Graphical Analysis of Information and Communication Technology in Applications

Ayushi Srivastava, Manika Bhardwaj, Pankaj Kumar Sharma

Abstract: With the fastest developing technologies and an ever increasing population, the world today is witnessing a global drift towards the dependency of human beings over the internet applications and resources provided by it. Various researches are being conducted in numerous fields for the betterment of the society. The 21st century has been going through a lot of innovations and inventions, in respect to the Information Technology (IT) sector. This paper mainly addresses the role of Information and Communication Technology (ICT) in various domains. With the benefits of ICT, its issues are also discussed which in turn, can be regarded as future area of researches.

Keywords: ICT; IT; role of ICT; issues

I. INTRODUCTION

Today we have more than 3 billion people having access to the internet which marks the presence of Information technology. Computers and their use is ever present in the modern era. The use of internet and communication in day to day lives is increasing manifold. With the current lifestyle the human race has become almost habitual of automatization and machines as their counterparts in any field or any work they do. The present scenario consists of a generation which is experiencing a revolution in the field of information technology. And for the generations to come thereafter, there shall be even more of it. The proposed futuristic applications and intended innovations will not only enhance the quality of life but also improve the efficiency of the existing ones. Real world objects shall be transformed into intelligent objects that shall have the capability to store, process and transmit data.

The kinds of technologies being used today are very different from those which were used even a decade ago. There has been such a rapid evolution in this sector that with each passing day, a new addition is made to the pool of technologies. One of such new additions to the information technology is ICT. It is not only a mere extension of IT but a huge emerging and developing area of research. In order to expand the ICT to every possible sector of life, There have been efforts made by the civil society with the private sector, academic institutions as well as the government sector.

Although the debate over the Information technology has no end. The merits and demerits of the same are known in abundance. On one hand where it enhances the society at personal, corporate and national level, it also increases the risks at the very same levels.

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The remaining sections of this paper explain ICT and importance in detail. Section II focusses over the term ICT followed by Section III which describes the various fields where ICT plays vital role these day. Section IV describes the issues and challenges faced in ICT followed by Section V with the conclusion.

II. ICT

The term ICT basically stands for Information and Communications Technology.

There exists no particular or uniform definition of the term as it is a constantly evolving field, but this term basically refers to the amalgamation of hardware, software, storage devices, sensors, wireless mediums, communication networks, and communication protocols. The term ICT is a popular term among the academic scholars and researchers since the 1980's. IT is the most commonly used label. Also sometimes the terms like "new media" or "digital media" are being used in business as well as industry. Such kind of semantic variety comes from the fast pace evolution of computers with communication and technology. In this manner the individual domains like audio, video etc. become indistinguishable from them [1].

With almost 9 out of every 10 people on this planet using one or more smart devices the amount of information and data is rapidly growing. The developing countries show more increase in the number of internet users per year. Here comes the role of ICT without which the many of the day to day activities and tasks would become non-functional leading to larger dysfunctionalities in the organizations. However, ICT still needs to penetrate into rural areas of most of the countries but that does not imply that the role of ICT in various fields is outstanding.

The United Nations have also created a "United Nations Information and Communication Technologies task force" and an internal "Office of Information and Communications Technologies" [2].

There is an ICT Development Index which is used to measure the levels of ICT usage across various countries. It also ranks and compares them according to the index every year. The highly ranked topmost countries in the list most commonly include those with a more than average living standard. Some of these countries are Australia, Canada, Macao (China), Singapore, Bahrain, New Zealand, United States and some of the European Countries. Nations are yearly improving their IDI rankings every year [3]. This is sufficient to know the extent of research, innovation and competition worldwide.

Any data that is stored or used is in digitalized form. There are four basic functionalities, to this data, namely, accessing the information, retrieving the information, receiving the information, storing the information, transmitting the information and manipulating the information.

III. ROLE OF ICT IN THE CURRENT SCENARIO

ICT is a collective term which includes any application or communication device that involves network hardware and software, computer, radio and broadcasting technologies. ICT is used in various fields like business, health care, economic sector, information technology disciplines, disaster response, governance and socio economic development [4]. ICT is broadly categorized into economic development, economic sector, business/IT and education. These can be individually discussed as given below:

A. Healthcare

IT is a boon to the healthcare sector and many findings proves that. ICT is an integrated part in improving the quality substantially. IT supports the health care delivery, consumer health, quality measurement and improvement, public accountability, clinical and health service research and clinical education [5].The database of the patients can be saved and retrieved any time. IT makes clinical research much easier than before. It helps in drug designing in a process called "IT- based drug design" ultimately expanding the search space [6]. The in –silica modelling of drug has reduced the steps and years of discovery of new drug [7].

B. Education

The idea of using ICT in education not just involves using gadgets but to manage and transfer the large amount of information and properly communicate them to the concerned people. The aim of the ICT in context to education is to make the people competent basic users of technologies so that they can efficiently participate in technical societies. Beyond basic competency our society needs more knowledgeable and capable technicians to manage and maintain ICT equipment. Bioscience relies on ICT systems and applications. In the present era of information explosion, the role of universities as a higher education and research center, lies in the real effort of bridging the gap in this sector in an effective manner [8].

C. Economy

As already said, the Information and Communication Technology (ICT) is a major source of sustainability in economic welfare and growth. It acts a motivator of productivity growth. It has the ability to transform entire industries into a totally new face in terms of economy. The analysis of ICT to industry's economy can be measured in terms of GDP (Gross Domestic Product). The contribution of any industry to GDP growth and the percentage of each industry growth to GDP growth are ways to measure the same.

ICT has a influential multiplier effect on the entire economy. It acts as an enabler of increased sustainability in other industries. ICT is differentiated from all tertiary industries in order to measure the impact of ICT industry. The primary industries are agriculture, forestry, mining, extraction, quarry mining etc. Secondary industry convert the raw materials provided by the primary industry into consumer goods. Also such industries process the goods from other secondary industries. These secondary industries include energy producing industries and the construction industry. Tertiary industries are mainly constituted of the service industry [9].

D. Social and Personal

The most widely used applications of ICT are social networking applications, chatting applications and data sharing platforms. We live in an era of digital data where most of the times we need to send or receive data. The ICT applications allow us to do so. Starting right from booking a cab or hotel or railway ticket to banking or purchasing goods, all of these services are available at hand. These make life easier for people as well as provide employment opportunities to others who are involved with effective execution of these services. Technology diffusion largely takes place along the social class lines [10].

E. Knowledge Management

The use of ICT can also be studied in the field of knowledge in terms of knowledge acquisition, knowledge collection and knowledge management. There are three types of IT resources as per the data received from 168 organizations in China and they are IT infrastructure, IT human and IT relationship. These three resources positively affect knowledge management capability (KMC), which directly impacts the competitive advantage [11].

Knowledge is a driver of economic social development and a great factor of production. The emergence of the knowledge society is built on the pervasive influence of modern information and communication technologies. It has helped in fundamentally reshaping the entire global economy. The capacity to modify, store, send/receive huge volumes of data cost effectively has increased at an overwhelming rate over recent years. Information digitization and the prevalence of the internet all over it are facilitating a new intensity in the application of knowledge to economic activity [1].

F. E-business

E-business is just another term for e-commerce which has taken over the globe in the past decade. The traditional trend of business has been taken over by the trending World Wide Web. We talk about the quantity or quality of information that is involved in any business; it could be transferred from one corner of the world to another in just a fraction of seconds using the internet. This is the major reason why the business is going all over the internet, because it leads to expansion. The exchange of information has become so easy these days that it appears as magic, where data could travel miles by just one click and to any corner it goes.

To make any business successful, information and communication forms the basic pillars so same applies to E-business. ICT has been a boon since its origin for various companies and firms, which are growing day by day. Taking any sector say, automotive, software, or education ICT has made it possible for these firms and companies to raise job opportunities for people, made learning process much easier so that business could be done easily.

Complex steps of business have been made much easier because of ICT thus leading to dynamic growth economic development. Companies use ICT for many purposes and with different levels of sophistication. Level 1 is the basic ICT use with the little organizational impact. Applications like e-mail and using the web do not have major implications for the existing business. They support existing processes without changing them. To use more effectively advanced forms of e-business such as the exchange of standardized data with business partners, companies on the level 2 often have to implement significant organizational changes in parallel. On the level 3 in some sectors (such as tourism) the rise of e-business has not only had an impact on internal processes but is transforming the entire business model of companies or the sector as a whole [12].

G. Women Empowerment

The process of gaining knowledge, different ideas, culture and passions will encourage women empowerment because till now the access to computers is still a huge dream at many places in the world. Attaining computer skills will help them to transform data and information into innovative ideas and knowledge that will lead to the development of new products and services. This will enhance the spirit of competitiveness, wealth and growth of their own selves as well as the nation. The under privileged community will greatly benefit from the government programs being run. It will surely bring about a positive change in the society and an unbiased growth in all spheres. There is a large section of the population who are still unable to access these kind of technologies which can connect them online[13].

IV. ISSUES

ICT as discussed above has various applications and important roles to play in the different aspects of society. But with these benefits, there are also some of the issues involved which need to be addressed and monitored for the efficient working of the technologies being incorporated in the society. Some of them are as given below:

A. Security Risk

Many organizations opt for outsourcing for cost reduction and to improve efficiency. But this could also lead to risks especially information risks that could jeopardize the information asset of the company [14].On the other hand, security risks in terms of information leakage and information stealing could be possible if there are loopholes in the system. An appropriate mechanism for such risks must be developed and put to work in order to avoid such activities and reduce the risk levels.

B. Privacy

Modern technologies as of those being used today require user details, such as name, age, gender, date or birth, and address to be stored in order to uniquely identify the user. Sometimes during transactions and payments online, the user needs to enter his/her credit card or debit card or online banking details. Other information which are uploaded on social networking websites are images and videos of a person or place or life event. All of these are stored onto devices or networks which if leaked may pose great danger. The privacy of such information is an issue to be addressed as to whether or not they must be stored permanently on the server.

C. Addressing

The ICT implementations require a number of devices to be connected to the internet as well as each other. All these devices need to be uniquely identified. A mechanism for addressing all such devices is still in research.

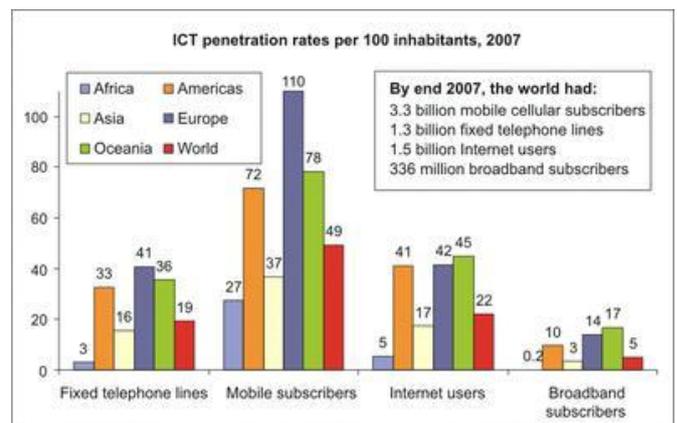### V. GRAPHICAL ANALYSIS

Fig 1. Graph of ICT penetration per 100 inhabitants
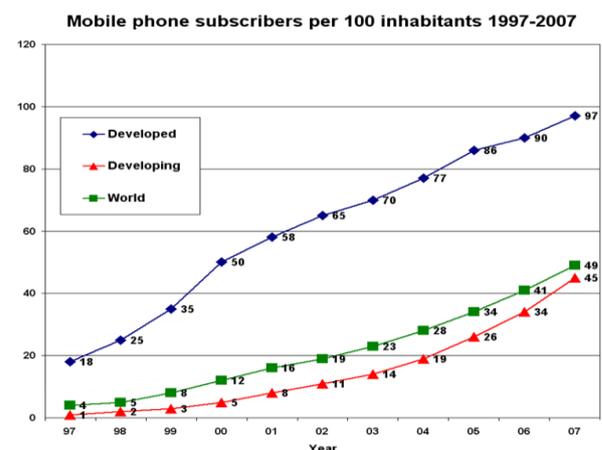

Fig 2. Mobile phone subscribers per 100 inhabitants growth in developed and developing world between 1997 and 2007

VI. CONCLUSION

The main objective of this paper was to show the role and importance of the Information and Communication Technologies in day to

day lives and over the society in the 21ˢᵗ century. Various issues were seen which need to be still addressed for improved efficiency. Future researches can be carried out in these issues. We never knew that technology would bring us to the state where we are today and we still cannot predict where it will take us in the coming years. ICT is a promising and an ever growing area that will, in years to come, modify the society and improve the living standards of people all over the globe.

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