General Framework for Wireless Spectrum Auctions, In IEEE (Hg.) 2nd IEEE International Symposium on New Frontiers on Dynamic Spectrum Access Network 2007. Piscataway, NJ; IEEE Operations Centre S 22-23.

★★★