



ICT: USE, VIEWS AND IMPACT

Jitendra Kumar¹, Ph. D. & Dr. Priya Soni Khare², Ph. D.

¹Assistant Professor, Department of Education, CMP College, University of Allahabad, Praygraj, Uttar Pradesh, India

²Assistant Professor, Department of Education, CMP College, University of Allahabad, Praygraj, Uttar Pradesh, India

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Abstract

The end of the twentieth century is marked by change, of revolutionary scope and scale, characterized by a series of transformations, such as technological convergence and world-wide media coverage, not to mention the globalization of their content. These in turn are leading the way to a true revolution, based on information and knowledge. This change is of immense significance, for they imply a break with the past, heralding a new era of economic, social and cultural development fundamentally different from anything that has gone before. Information now plays an increasingly important part in economic, social, cultural and political life. This phenomenon is taking place regardless of a country's size, state of development, or political philosophy. The origin of these far reaching changes is to be found in the diffusion of information, through Information and Communication Technologies (ICT) and its progress is speeded up by the digital revolution and the convergence of the computer, telecommunication and audio visual industries.

Keywords: Information and Communication Technology, Digital Revolution, Uses of ICT, Impact of ICT and Views towards ICT



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Information and Communication Technology (ICT)

ICT refers to all technologies used to handle telecommunications, broadcast media, intelligent building management systems, audiovisual processing and transmission systems, and network-based control and monitoring functions. It explains the convergence of several technologies and the use of common transmission

lines carrying very diverse data and communication types and formats. In other words, ICT is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer network-hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning.

In this modern era information and communication technologies have provided society with a vast array of new communication capabilities. For example, people can communicate in real-time with others in different countries using technologies such as instant messaging, voice over IP (VoIP), and video-conferencing. Social networking allow users from all over the world to remain in contact and communicate on a regular basis. Modern information and communication technologies have created a "global village," in which people can communicate with others across the world as if they were living next door. For this reason, ICT is often studied in the context of how modern communication technologies affect society.

According to the European Commission, the importance of ICTs lies less in the technology itself than in its ability to create greater access to information and communication in underserved populations. Many countries around the world have established organizations for the promotion of ICTs, because it is feared that unless less technologically advanced areas have a chance to catch up, the increasing technological advances in developed nations will only serve to exacerbate the already-existing economic gap between technological "have" and "have not" areas. Internationally, the United Nations actively promotes ICTs for Development (ICT4D) as a means of bridging the digital divide.

Hamelinki has usefully tried to define ICT by distinguishing between capturing technology (such as cameras and digital video recorders), storage technologies (such as CD-Rom and film), processing technologies (such as application software), communication technologies (such as local area networks) and display technologies (such as computer monitors or the screens of mobile phones).

According to the United Nations Economic Commission for Africa, ICT cover internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services, and other related information and communication activities. Because of this complex array of components and gadgets and its transformative power, perception of

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what constitutes the information and communication technology also differ. Some use them as a catch all to describe the technological revolution, the transformative process that is sweeping all over the globe. For others the concept ICT identifies the individual technological innovations that affect our everyday life, most prominently, the internet, the electronic banking, e-commerce etc. Yet others view it as a massive infrastructure consisting of transmitting a full range of interaction of audio, video and data services. No matter which component is emphasized, the phenomenon of ICT is massive, transformative and inevitable, given the enabling power of the technology involved. As, Al Gore, former Vice -President of USA, has stated, new technologies that enhance the ability to create and understand information have always led to dramatic changes in civilization. There is no longer any doubt that (these new) machines will reshape human civilizations ever more quickly and more thoroughly.

The Wikipedia information technology portal refer to information and communication technology (ICT) as the subject that deals with the use of electronic computers and computer software to convert, store, protect, process, transmit, and retrieve information. In contrast, 'the online tech target' definition places emphasis on the different types of technologies themselves, claiming that, ICT (information and communications technology - or technologies) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning.

Relevance of ICT

“This new technology greatly facilitates the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational system, improve policy formulation and execution and widen the range of opportunities for business and the poor”. (World Bank)

ICT is considered as one of the basic building blocks of modern society. It has aroused optimism in the society. It can enhance the competitive muscle of developing nations and motivate public participation and democracy. Effective and timely communication is necessary for information to be useful and human created communication technologies require scarce resources such as time and energy. ICT does play an important role in lowering or sometimes virtually eliminating the resource cost of communication. ICT is fundamentally concerned with the ways in

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which individuals and societies experience space and time.

Historically canals, railways and aero-planes, all helped to bring people and processes closer, thereby accelerating the potential for the accumulation of resources. The introduction of ICT has played an ever more dramatic role in restructuring the potential for ever faster accumulation of resources; with it the social and cultural structure necessary to maintain it. Information and communication technology made distance insignificant.

ICT is a powerful tool for revolutionizing production, consumption and market as a whole as well as for giving opportunity to valorize grassroots and preserve indigenous knowledge for the future generation. But most of all, ICT has a vocation to disseminate knowledge, fight diseases, empower people and improve their lives. It's potential to harness and protect natural resources, boost economy and back- up social development is not just appealing but worth to be further explored. The future role has to be determined accordingly to its power to catalyze positive change and induce development and value additions.

Perspectives of ICT on Development

In order to have a deeper understanding of the ICT and its impact a framework has to be evolved that can be used as an interpretive lens to understand the role of ICT in development in general and education and governance in particular. The debate on development has centered around three main perspectives: modernization, dependency, and Human-centeredness (or human development).

To become developed, one had to emulate the proven recorded activities of others. This is true in the case of countries also. Developing countries has to learn from the experiences developed nations who have utilized the power of technology, the availability of capital, skilled workforce, and an entrepreneurial class to achieve growth. In this scenario ICT plays an important role. It is not only can serve as a catalyst for this change, but also can actually help poorer countries to leapfrog stages of development. This perspective, equates development with modernization.

In contrast, the dependency perspective argues that poverty is not accidental, but is caused by the very processes that made developed countries rich. These countries exploited the poorer countries, mainly through colonization and trade. Poorer countries were forced to expand resources to manufacture products and organize their economies, solely to benefit the richer countries. In this case, ICTs only strengthen the positions of the developed countries since offshore computing and

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manufacturing ICT commodities are done mainly to feed the needs of the richer nations, and not for the underdeveloped countries. This view is also discredited because it treats all underdeveloped countries uncritically and puts the onus of development on local government resources rather than the global context.

An alternative to these perspectives is the class of theories labeled variously as “human development,” “alternative” or “people-centered development”. The focus here is on creating a society where individual potential can be realized. In this view ICT has an appropriate avenue and role in development. Human development views national development as “the enlargement of people's choices” and has resonance with Amartya Sen's work on building capacities and entitlements. The aim is to facilitate enabling mechanisms for people.

The key features of this perspective are:

- Enabling choices in education, health, and standard of living
- Building a democratic society marked by involvement, participation, and transparency
- Better management of behavior and customs, based on a better understanding of culture

Conceptualizing the ICT

Conceptualizing ICT use helps us to classify and categorize how ICT has been applied in the global context, especially to development. Investments in ICT and its quantum will only give a one side of the picture. The extent and nature of the impact need to be examined to determine whether fundamental changes have been achieved through the use of ICT. To examine this impact on development three different conceptualizations of ICT is important: its *use*, how it is *viewed*, and how it *impacts* development.

Conceptualization of ICT "Use"

There are mainly four different conceptualizations of the use of ICT in national development: ICT as a commodity, ICT supporting development activities, ICT as a driver of the economy, and ICT directed at specific development activities.

ICT as a Commodity: ICT is seen as a Commodity or product to be used to earn foreign currency through export. Prime examples are manufacturing computer and related products, offshore software development, and offshore computing. ICT has been one of the fastest growing technologies in both production and consumption during the past four decades, and the prospects for the future are seen to be equally

promising. Both the production and use of ICT have often been associated with positive economic and developmental impacts. As a result, many countries, both industrialized and developing, have taken an active role in promoting the production and consumption of this technology.

ICT Supporting General Development Activities: ICT helps in activities related to development planning and the management of development projects. It is a widely accepted fact that, the most important problem that is faced by developing countries is the problem of "Information poverty" i.e., the scarcity of reliable information essential for the efficient and effective functioning of both governments and firms and also the inadequate development of systems to collect, organize, and process information that is crucial for making and implementing decisions is another major obstacle to effective development planning in these countries. Such problems can be averted through the effective use of ICT and its tools and can make the way for the speedy growth of the country both in economic and social perspective.

ICT as a Driver of the Economy: ICT is conceptualized to have a macro-level influence (e.g., in infrastructure development, education, in the development of the private sector). This view is very well illustrated in the following OECD statement:

“ICT is seen as a powerful agent for economic development through products and service industries generated directly and indirectly, and through transformations permitted nationally at the firm, industry and branch level and internationally through the changing pattern of comparative cost structures and trade flows”.

ICT can help to enhance the working of markets and reduce transaction and coordination costs within and across organizations. This is of particular relevance to developing countries where transaction costs are very high because of logistical problems. ICT applications can enable improvements in productivity and quality in a number of sectors relevant to developing countries, such as agriculture, manufacturing, infrastructure, public administration, and services such as finance, trade, distribution, marketing, education, and health. ICT can help modernize low-technology industries such as textiles, and can also be used to develop socially relevant applications such as national distribution systems for power, food, and fertilizers. Moreover, there is the strong possibility that efficient adopters of ICT will substantially enhance their international competitiveness over non – adopters. In short, ICT has become a "critical infrastructure for competing in an information- intensive global economy".

ICT Directed at Specific Development Sectors or Projects: ICT is conceptualized as having a developmental impact when it is used within the context of targeted developmental initiatives. It has been suggested that ICT applications in much-ignored sectors such as health care, employment, and public information could have a positive impact on rural communities in developing countries.

Conceptualization of ICT "Views"

There are classifications of ICT which view ICT as a tool. Classification of the ICT along five different views as proposed by Orlikowski and Iacono is appropriate for studying its role in national development.

Nominal View: ICT is present only as the object of study and no specific view is articulated. The term "ICT" could well be replaced by any other concept, say, "human resource," without changing the substance of the study to any great extent.

Tool View: ICT is conceptualized as an engineered artifact, is a technical entity, and thus is a means to achieve something. ICT is a substitute for labor, can increase productivity, can process information, is a means of communication, and can even alter social relations. In the context of national development, all these can provide support for development management and activities.

Computational View: ICT is conceptualized purely as technology and the algorithms, codes, and models that comprise the system. This is the "machine" in ICT. The computational view can also be seen in terms of the difference between technologies, such as cell phones versus landlines.

Proxy View: ICT is conceptualized in terms of a surrogate for some other concept. Examples of such concepts are perception about ICT by a specific group, or as the extent of ICT diffusion in an organization or ICT as economic capital. We interpret this view as "what ICT represents." In terms of national development, ICT is seen as a knowledge enabler.

Ensemble View: ICT is conceptualized as part of a bigger "package" going beyond the technology (hardware, software) to activities and interactions performed in specific social and cultural contexts. Thus a specific instance where ICT is deployed is viewed as a development project, which encompasses all the associated issues such as designing, developing, and implementing the system in a specific organizational or social context. ICT is viewed as a production network and a system of alliances between disparate groups.

Conceptualization of ICT "Impact"

The most important discussion about *ICT* is with regard to its impact on the development of the system. This can be discussed by using the framework proposed by Malone and Rockart and Sein and Ahmad in the context of ICT and national development. This model posits that new technologies impact society through three effects.

The *first-order or primary effect* is simple substitution of old technology by the new. The statistics and cases illustrating primary effects, such as increase in number of telephones, Internet connections, computer usage, etc. are important because it is essential for higher order effects to take place.

The *second-order or secondary effect* is an increase in the communication and other phenomenon enabled by the technology. This clearly has the potential for a stronger impact on national development.

The *third order and tertiary effect* is the generation of new technology-related businesses and societal change. This will imply the development of new businesses such as service and training in electronic communication media, and electronic communication enabled structures such as virtual organizations. The increase in communication may also lead to a more open society, more sharing of information, and thus may impact societal norms.

ICT as General Purpose Technology

Technological change proceeds in many ways. Much of it takes the form of small incremental improvements that individually go almost unnoticed but cumulatively have big effects on productivity over long periods. Every once in a while a new technology comes onto the scene that impacts on more or less everything in our lives: what we produce and how we produce it, how we organize and manage production, the location of productive activity, the infrastructure we need, as well as the laws we require concerning such things as property rights and permitted forms of business organization. Such technologies are called general purpose technologies (GPT).

The recent ICT "revolution" can be seen to be one such GPT, since today, computers and related equipment are used in most industries of the economy. ICT has also displayed a substantial level of technological dynamism spurring not only radical improvement in computational capacity, but also a successive wave of new technologies (ranging from the semiconductor to the Internet): Moreover, ICT has seriously facilitated new ways of organizing firms, including the decentralization of

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decision making, and team production and thereby exhibiting innovational complementarities with other forms of advancement.

ICT for Grass-root Development

ICT is an integral part of development strategy for rural sectors. It has great potential to bring in the desired social transformations by enhancing access to people, services, information and other technologies. ICT applications can enhance rural people's opportunities by improving their access to markets, health, education, finance and government services.

ICT for Quality Health Services

The impact of ICT in health sector has been phenomenal, as it transforms the delivery of public and private health care services in the developing countries. ICT allows multitude of health facilities around the world to have universal and instant access to any sort of medical information. ICT is at the heart of modern healthcare systems and services and can distribute information worldwide, in particular to the developing world. Nevertheless, ICT offers the prospects for a longer and healthier life as well as to boost human health, hygiene and nutrition. Many remote villages that lack easy access to hospitals and medical facilities are now being helped by telemedicine and digitized health information, which are helping millions of citizens improve their daily lives.

ICT for Promoting Education

The development of the information society and the widespread dissemination of Information and Communication Technology (ICT) give rise to new opportunities for learning and acquiring new skills and competences that are necessary for employment, education and training, self-development and participation in society. The surge in multi-media, video conferencing and artificial intelligence is resulting in an expanded ability to transform information, thereby increasing, the possibility for spreading and sharing knowledge. In the world of education and training, these new possibilities are changing methods of learning and enlarging the sphere of dissemination. Distance no longer matters and illiterate or the excluded populations now have easier access to knowledge. In addition since the correlation between education, training and development is clearly established, development strategies are placing ever higher stakes on wide spread access to education, and particularly continuing education.

ICT for Governance

E-government - or electronic government - is one of the buzzwords in the discussions on modernizing public administration. Modern information and communication technologies (ICT), especially Internet and web technologies are seen as enhancing the access, transparency, efficiency, and quality of public administration. ICT helps new and better government, since they may be used to restructure existing institutional arrangements and to ensure that these innovations flourish. The ICT enabled governance is more responsive to the needs of citizens and enterprises; it is more democratic, and more efficient.

ICT for Providing Livelihood Opportunities

Increasing livelihood opportunities and food security form the key trajectories to enhance people's economic opportunities in developing countries. In urban areas, ICT is largely employed to enhance industrial and services productivity; while in rural areas, ICT is used for expanding income generating options through facilitating local trade, enhancing market opportunities and competitiveness and providing access to information on livelihood. Access to information on weather trends, improved farm practices, credit availability, market prices of various commodities increases livelihood opportunities of the rural people.

Digital Divide

The digital divide is probably one of the first concepts considered when reflecting on the theme of the social impact caused by Information and Communication Technologies. The digital divide refers to the gap between people with effective access to digital and information technology and those with very limited or no access at all. It includes the imbalance both in physical access to technology and the resources and skills needed to effectively participate as a digital citizen. "Digital Divide" also refers to the gap between those who can benefit from digital technology and those who cannot. "Closing the Digital Divide" therefore means more than just giving the poor the same technologies already received by the rich. Closing the Divide involves restructuring the communications sectors in each nation so that benefits can flow to the masses, not just the elite urban sectors of emerging markets.

Conclusion

The significance of information and communication technologies is a recurrent theme in the global economic literature. These new technologies have enormous potential to increase productivity of almost all economic sectors, to overcome

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problems of dysfunctional administration, and to expand and improve the quality of services. They have an enabling role for the globalization trends; they constitute the means for the compression and transgression of time and space barriers. It has freed the economy of the constraints of distance and the scarcity of resources. Digital technology and data compression have produced means of creating information, which can be multiplied to infinity, making the ICT based economy one of abundance and profusion.

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