A Global Perspective Review of Information Communication Technology Adoption in India

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Abstract

In this paper the author explores about the Information Communication Technology status of India. The analysis of ICT status of India is done by studying different Information Communication Technology Development in Telecommunication sector with top ten economies. This data was utilised for the comparison of India in terms of ICT in Telecommunication sector development. The study was done based on the secondary data collected from various reports, articles, newspaper and websites. A study of the overall ICT development among the top ten economies is also done. When focusing on ICT Ranking the emphasis is done to explore the reason behind the Nation's lagging in the ICT Index. Suitable recommendations are also made for better ways to boost ICT development in India.

Keywords: *India, Information Communication Technology, ICT Index, ICT Ranking Telecommunication sector, Development.*

Introduction

ICT (information and communications technology) is a wide term which is inclusive of modest or sophisticated communication gadget or applications like radio, television, mobile phones, computers and network hardware and software etc which are used for production, distribution, processing and transforming information (Marcelle, 2000). ICT is involved in everything which we use relating to technological advancements. ICT paves the major role of success for many sectors which ranges from education to health and infrastructure to military. ICT bridges us with the rest of the world. Apart from mobile and televisions ICT includes the system in our day to day use like transportation means, banking, shopping etc. ICT even is associated with constructions, entertainment, health, education, etc. in direct or indirect

ways. In developed Nations, Government officials, business people and nationalities work combinedly to bind the transformation power of ICTs to create services more effective, catalyse financial development and to strength social networks. The Global analysis shows that the strength of the Nation is not only measured by the means of their military strength but also in the progress of ICT. ICT is defined as an integral part of progress, United Nations have been active in the promotion of ICT for Development (ICT4D) to bond the digital split (Steyn & Johanson, 2011).

Literature Review

Deliktas & Kok, (2003) stated that ICT changed the Globe into a data-rigorous society, and it is taken as the key for growth that can extremely change the economical, political, cultural, and social conditions in several developing Nations.

Qiang and Pitt (2003) observed that the growth in ICT has led to the overall progress of many countries. Investments in ICT sector are seen to be swelling in most of the Countries now a days. Developing countries spends more on the ICT infrastructure than the developed Nations. From 1993 to 2001 the collective annual growth rate of Information Communication Technology expenditure in developing economies was 12%, where as only 6% in developed economies.

WITSA, (1998) stated that globally, ICT expenditure mounted to $1.8 trillion in 1997, 6 percent of the total global Gross Domestic Product and 40 percent greater than it was in 1992. Asia, Latin America and Eastern Europe showed the quick mounting Information Communication Technology investment with five year annual growth rates of 14.5 percent, 13.6 percent and 9.5 percent respectively from 1992 to 1997.

Shirazi et al., (2010) observed that Several developing economies in Africa, Asia and Latin America also boosted their investment in the Information Communication Technology infrastructure regarding societal and commercial demand.

Ngwenyama et al., (2006) explored that International organizations such as the International Telecommunication Union (ITU), World Bank and International Monetary Fund (IMF), have emphasized ICT as a significant tool for progress in poor countries.

Kuppusanmy and Santhapparay, (2005) concluded that a country could benefit optimum from their investments in the ICT sector. A research done on investment in Information

Communication Technology and its payoff in Malaysia has shown that Information Communication Technology investments are paying off in terms of financial development.

Colecchia and Schreyer, (2002) explored that for the developed countries also ICT played a greater role in the economic growth. A study showed that ICT has contributed to financial progress in the US and nine other Organisation for Economic Co-operation and Development countries.

Research Methodology

The research is based on secondary data. A theoretical analysis is done from selected data available from different journals and Websites. The comparison of ICT development status of India is done based on ICT Index as per Information Society Report (2017). The data is collected only for the ICT infrastructure development on Telecommunication and internet penetration factors. As internet and Telecommunication is one of the biggest factors in ICT infrastructure, its development could greatly help identify the overall ICT infrastructure development status (Fagerberg & Srholec, 2008).

World Wide Status of Information Communication Technology

- The recent data on ICT development from International Telecommunication Union (2017) showed continuous growth in accessibility and usage of ICTs. There is a constant progress in the acessibility of communication in the last decade, which has led for progress in mobile phones and in mobile broadband. Progress in fixed and mobile-broadband infrastructure has accelerated Internet accessibility and usage.

- Mobile-cellular networks are progressively universal and nowadays dominates the facility of fundamental telecommunication facilities. The mobile-cellular subscribers worldwide now surpassed the global population, even though several inhabitants, especially in developing countries, does not make use of a mobile phone. The fixed-telephone subscribers have continued to decline, falling lower than 1 billion globally, and is especially lesser in the least developed countries (LDCs).
- Mobile-broadband services witnessed a swift growth. The mobile-broadband subscribers globally surpassed 50 per 100 inhabitants, which enabled better accessibility to the Internet and online facilities. The launch of innovative mobile

technologies is quickening this trend, with Long Term Evolution or greater competences now accessible to most mobile users. There has been slow growth in fixed-broadband subscribers globally, even though this currently have slightly exceeded that for fixed telephone lines.

- There are digital splits among countries and regions, and between developed and developing countries, especially LDCs. The mobile-broadband subscriptions are doubled per 100 inhabitants in developed countries in comparison to developing countries, where as the break between more-connected developing countries and Least Developed Countries has increased recently. Mobile-broadband subscription rates are greater in Europe and America than in other regions, and more than thrice those in Africa. The inhabitants in developed countries too enjoy higher bandwidth than those in developing countries.

- These digital splits are seen in Internet usage and in their accessibility. Above 50 percent of all households globally have accessibility to the Internet, even though the growth rate seems to have declined. Households in developed countries are almost double times connected to internet when compared to developing countries and greater than five times than those in Least Developed Countries. The same difference among rates of accessibility for individual users are also evident. Europeans access Internet thrice the times greater than Africans and are enjoying higher accessibility speed.

- There is a substantial gender digital divide and is comparatively less in developed countries, more evident in developing countries and extensive in Least Developed Countries, where only one in seven females are making use of Internet in comparison to one in five males. The gender digital divide in Africa boosted expressively in the past five years.

- Youth are connected to internet more often when compared to elders. Individuals aged between 15 and 24 who are online is approximately above 70 percent globally, in comparison with 48 percent of the population in all. Elderly population rarely access internet.

The continuance of Digital gender gap

The percentage of male Internet users are greater than the proportion of female users of Internet in two out of three Nations in the world. There is a robust connection among gender equality in the enrolment ratio in tertiary education and gender equality in Internet usage. The sole region where a high proportion of female uses the Internet than the male is the Americas, and it also secured gender equality in tertiary education.

Globally female users of Internet are 12% lesser than the percent of male Internet users. Although the gender inequality has lessened in utmost regions since 2013, it has broadened in Africa. In Africa, female Internet users are 25% less than the proportion of male Internet users. In Least Developed Countries, only one out of seven females make use of the Internet when compared with one out of five males.

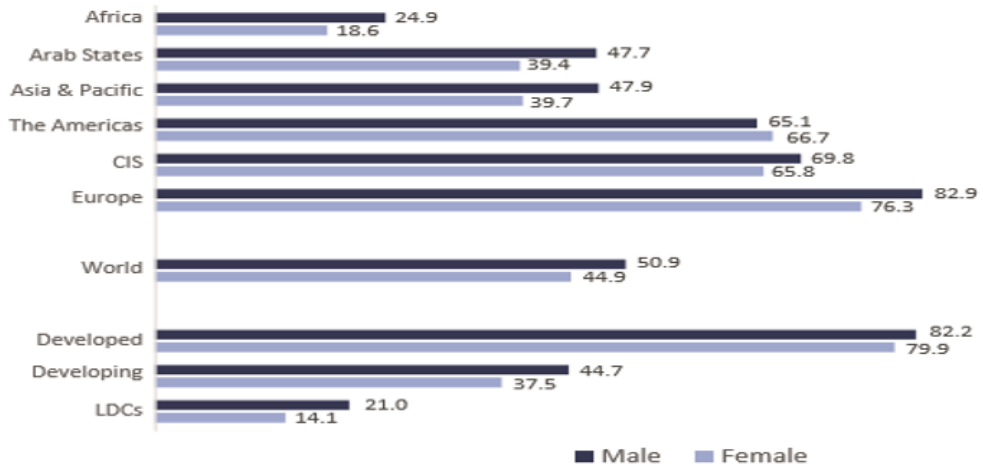
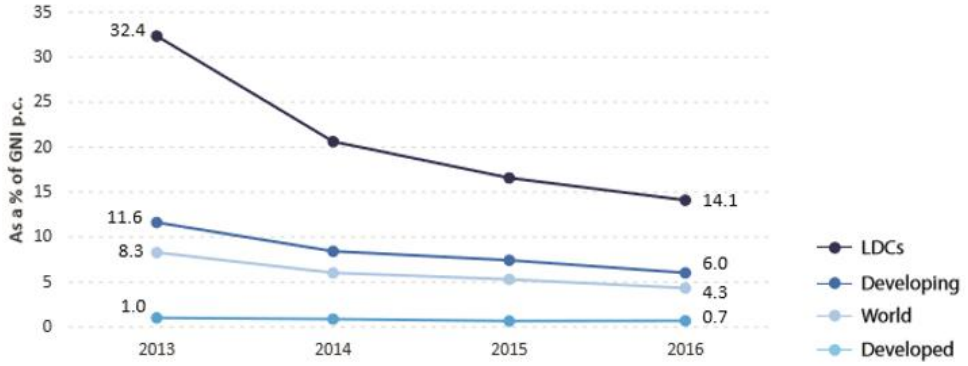


Figure 1. Internet penetration rate for men and women 2017*
Source: ITU(2018) Note: *Estimates. CIS denotes to the Common wealth of Independent States.

Affordability of Mobile-Broad Band in comparison to Fixed Broad Band

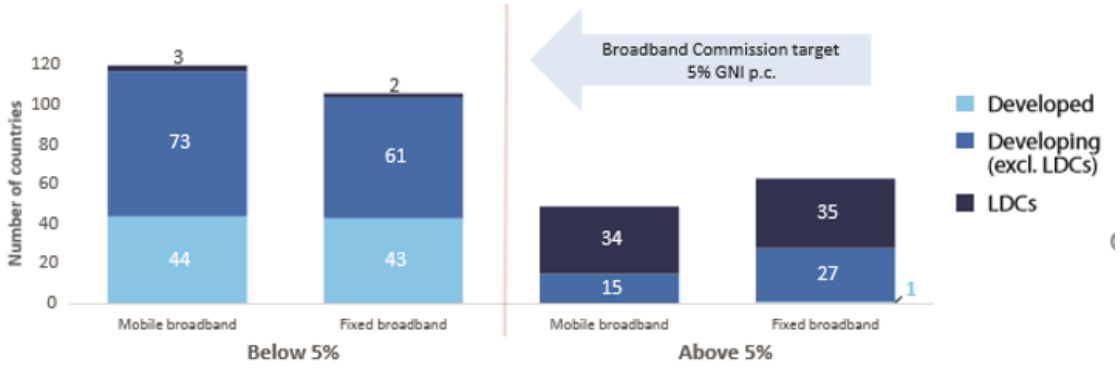
Mobile-broadband rates being a percent of GNI per capita came to its fifty percent between 2013 and 2016 globally. The sharpest decline has happened in Least Developed Countries, where prices fell from 32.4 to 14.1% of Gross National Income per capita.

Mobile broadband prices as a percentage of Gross National Income per capita, 2016



Source: ITU(2018)
Note: Based on Simple averages including data for 136 countries.
Figure 2 Mobile broad band prices

Mobile broadband became reasonable than fixed-broadband services in most developing countries. Mobile broad band prices represented greater than 5% of Gross National Income p. c. in most Least Developed Countries and are therefore unreasonable for the greater population.



Source: ITU
Note: Based on data available for 169 countries
Figure 3. Broad band prices

Despite the worldwide increase in high-speed fixed-broadband subscriptions, there remained a lag of highspeed connections in the developing world, with a penetration rate of 6% (1.6%

excluding China) in comparison to 24 percent in developed countries.

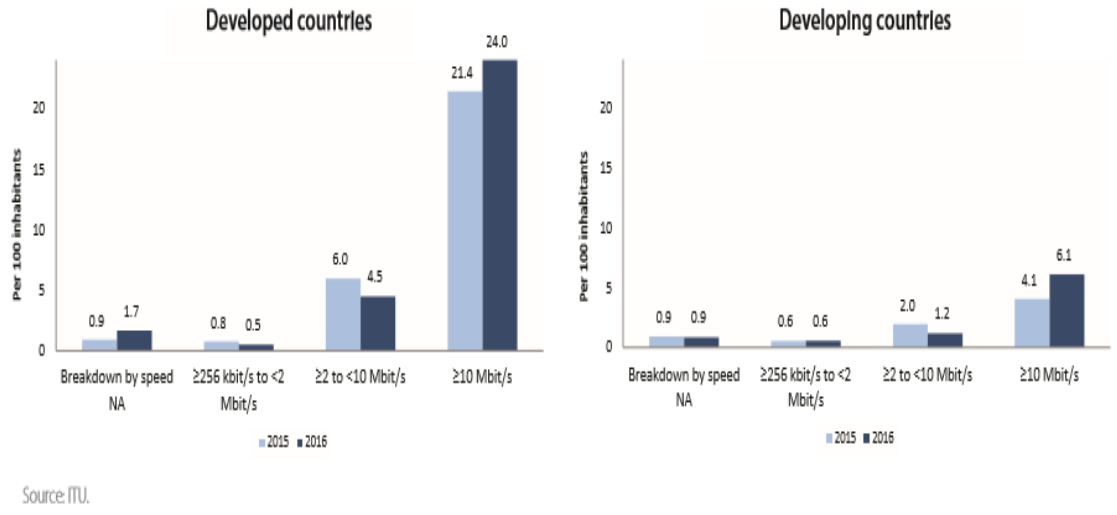


Figure 4. Fixed Broadband subscriptions

Top ten countries according to the I C T Index 2017

The ICT Development Index (IDI), which is published each year since 2009, is a composite index which are combined with 11 indicators into one benchmark measure which can be utilised for monitoring and comparing developments in information and communication technology (ICT) between countries and over time.

Iceland is one among globally most progressed information societies which occupies 1st Rank in ICT Index 2017. High speed mobile and fixed networks are usual here. Nearly whole inhabitants are passionate Internet users. The adaptation of innovative technologies among the population, 3G services were initially provided in 2007 and Long Term Evolution was introduced in 2013. Currently, the maximum population is covered by 3G services and it has a modest mobile market with reasonable price.

Korea Occupied 2nd Rank in ICT Index 2017. In the year 2016 93 percentage of citizens in the age group of 3 have been using the internet . In 2017 93 percentage of the population has made use of smartphone for accessing the Internet. Korea has its country wide LTE coverage and nearly 80 percentage of the Nation's connection over mobile are by LTE. 1 Gbps service is availed by more than 90 percentage of the household sector.

Switzerland Switzerland occupies the 3rd Rank in the ICT Index 2017 and it has a classy telecommunication market with higher penetration rate for fixed and mobile services. Next Generation networks(NGA) are broadly reachable and fixed broadband penetration is among the highest in the world . Switzerland are among the greatest investors in telecommunication networks in Europe.

Denmark Denmark occupies the 4th place in ICT ranking 2017. It has a well sophisticated telecommunication market. Denmark has one of the maximum mobile-broadband penetration rates globally. Denmark has a broadly accessible and well advanced fixed-broadband infrastructure. Denmark lead to a changeover from fixed telephone subscriptions to mobile subscription which leads to weakening in the fixed telephone subscriptions over the past years (ITU, 2015). The populaces make use of Internet and the households have Information Communication Technology penetration which is more than 90 percentage.

United Kingdom United Kingdom secures the 5th ranking in the Information Development Index rankings. It has very sophisticated and progressed telecommunication market, highlighted by a severely modest environment. Mobile penetration is high and mobile-broadband networks extensively reachable. Smartphone has been the preferred gadget for usage of Internet in United Kingdom, and improved Internet accessibility and speed lead to the change of consumption patterns, like the outstanding increase in the usage of over-the-top messaging services. Most inhabitants people living in the United Kingdom have access to the Internet.

Hong Kong (China) has attained the 6th position in the ICT ranking 2017. It became the sophisticated and competitive market in the tele-communication and mobile market in the world. It was one of the forerunner countries in the world for the introduction of mobile number portability in 1999, which has aided for the promotion of competency. About 90 percentage of mobile subscribers are for 3G/Long Term Evolution(LTE) services with 86% of the inhabitants in the age group of 10 and above and over having a smartphone in 2016. Fixed broadband is accessible in all offices and households. Asymmetric Digital Subscriber Line, Fibre to the premises and coaxial cable, and fixed wireless Long Term Evolution is also accessible. 93 percentage of households use fixed broadband service. Public Wi-Fi service are free of charge and are available in common places. It is the main telecommunication and Internet hub.

Netherlands

The Netherlands secures 7th position in the ICT Ranking 2017 The Telecommunication market is highly modest, with high mobile and fixed penetration rates with reasonable charges for users. It is among the foremost countries for Next Generation Access coverage. Penetration rates for mobile cellular and mobile-broadband services penetration are higher than the European average. Fixed infrastructure is highly progressed in Netherlands. The country has high ICT household penetration rates.

Norway

Norway secures the 8th position in Information Development Index 2017 . The inhabitants of Norway are active users of ICTs they have crossed the penetration rate for fixed and mobile services greater than the European average. Charges for mobile and in specific mobile-broadband offers are among the most reasonable globally. The country is among the most progressive information societies Worldwide. Household Information Communication Technology penetration is maximum and maximum inhabitants are Internet users.

Luxembourg

Luxembourg holds the 9th position in the ICT Ranking. 3G and Long Term Evolution coverage have almost extended broadly and has a well progressed fixed telecommunication infrastructure. Penetration rates for fixed-telephone and fixed broadband are more than the European average and prices are reasonable. The mobile-cellular penetration is high. Luxembourg has a very progressed ICT infrastructure. ICT households penetration is maximum and nearly the whole inhabitants are Internet users.

JAPAN

Japan holds the 10th position in the ICT Ranking. Japan has a higher level of accessibility mobile communications, and the Communications Usage Trend Survey revealed that 96 percentage of household sector has a mobile phone in 2015. The country proved to be leading in higher speed of the mobile and became the pioneer to introduce 3G in 2001. 2008 made the entire populace to be covered by 3G. Apart from the popularity of mobile, 72% of Japanese

households had a fixed line telephone in 2016.Fibre to the premises have 76 percentage of fixed broadband subscriptions at the end of March 2017, by 2015, an ultrahigh-speed broadband service was accessible to 99.98 per cent of Japanese household sector.

ICT Adoption in India

India holds the 134th position in the ICT Ranking(2017). India is the second largest mobile subscriber in the world. Mobile broadband using 3G technologies were introduced in 2008. Many spectrum auctions for Long Term Evolution was there since 2012, and operators have been progressively introducing Long Term Evolution using various frequency levels, and 59% of mobile Internet subscriptions were broadband in 2016. The two largest fixed telephone line operators, BSNL and Mahanagar Telephone Nigam, Ltd. (MTNL), are state-owned. BSNL functions all over the place with exception to the cities of Delhi and Mumbai, where MTNL operates. Fixed-telephone penetration is lower when compared with Mobile phone penetration. The top ten Internet Service Providers accounted for 98% of all subscriptions. The largest operator is BSNL, India is linked to more than a dozen undersea fibre-optic cables and has cross-border terrestrial links with neighbouring Nations.

Government policy: The Telecom Regulatory Authority of India (TRAI) was established in 1997 for regulating the sector. The legislation is the Indian Telegraph Act of 1885, which was altered several times. The 2012 National Telecommunications Policy was instrumental in introducing countrywide licences.

India lags in the digital economy

- India's drop in the ICT ranking can be because other countries are stirring forward at greater speed.
- Inadequate infrastructure and the population with low skill, remains the key blocks to extensive ICT adoption, specifically regarding individual usage.
- One third of Indians are still illiterate and the same proportion of youngsters have not done enrolment in secondary education.
- Only 15 out of 100 households have Internet accessibility and mobile broadband is benefitted by few, with only 5.5 subscriptions for each 100 people.
- An in-depth digital split continues between highly connected metropolitan cities and rural areas.

- In 2015, the government introduced the Digital India program, by promoting investment in digital infrastructure, enhancing digital literacy, and oferring online services to citizens. India's performance regarding online services and e-participation have been in par with peer countries, but far from the global best.

Suggestions

- In India, Information technology awareness is majorly seen in metro cities alone, despite of the efforts taken by the concerned state Governments initiative to progress the suburban places. Hence the initial step should be to enhance IT to smaller towns/suburban regions in an extensive manner. The Indian planners can adopt the plan that Singapore has undergone(Yap,1994).
- Promotion of tax incentives for domestic companies in order to investment in technologies.
- Improve bilateral and multilateral agreements with key and upcoming markets which addresses language skill development, social security, etc.
- Instead of starting all the technology parks in Metro cities efforts should be taken to spread the technology parks in other smaller towns which can be an aid to generate more educational and training institutions to come up in these areas.
- India is a leader in Information Communication Technology aided outsourcing service. The Government's exertions to extend fibre-optic backbones to remote places can be beneficial for lesser cost and become highly affordable and helps to minimise the gap in Information Communication Technology accessibility between rural and urban places.

Conclusion

ICT in India has been compared with the ICT status of the top 10 economies as per ITU report (2017) world in terms of ICT infrastructure in Telecommunication Sector. ICT is currently the major factor in the development of a Nation. India's development status in terms of ICT infrastructure and ICT skills lies well below the world average. So optimum effort is needed for India's ICT ranking to get a change over from the position of 134^{th} to one among the top ten economies which should be the prime goal of each citizen of the Nation.

References:

- *Colecchia, A. and Schreyer, P. (2002). ICT Investment and Economic Growth in the1990s: Is the United States a Unique Case? A Comparative Study of Nine OECD Countries. Review of Economic Dynamics, 5(2): 408-442.*
- *Deliktas, E. & Kok, R. (2003). Efficiency Convergence in Transition Economies: 1991-2002 A Non Parametric Frontier Approach, Department of Economics, Ege University.*
- *Fagerberg, J., & Srholec, M. (2008). National Innovation Systems, Capabilities and Economic Development. Research Policy, 37 (9), 1417- 1435. doi:10.1016/j.respol.2008.06.003*
- *Kuppusanmy, M. and Santhapparay, S. (2005). Investment in Information and Communication Technologies (ICT) and its Payoff in Malaysia. Perspectives on Global Development and Technology, 4(2): 147-16.*
- *Marcelle, G. (2000). Gender, Justice and Information and Communication Technologies (ICTs). Presentation, New York.*
- *Measuring the Information Society Report 2017 Volume 2 ISBN: 978-92-61-24511-5 (Paper version) 978-92-61-24521-4 (Electronic version)*
- *Ngwenyama, O., Andoh-Baidoo, F.K., Bolou, F. and Morawczynski, O. (2006) Is There a Relationship Between ICT, Health, Education and Development? An Empirical Analysis of Five West African Countries from 1997-2003. Electronic Journal on Information Systems in of Developing Countries, 23(5): 1-11.*
- *Qiang, C., Pitt, A., & Ayers, S. (2004). Contribution of Information and Communication Technologies to Growth. Washington, DC: World Bank*
- *Shirazi, F., Gholami, R. and Higón, D.A. (2010). Do Foreign Direct Investment (FDI) and Trade Openness Explain the Disparity in ICT Diffusion between Asia-Pacific and the Islamic Middle Eastern Countries? Journal of Global Information Management, 18(3): 59-81.*
- *Steyn, J. & Johanson, G. (2011). ICTs and sustainable solutions for the digital divide. Hershey, PA: Information Science Reference.*
- *WITSA. (1998). Digital Planet 1998: The Global Information Economy. Arlington: WITSA.*