DIGITAL TECHNOLOGY IN INDIA: ITS GENESIS, DIFFUSION AND POTENTIALS

Akash Suna[*]

[*]Research Scholar (Ph.D.), Centre for the Study of Social Systems, Jawaharlal Nehru University, New Delhi

Abstract

In contradistinction to the assumptions of technological determinism paradigm, many sociologists believe emergence and spread of technology as an outcome of correlative changes in the society. Undeviatingly, digital technology that emerged as disruptive technology among all hitherto developed technological innovations should be analysed in relation to the dynamics of societal processes. Though the Internet service began as a public sector initiative, the pan Indian diffusion of the digital technology owes greatly to the private sector and such market led success is a manifestation of new economic policy of 1991. Several government programmes and policies that promote use of this technology are inseparable facets of E governance vision that aims at making the government transparent, accessible and accountable. Despite the phenomenal growth in terms of reaching the masses, there continues an unconditional disparity across geographies and social categories which might ultimately lead to the significant differences in outcomes. It is the democratic potentials of the internet that can facilitate India in actualising the ambitious dreams of functional financial inclusion, universal coverage of health and education, robust participation of citizens in political processes and meaningful civic engagements. Entertainment, that predominates the online activities in India can be viewed as These potential functions of the Internet are not the results of the technology per se, rather these are the promises of the welfare state and technology can augment in realizing these promises. Though India joined the bandwagon of Internet connected countries much late, now it stands out as an important player in the field as it provides the internet at the cheapest cost and has the second highest number of smartphone users and facebook users. Optimistic promises of the technology appears hyperbole when we encounter the instances of misinformation, fake news, cyber crime that have devastating impacts on both online and offline worlds. As technology develops and reaches the society, it is perceived and used in particular ways based on the values of that particular society and any comment on technology use must give due consideration of these values. Since India is yet to have a saturated environment of digital technology use, attention needs to be paid to the functioning of the technology instead of making any conclusive remark on either its potentials or outcomes.

Keywords: Digital technology, socio-economic aspects, digital inequality, potentials of internet

Introduction

After a series of successive developments in the technological realm, human race has reached the age of digital technology that has made unprecedented changes in both the materialistic and non-materialistic aspects of human life. Introduction and adoption of this novel technology has been a matter of grave concern for sociologists, who have been analysing the societal aspects of technology since a prolonged period. Though it is an objective reality that the versatile nature of digital technology and its wide scale diffusion represents a marvel in the history of human-technology symbiosis, it should be understood with the help of both lenses of change and continuity. Also, a technologically deterministic account should also be abandoned and adopting a holistic approach promises to provide a more robust narrative of the new developments in contemporary world. Here, holistic approach is not just plainly an approach that refrains from treating technology in isolation and analyses it in relation to economy, politics, society and culture. In addition to this, a holistic approach necessitates temporal and spatial elements to be given due consideration because any technological innovation of the present is often an up gradation of any technological innovation of the past which means the nature and uses of any particular technology is shaped by its historical development. For example, the success of the Internet in terms of its global outreach is primarily due to its origin in the Advanced Research Project Agency (ARPA) of the U.S Defence Department, where the government invested greatly to ensure research and development (Castells, 2001). The transnational nature of the Internet and multinational corporations regulating ICT industry and the forces of globalisation implies that any scrutiny of digital technology must not be confined to any particular region. However, this is not to deny that policies and laws at national level lave lost their significance. In addition to this, the novel cyberspace presents a unique space for the public to have deliberations without any obstructions.

Following the aforementioned arguments, this paper tries to locate Indian experience of the digital technology in its history and its relation with the larger global order. It tries to situate the growth of this technology in relation to India's economy, culture and social structure that are unique to the Indian experience. Also, it tries to situate this experience in the global experience in order to manifest the regular uniqueness and show the potential differences in a detailed manner. The paper uses the term digital technology as an analytical category that includes the Internet, smartphones, laptops, computers, apps and other technologies that use internet like the ATM cards. It has used different secondary sources like books, chapters, articles, reports etc to illuminate on this striking technological development. India's ambition to become a digital economy

and the multiradial 'Digital India' initiatives necessitates sociological accounts to be produced to unearth the intricacies of technology use that can also facilitate in developing better and more inclusive policies.

Genesis of digital technology

A thorough analysis of the development and spread of digital technology must consider the factors that are intrinsic to the technology and the ones that are extrinsic to it. Though technological innovation does not take place in isolation and aloof from the social world, any innovation is an attempt to cater contemporary needs (Webster, 2014). One of the intrinsic factor that contributes to the adoption of digital technology in general and the internet in particular is the capacity to overcome temporal and spatial barriers (Castells, 2001). This capacity has enhanced the communication process and access to information that makes the internet a technological breakthrough. Robert Metcalfe, the inventor of the Ethernet has argued that the value of a network is determined by the number of users. Metcalfe's Law states that if the number of nodes equals n, the number of potential connections equals to $(n^2 - n)/2$, which means that the number of potential connections increases quadratically with the number of nodes. The more people that an individual subscriber can reach through the network, the more valuable the network becomes, even when the nature of the service and the price paid for it remains the same (Yoo, 2016). Norris (2001) argues that as the number of people connected to the Internet increases, its utility increases and it becomes more attractive.

Similarly, global adoption of the smartphones is due to its ability to deliver wealth of functions like texting, entertainment, communication etc that we need in our everyday life and they have become the 'digital companions' of their users. Since this paper attempts to locate the development of digital technology in relation to the changes in social world it will discuss more on the extrinsic factors.

Broadly, digital technology can be said to have two components wherein one is intangible whereas another one is tangible. The intangible component implies the Internet, software and different applications whereas the tangible component implies the gadgets like smartphones, computers, laptops etc. Any analysis of the history of the Internet in India requires starting from the telecom industry as it regulates the communication services of which the Internet stands out to be a prominent one. Though the world started using the Internet during 1960s, Indians got online in the year 1986 with the introduction of the Educational Research Network (ERNET)**,** a joint project of the Department of Electronics (DOE) and also the United Nations Development Program (UNDP)**.** Videsh Sanchar Nigam Limited (VSNL) was the first provider of the internet and opened the cyberspace for Indians on 15th August, 1995 in six cities through telephone connection. VSNL was incorporated in 1986 as a public sector enterprise to cater to overseas communication services.

However, it was in the year 1991 that the economy was liberalized encouraging private players and global trade which led to drastic changes in the telecommunication sector. Consequentially, the process of privatisation helped the private farms to have a stronghold in the Indian telecom industry and reduced the share of the public sector. The private sector has also emerged as the major service provider for both wireless and wireline internet services and mobile internet is the most popular form of accessing the internet. Hence, it can be said that the success of telecommunication in India is largely the success of the private service providers in the telecom market. The sorry state of affairs of the public sector company Bharat Sanchar Nigam Limited (BSNL) indicates the failure of the state in providing satisfactory level of services. Apart from facing recurrent loses, BSNL also has issues like steady decrease in investment and many of its employee are leaving their jobs though it is already having an acute scarcity of staffs along with irregular recruitment (Kant, 2022). Soon Indians will be experiencing the 5G network which will necessarily generate new opportunities along with specific challenges.

Similarly, the private sector also has full control over the digital gadgets market as there is no public sector manufacturing company. Moreover, the most popular manufacturers of smartphones, laptops, PCs, tablets and other devices in India are multinational information technology companies and their presence in Indian market entails the global flow of transnational capital. Though some of these companies have setup their manufacturing units in India, the nexus between foreign capital and Indian market and the dominance of the former appears ostensible. Hence, Shah (2007) correctly argues that the internet technologies came to India as a signifier of neo-liberal politics and globalised (post) modernity. Apart from this, the popular apps in India like Facebook, Instagram, Whatsapp etc have foreign origin and are dovetailed in the globalisation process. Such apps facilitate not only unhindered communication processes across globe but also the transnational flow of values and ideas manifesting their potentials in augmenting globalisation. Another phenomenon that shows the burgeoning success of private sector with respect to digital technology is the IT sector, which shares almost 9 per cent of the total GDP.

Another contributor to the success of digital technology reaching masses is the electricity without which no can ever imagine the functioning of digital devices. Access to electricity has reached 99% in 2020, which was only 50% in 1993 (IEA, 2022). India has also witnessed similar growth in per capita electricity consumption that was 16 units in 1947 and turned to 1208 in 2021 (PIB, 2022).

Government intervention in promoting the use of digital technology is can be direct and indirect. Direct interventions entail government policies and schemes that are aimed at providing benefits to the citizens directly, for example, distribution of laptops and tablets to students. Conversely, indirect interventions are done in such domains that affect the access to technology. For example, the new economic policy of 1991 was an intervention in the market that resulted in better access to the internet. Similarly, the government programmes aiming at increasing the literacy rate also have positive impacts on the use of digital technology because education provides capacity for analytical reasoning and information

filtering strengthen numeracy, English language and keyboard skills (Norris, 2001). In addition to this, government has been increasingly integrating cyber technology in its administration and governance whereby access to this technology is becomes not just a choice, rather a compulsion. Acceptance of only online application for different employment opportunities is an example that indicates the inevitability of accessing and using digital technology in India.

The changes in attitudes of Indians in particular and global public in general must not be overlooked because attitudes shape the perception of technology including the digital technology. Collapse of Soviet Union in 1991 dramatically brought an end to the idea of collectivism and paved the path for unobstructed and galloping success of capitalism which further led to the development of individualism (Fukuyama, 1992). The success of capitalism is primarily for two reasons – its enormous potential to cater the material needs of society and its suitability to nurture democracy. Capitalism has been supplying consumer goods and services on an unprecedented scale improving the life standards of people not only in India but also in many parts of the world. A free market without any intervention by the government allows people to make their own decisions and fulfill their own dreams nurturing individual autonomy. The resultant culminations of individual autonomy along with toleration of differences are two cornerstones of modern democracy and hence market driven growth of digital technology in India is in consonance with individualism and democracy as well. Promotion of consumerism is another consequential outcome of capitalistic growth and this has led to the phenomenal success of smartphone market in India.

Leisure has been a part and parcel of Indian society since time immemorial and the monuments, music, dance, art and aesthetics, literature are the sustainers of this relationship. Unlike the western society, where leisure is limited to the middle and upper class, leisure in India is a luxury enjoyed by all with possible differences in form and intensity. Prominence of entertainment as the major online activity and remarkable success of social networking sites signals that the success of digital technology is partly due to their ability to augment the leisure practices of Indian users. Online leisure practices predominates the online activities of not only the affluent Indians but also among the poorer sections of society, who constitutes a lion's share of the population. In fact it is the younger generation of the third world in general and of India in particular who are the game changers of digital technology market and have rightly been labelled as the *next billion users* (Arora, 2019). Such popularity of leisure practices in a third world country like India also discredits the hierarchy of needs theory proposed by Maslow that has already been witnessed in the environmental movements of the global south.

Diffusion of digital technology

A comprehensive analysis of distribution of digital technology needs to locate a country within the globe and must also pay attention to the differences with respect to other factors like region, gender, education, income and others which play crucial roles in access and use of the internet. The available data shows that the internet penetration rate in the developed world is 87% but it is 47% in developing countries and only 19% in the least developed countries (Roese, 2021).

Currently, India is one among the leading actor in the globe where the Tele-density has reached 86.37% in 2020 and the cost of data has reduced substantially to Rs. 10.55 per GB, enabling affordable internet access for millions of citizens (Department of telecommunications, 2021). As per available records, 43% of the total Indian population has access to the Internet and there also exists tremendous gap of digital divide between urban and rural India. It has been found that 67% of the urban population i.e. 323 million individuals in Urban India are active internet users while 31% of the rural population i.e. 299 million individuals in Rural India are active internet users (IAMAI & Kantar, 2020). There exists differences in different types of cities wherein top metropolitan cities account for 80% of total urban internet users whereas non-metros and small towns account for only 20% of the same. There exist differences between states wherein Maharashtra has the highest internet penetration (61%) and Bihar has the lowest (24%). Also, there exists a gender divide as 58% of internet users are male whereas 42% of them are females. However, it has been found that this gap in internet use is gradually closing. 100% of the internet users access the internet using mobile phones whereas 17% use PC and 6% use other devices like tablet, smart TV, smart speaker etc. Further, different socio-economic factors like age, gender, income, education, and ethnicity etc are likely to play crucial role in determining access and use of digital technology.

Diffusion of the internet can also be analysed in terms of the number of services that can be accessed through it. India has made tremendous progress in this field both due to the initiatives of the market and that of the state. Mirroring the success of liberalisation in the production of goods and services, market has made easy online access to many services like e-commerce, entertainment, education, health facilities etc. Availability of different government services online, e-governance, direct benefit transfer etc are some of the state driven initiatives resulting in wider diffusion of the internet. Success of digital technology in certain spheres is an amalgamation of efforts of both market and the state. For example, the phenomenal growth of digital payments is a result of different payment apps and promotion of online transactions by the government. The market driven initiatives fulfil the capitalistic ethos of profit maximization whereas the initiatives by the state are manifestations of the duties of the welfare state (Webster, 2014).

Potentials of digital technology

Easy and instantaneous access to a variety of information and availability of new forms of communication are two main factors behind democratic potentials of digital technology. Webster (2014) argues that owing to the spread of Information and communication technology, there exists multiplicity of sources and means of accessing information. In addition to this, there exists multiplicity in the form of information wherein the same information can be presented as text, image, audio, video or a combination of all of these. As it has entered almost all spheres of our personal and public life, it is

necessary to understand the optimistic, neutral and pessimistic claims about it. This paper will analyse the potential of digital technology in relation to economic benefits, social networking, and political engagement.

As mentioned earlier, the IT sector in India contributes almost 8 per cent to the GDP and hence plays a crucial role in India economy. Economic benefits of the digital technology is due to its ability to make access to information more democratic (can be called as democratization of information). Access to information on income opportunities and function of the internet as a mediator between employee and employer and between producers and consumers are factors behind economic benefits. For example, the global success of E commerce is due to its ability in connecting the spatially dispersed producers and consumers (Castells, 2001). In India, spectacular growth of online payments represents financial inclusiveness of digital economy. However, introduction of digital technology can also result in reduced employment opportunities or growth in particular jobs like IT sector jobs. Automation of different manual jobs can deteriorate employment rate in India, where unemployment continues to be a major problem. Since use of computing technology gets incorporated in different occupations, people without having the required digital skills may get marginalised.

The Internet has turned the world into microcosm by reducing the spatial distance and has facilitated development of such social networks that are unimaginable without it. These social networks can be a personal choice of befriending someone or can be a choice to support a greater cause like environmentalism, human rights etc. It is the affordable privacy of different social networking sites that allows people to explore relationships in the online world which cannot be explored in the real world due to the socio-cultural forces. For example, friendship transcending the class boundary may not be imagined in the real world but it can be achieved in the online world since it allows a carefully crafted public appearance for users (Arora, 2019). But customization of online identity and digital anonymity can also result in digital vulnerability which can have significant impacts on life and property. Forging transnational social networks for any local or global issue has genuine consequences on the progress of the movements and such networks are inevitable for issues that have global significance like the anti nuclear protest and environmental movements. However, such social networks can be replications of existing form or structure in these movements wherein the urban educated middle class youth predominates since this section also dominates the user base of digital technology.

As access to information gets more democratized, it has the potential in resulting increased awareness of happenings among the citizens. The enhanced access to news and other information is considered as the main driving force behind formation of a robust public sphere in this age of the Internet (Webster, 2014). Digital technology can also facilitate different forms of both vertical and horizontal interaction which can help in furtherance of democratic values. The online public sphere presents a platform for all of its users and generates a hope for circulation of those voices that have not been represented in the mainstream media. Voice can be of two types- voice as a process and voice as a value. Voice as a process means sharing one's experience and views with others whereas voice as a value requires certain favourable attitude to one's views (Couldry, 2010). Presentation of voices of the marginalised either as a process or value can ensure their effective presence and participation in online public sphere. However, online communication has also the potential of spreading of hate speech, misinformation that can have varying degree of impact based on the social location of an individual or a group.

Conclusion

There exists an ever increasing growth and potential of digital technology in India creating new possibilities and challenges. Instead of viewing technology as the agent of social change, it needs to be viewed as an outcome of changes in the social world. The promising benefits of digital technology are likely to be attained at the cost of surveillance by both the market and the state since both are on their mission to cater the supposed needs of people. Though began as an exciting technology for communication, the Internet has become an intrinsic part of our everyday life and hence emphatic cyber laws are the need of the hour. India is on its path to be digital and any speculation made on the basis of contemporary developments on future is at the risk of being falsified. As use of technology is subject to the social environment, there is a need to have contextualised understanding of digital technology. Such contextualised study will facilitate in unravelling the complex use of digital technology and it will also help in making comparative studies as well. Another benefit of contextualised study is its contribution in formulating appropriate policies which will foster a relatively inclusive development.

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