Novelty Journals

ISSN 2394-7314

International Journal of Novel Research in Computer Science and Software Engineering
Vol. 2, Issue 3, pp: (5-14), Month: September-December 2015, Available at: www.noveltyjournals.com

# Challenges of Computer Crime Investigation in India

Asst. Prof. Shreyas Upendra Dingankar

Bharati Vidyapeeth Institute of Management and Entrepreneurship Development, Pune

***Abstract:*** **Computer crime is the use of information technology in any suspicious criminal activities. Recently, our life becomes increasingly depending on modern information technology; however, it becomes very important to improve the computer crime investigation procedure especially in cases of processing very important and sensitive information such as government and military intelligence, banking information or personal private information. Cybercrime investigation helps detecting unauthorized access to any digital source information with the intent of modifying, destroying or stealing that digital data or information. Such suspicious actions can cause financial damages or important information loss; moreover, it might distribute or destroy high secret and private or confidential information. Therefore, this paper focuses mainly on highlighting the main challenges of the Indian States (Maharashtra, Karnataka, Delhi and Hyderabad) in computer crime investigation system by taking a look at the recent developments in the continent's Internet infrastructure and the need of information security laws in these particular countries.**

***Keywords:*** **Computer Crime; Cybercrime; Computer Crime investigation procedure.**

## 1. INTRODUCTION

Due to the revolution of communication and information technology the use of internet has been enlarged which increases the rate of digital crime all over the world. Digital crime can be defined as "crimes directed at digital devices or their application systems." It is very important to secure sensitive information that are processed over the web (Internet) such as government and military intelligence, banking information or personal private information. Nowadays, our life becomes increasingly depending on modern information technology; however, it becomes very important to improve the computer crime investigation procedure especially in case of processing very important and sensitive information. Computer crimes may include different suspicious activities such as machine unauthorized access, digital frauds, system interference as well as computer misuse which might not involve any type of machine physical damage. In fact, computer crime is not just unauthorized access to a computer system with intent to delete, modify or damage computer data and information but it's so far more complex. It can be any type of information. The purpose of this paper is therefore to highlight the main challenges of the Indian States (Maharashtra, Karnataka, Hyderabad and Delhi) in computer crime investigation system, by taking a look at the recent developments in the continent's Internet infrastructure and the need of information security laws in these particular countries [1, 2, 3].

International Journal of Novel Research in Computer Science and Software Engineering
Vol. 2, Issue 3, pp: (5-14), Month: September-December 2015, Available at: www.noveltyjournals.com

The reminder of the paper is structured as follows. Sections 2 and 3 provide general overview about computer crimes and introduce the computer crime context. Section 4 discusses the state of information security in Indian States. Sections 5 and 6 provide Internet users and population statistics for Indian States and its discussion respectively. Section 7 highlights the challenges of Indian States computer crime investigation system.

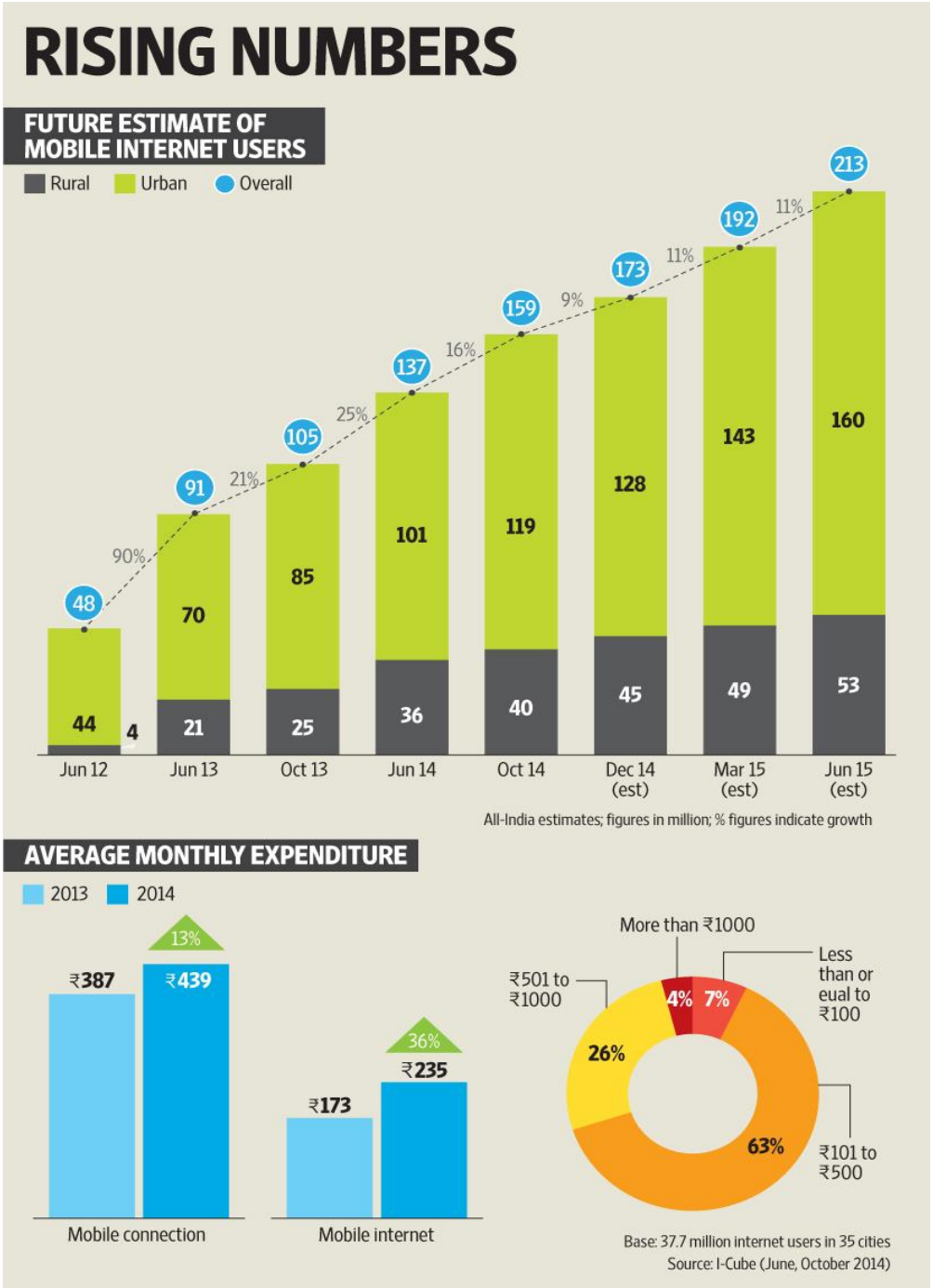
## 2. GENERAL OVERVIEW

The synergy between telecommunication and information technologies has increased the number of users as well as raising the number of computer crimes. To secure data or information from computer criminals, it is very important to have a database to prevent unauthorized access based on confidentiality. Computer crime investigation is slightly complex than traditional crime investigation. But both have similar investigation procedure including (collecting evidences, inspection and analyzing evidences). In addition to that, in both traditional and computer crimes the investigators strive for answering.

- What was the type of the crime?
- When did it happen?
- Where did it happen?
- How did it happen?
- Who did it?
- Why did it happen?

Computer crimes are dealing with specific areas such as computer devices, network, and storage devices and might include any other digital communication Medias. In computer crimes investigation it's very important to have huge record of any available devices' catalogues, manuals or any logging files which can help in tracing or can be used as evidence for detecting the computer crime perpetrator. The strategic plan is the most important step in computer crimes which can be as a long term plan or map that is concerned with national data network infrastructure. The investigation team is another important factor as well to discover any computer crime. In fact it's very difficult to have one investigation team with different skills such as a good experience in information technology, network, computer machines and software tools. Moreover, the guide or team leader should be the most expert in forensic and computer crimes investigation. Digital forensics can be defined as the communication technology (ICT) arena. India has agreed to reach some common objectives by year 2016, involving the development of global partnerships. This goal concentrates on the cooperation with the private sector to maintain the benefits of new technologies, especially information and communication technologies. The Indian governments have agreed to cooperate with private sector companies to provide information and communication technology (ICT) services to all of their citizens. Different organizations and companies have already started investing in India, helping and supporting the region in developing its infrastructure. Throughout the 1860s and 70's, British cable expanded eastward, into the Mediterranean Sea and the Indian Ocean. An 1863 cable to Bombay, India (now Mumbai) provided a crucial link to Saudi Arabia. In 1870, Bombay was linked to London via submarine cable in a combined operation by four cable companies, at the behest of the British Government. In 1872, these four companies were combined to form the mammoth globe spanning Eastern Telegraph Company, owned by John Pender. A spin-off from Eastern Telegraph Company was a second sister company, the Eastern Extension, China and Australasia Telegraph Company, commonly known simply as "the Extension". In 1872, Australia was linked by cable to Bombay via Singapore and China and in 1876; the cable linked the British Empire from London to New Zealand. Africa and specially the North Africa's countries are now well connected via cable, giving the local Internet Server Provides the ability to offer faster and cheaper Internet access types to the customers.

**International Journal of Novel Research in Computer Science and Software Engineering**
Vol. 2, Issue 3, pp: (5-14), Month: September-December 2015, Available at: www.noveltyjournals.com




https://www.google.co.in/search?q=india+internet+usage+statistics+2015

- ***Growth Of IT Users:***

- Inexpensive smartphones and 2G subscriptions are expected to help boost Internet usage rates in India over the next two years, according to a new study by the Internet and Mobile Association of India (IAMAI) and KPMG. While city dwellers are quickly upgrading to 3G and 4G, slower but more affordable data plans will enable more people to get online.

- IAMAI-KPMG estimates that there will be a total of 500 million Internet users (out of a total population of 1.25 billion) in India by 2017, up from a current number of about 350 million. According to the report, the number of mobile Internet users in two years will be 314 million.

- Though India has the second-highest number of Internet users in the world after China, its online penetration rate is still just 19 percent.
- In a statement, IAMAI president Dr. Subho Ray said Internet growth will be driven by users in rural areas: "The advent of low-cost smartphones coupled with low mobile tariffs has empowered consumers in the hinterland to use data connectivity, and we will be seeing more usage from those areas in months to come."
- According to the report, 905 million Indians live in rural areas and 6.7 percent, or 61 million, currently use the Internet on a regular basis. About 4.4 percent go online using a smartphone, a significant increase from 0.4 percent in 2012. People without smartphones or PCs use community centers or cyber cafes instead, but that will probably change quickly as more makers of inexpensive Android devices — such as Xiaomi, Micromax and OnePlus — focus on India as a key growth market.
- While many rural subscribers will select 2G plans, their counterparts in rural areas are likely to sign up for speedier connections. At the end of last year, there were 82 million 3G subscribers in India, but that number is expected to almost triple to 284 million by the end of 2017.

http://techcrunch.com/2015/07/21/india-internet-growth/

## 3. CONTEXT OF COMPUTER CRIME

Computer crime, cyber-crime, e-crime, hi-tech crime or electronic crime generally refers to criminal activity where a computer or network is the source, tool, target, or place of a crime. These categories are not exclusive and many activities can be characterized as falling in one or more category. Additionally, although the terms computer crime or cybercrime are more properly restricted to describing criminal activity in which the computer or network is a necessary part of the crime, these terms are also sometimes used to include traditional crimes, such as fraud, theft, blackmail, forgery, and embezzlement, in which computers or networks are used to facilitate the illicit activity.

Computer crime or cyber-crime can broadly be defined as criminal activity involving an information technology infrastructure, including illegal access (unauthorized access), illegal interception (by technical means of non-public transmissions of computer data to, from or within a computer system), data interference (unauthorized damaging, deletion, deterioration, alteration or suppression of computer data), systems interference (interfering with the functioning of a computer system by inputting, transmitting, damaging, deleting, deteriorating, altering or suppressing computer data), misuse of devices, forgery (ID theft), and electronic fraud.

http://www.cyberlawsindia.net/computer-crime.html

## 4. STATE OF INFORMATION SECURITY IN INDIAN STATES

**Year after year, cyber-attacks have escalated in frequency, severity and impact. The past year was no exception: In 2015, the number of detected security incidents soared 38%.**

As threats continue to mount, understanding and managing cyber security risks have become top of mind for leaders in business and government. Organizations are responding by taking action. Increasingly, they are adopting innovative technologies like cloud-enabled cyber security, Big Data analytics and advanced authentication to reduce cyber-risks and improve cyber security programs.

Businesses are also embracing a more collaborative approach to cybersecurity, one in which intelligence on threats and response techniques is shared with external partners. Internally, organizations are rethinking the roles of key executives and the Board of Directors to help create more resilient and proactive security capabilities.

Another notable measure of progress is a renewed willingness to invest in security. This year, survey respondents reported they have significantly boosted information security spending to better enable them to tackle the cybersecurity juggernaut head on. Read on for details on how innovative organizations are addressing this challenge.

**International Journal of Novel Research in Computer Science and Software Engineering**
Vol. 2, Issue 3, pp: (5-14), Month: September-December 2015, Available at: www.noveltyjournals.com


http://www.pwc.com/gx/en/issues/cyber-security/information-security-survey.html

## 5. INTERNET USERS AND POPULATION STATISTICS FOR INDIA

Around 40% of the world population has an internet connection today. In 1995, it was less than 1%. The number of internet users has increased tenfold from 1999 to 2013.

The **first billion** was reached in 2005. The **second billion** in 2010. The **third billion** in 2014.

The chart and table below show the number of global internet users per year since 1993:

**International Journal of Novel Research in Computer Science and Software Engineering**
Vol. 2, Issue 3, pp: (5-14), Month: September-December 2015, Available at: www.noveltyjournals.com

| Year (July 1) | Internet Users | Users Growth | World Population | Population Growth | Penetration (% of Pop. with Internet) |
|---|---|---|---|---|---|
| 2014* | **2,925,249,355** | 7.9% | 7,243,784,121 | 1.14% | **40.4%** |
| 2013 | **2,712,239,573** | 8.0% | 7,162,119,430 | 1.16% | **37.9%** |
| 2012 | **2,511,615,523** | 10.5% | 7,080,072,420 | 1.17% | **35.5%** |
| 2011 | **2,272,463,038** | 11.7% | 6,997,998,760 | 1.18% | **32.5%** |
| 2010 | **2,034,259,368** | 16.1% | 6,916,183,480 | 1.19% | **29.4%** |
| 2009 | **1,752,333,178** | 12.2% | 6,834,721,930 | 1.20% | **25.6%** |
| 2008 | **1,562,067,594** | 13.8% | 6,753,649,230 | 1.21% | **23.1%** |
| 2007 | **1,373,040,542** | 18.6% | 6,673,105,940 | 1.21% | **20.6%** |
| 2006 | **1,157,500,065** | 12.4% | 6,593,227,980 | 1.21% | **17.6%** |
| 2005 | **1,029,717,906** | 13.1% | 6,514,094,610 | 1.22% | **15.8%** |
| 2004 | **910,060,180** | 16.9% | 6,435,705,600 | 1.22% | **14.1%** |
| 2003 | **778,555,680** | 17.5% | 6,357,991,750 | 1.23% | **12.2%** |
| 2002 | **662,663,600** | 32.4% | 6,280,853,820 | 1.24% | **10.6%** |
| 2001 | **500,609,240** | 21.1% | 6,204,147,030 | 1.25% | **8.1%** |
| 2000 | **413,425,190** | 47.2% | 6,127,700,430 | 1.26% | **6.7%** |
| 1999 | **280,866,670** | 49.4% | 6,051,478,010 | 1.27% | **4.6%** |
| 1998 | **188,023,930** | 55.7% | 5,975,303,660 | 1.30% | **3.1%** |
| 1997 | **120,758,310** | 56.0% | 5,898,688,340 | 1.33% | **2.0%** |
| 1996 | **77,433,860** | 72.7% | 5,821,016,750 | 1.38% | **1.3%** |
| 1995 | **44,838,900** | 76.2% | 5,741,822,410 | 1.43% | **0.8%** |
| 1994 | **25,454,590** | 79.7% | 5,661,086,350 | 1.47% | **0.4%** |
| 1993 | **14,161,570** | | 5,578,865,110 | | **0.3%** |

* estimate for July 1, 2014
Source: ***Internet Live Stats*** (elaboration of data by *International Telecommunication Union (ITU)* and *United Nations Population Division)*

***Source: Internet Live Stats*** *(elaboration of data by International Telecommunication Union (ITU) and United Nations Population Division).* ***Note:*** *in assigning the colors, we followed the original color convention of the 5 Olympic rings: blue for Europe, yellow for Asia, black for Africa, green for Australia and red for America.*

Internet Users by Country

In 2014, nearly 75% (2.1 billion) of all internet users in the world (2.8 billion) live in the top 20 countries. The remaining 25% (0.7 billion) is distributed among the other 178 countries, each representing less than 1% of total users.

China, the country with most users (642 million in 2014), represents nearly 22% of total, and has more users than the next three countries combined (United States, India, and Japan). Among the top 20 countries, India is the one with the lowest

penetration: 19% and the highest yearly growth rate. At the opposite end of the range, United States, Germany, France, U.K., and Canada have the highest penetration: over 80% of population in these countries has an internet connection.

An Internet User is defined as an individual who has access to the Internet at home, via computer or mobile devcie.

List of Countries by Internet Usage (2014)

| Rank | Country | Internet Users | 1 Year Growth % | 1 Year User Growth | Total Country Population | 1 Yr Population Change (%) | Penetration (% of Pop. with Internet) | Country's share of World Population | Country's share of World Internet Users |
|---|---|---|---|---|---|---|---|---|---|
| 1 | China | 641,601,070 | 4% | 24,021,070 | 1,393,783,836 | 0.59% | 46.03% | 19.24% | 21.97% |
| 2 | United States | 279,834,232 | 7% | 17,754,869 | 322,583,006 | 0.79% | 86.75% | 4.45% | 9.58% |
| 3 | India | 243,198,922 | 14% | 29,859,598 | 1,267,401,849 | 1.22% | 19.19% | 17.50% | 8.33% |
| 4 | Japan | 109,252,912 | 8% | 7,668,535 | 126,999,808 | -0.11% | 86.03% | 1.75% | 3.74% |
| 5 | Brazil | 107,822,831 | 7% | 6,884,333 | 202,033,670 | 0.83% | 53.37% | 2.79% | 3.69% |
| 6 | Russia | 84,437,793 | 10% | 7,494,536 | 142,467,651 | -0.26% | 59.27% | 1.97% | 2.89% |
| 7 | Germany | 71,727,551 | 2% | 1,525,829 | 82,652,256 | -0.09% | 86.78% | 1.14% | 2.46% |
| 8 | Nigeria | 67,101,452 | 16% | 9,365,590 | 178,516,904 | 2.82% | 37.59% | 2.46% | 2.30% |
| 9 | United Kingdom | 57,075,826 | 3% | 1,574,653 | 63,489,234 | 0.56% | 89.90% | 0.88% | 1.95% |
| 10 | France | 55,429,382 | 3% | 1,521,369 | 64,641,279 | 0.54% | 85.75% | 0.89% | 1.90% |

Source: ***Internet Live Stats*** (www.InternetLiveStats.com)

Elaboration of data by *International Telecommunication Union (ITU), United Nations Population Division, Internet & Mobile Association of India (IAMAI), World Bank.*

**July 1 2014 Estimate**

**Internet User** = individual, of any age, who can access the Internet at home, via any device type and connection.

***Definitions:***

***User:***

An individual who has access to the Internet at home. This indicator does not record use, or frequency of use, but only **access**. In order to have access, the hardware equipment must be in working conditions, the Internet subscription service must be active, and the individual household member must have access to it at any time (there must be no barriers preventing the individual from using the Internet). The hardware equipment may or may not be owned by the household. There are no age limits (minimum or maximum), so an Internet user can be of any age. There can be multiple devices and services within the household. The data is collected through annual household surveys administered by individual countries based on ITU guidelines. The United Nations Statistics Division has recommended collection of data on households accessing the Internet also outside of home, but this is not a *Core ICT Indicator*. An "Internet User" is therefore defined as an **individual who can access the Internet, via computer or mobile device, within the home where the individual lives**.

***Internet:***

A world-wide computer network that can be accessed via a computer, mobile telephone, PDA, games machine, digital TV, etc. The Internet access service can be provided through a fixed (wired) or mobile network: analogue dial-up modem via standard telephone line, ISDN (Integrated Services Digital Network), DSL (Digital Subscriber Line) or ADSL, Cable modem, High speed leased lines, Fiber, Powerline, Satellite broadband network, WiMAX, Fixed CDMA, Mobile broadband network (3G, e.g. UMTS) via a handset or card, Integrated SIM card in a computer, or USB modem.

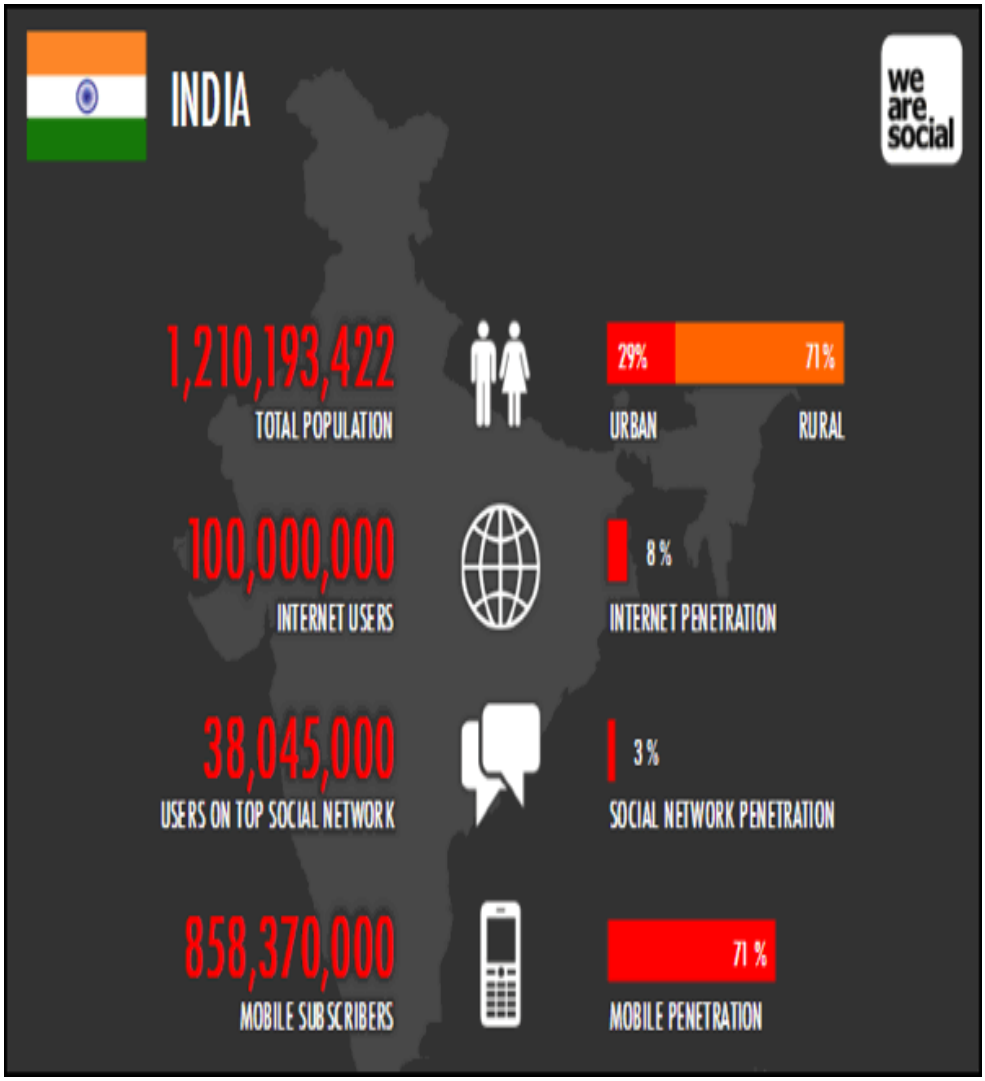
***Sources:***

Current internet user population estimates are delivered by Worldometers' RTS algorithm, which processes data elaborated through statistical analysis after being collected from the following sources:

- International Telecommunication Union (ITU) - United Nations specialized agency for information and communication technologies and the official source for global ICT statistics
- The World in 2014: ICT Facts and Figures - ITU
- Measuring the Information Society - ITU MIS Report 2013
- Internet Users Data - World Bank Group
- The World Factbook: Internet Users - U.S. Central Intelligence Agency
- United Nations Population Division - U.N. Department of Economic and Social Affairs

## 6. DISCUSSIONS

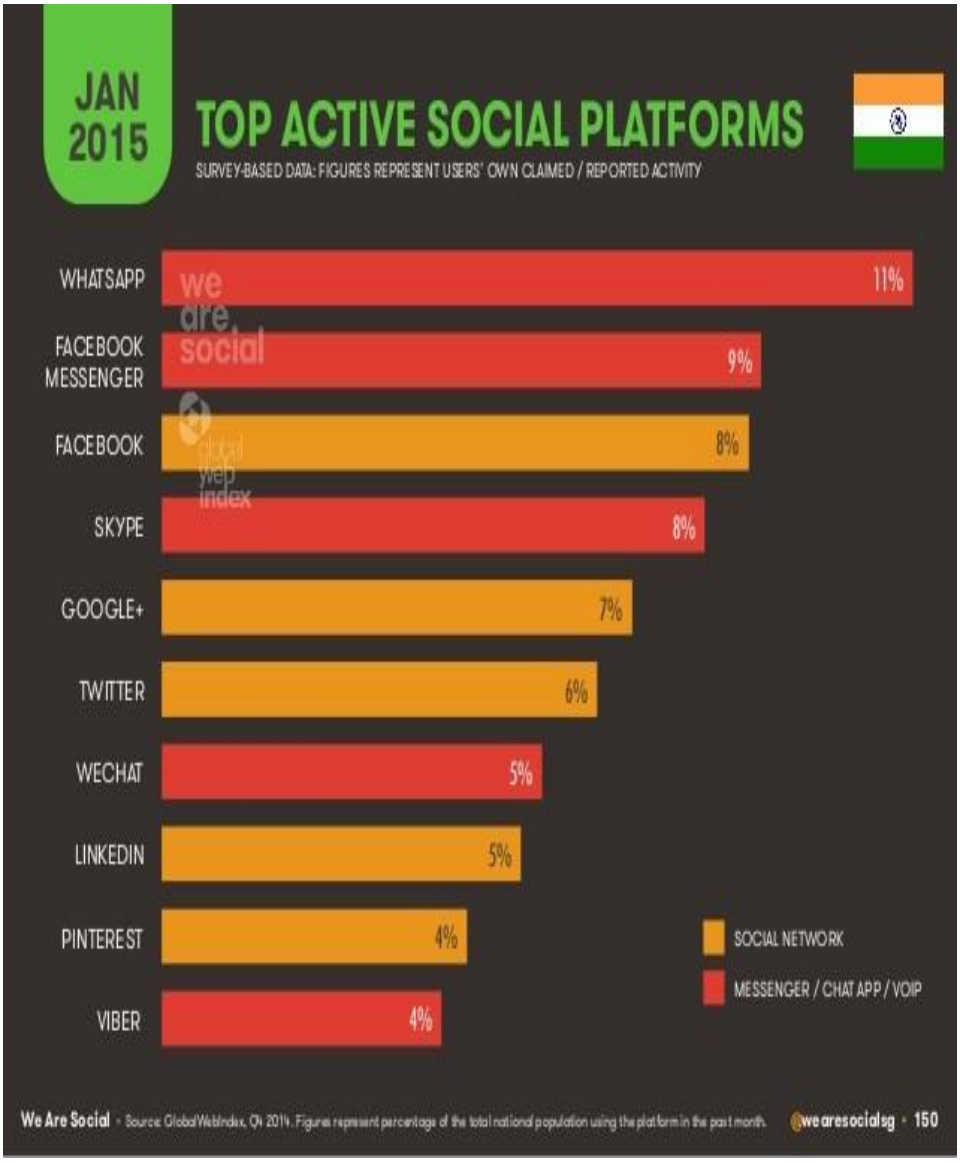
As shown in Figure 1 Indian Total population of 1,210,139,422 in which 29% are From Urban and 71% of Rural. There Are over 100,000,000 Internet users around the Globe and 8 internet Penetration. Around 38,045,000 users on Top Social Network and 858,370,000 are mobile Subcribers!!!



**International Journal of Novel Research in Computer Science and Software Engineering**
Vol. 2, Issue 3, pp: (5-14), Month: September-December 2015, Available at: www.noveltyjournals.com

In Fig 2 there are is survey in which it is cleared observed that how many percent people are active on different Social Activity.

1. *WHATS APP 11%*
2. *FACEBOOK MESSENGER 9%*
3. *FACEBOOK 8%*
4. *SKYPE 8%*
5. *GOOGLE 7%*
6. *TWITTER 6%*
7. *WECHAT 5%*
8. *LINKEDIN 5%*
9. *PINTEREST 4%*
10. *VIBER 4%*



**International Journal of Novel Research in Computer Science and Software Engineering**
Vol. 2, Issue 3, pp: (5-14), Month: September-December 2015, Available at: www.noveltyjournals.com

## REFERENCES

[1] *Manual for Measuring ICT Access and Use by Households and Individuals, 2014. International Telecommunication Union (ITU).*

[2] *2010 World Population and Housing Census Programme. United Nations Statistics Division (UNSD)*

[3] *Core ICT Indicators 2010. International Telecommunication Union (ITU).*

[4] *https://www.google.co.in/search?q=india+internet+usage+statistics+2015*

[5] *http://techcrunch.com/2015/07/21/india-internet-growth/*

[6] *http://www.cyberlawsindia.net/computer-crime.html*

[7] *http://www.cyberlawsindia.net/computer-crime.html*

[8] *The International Arab Conference on Information Technology (ACIT'2013)*

[9] *Mohamed SarrabCommunication and Information Research Center, Sultan Qaboos University, Sultanate of OmanHamza AldabbasPrince Abdullah bin Ghazi Faculty of Information & Technology, Al-Balqa Applied University, JordanMahmoud ElbasirCenter for Computing &Social Responsibility, De Montfort University, Leicester, UK*

[10] http://www.pwc.com/gx/en/issues/cyber-security/information-security-survey.html.

[11] http://en.wikipedia.org/wiki/Fiber-Optic_Link_Around_the_Glob.