Bridging Digital Divide in India : Positive Outlook Amid COVID-19

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Abstract

The digital divide is described as the gap in access to, knowledge of, use of, or ability to comprehend information and communication technology (ICT) between different societal groups. The digital divide can often give way to an upsurge in social inequalities. This study intended to comprehend the extent of the rural-urban digital divide in India regarding access to the internet and to analyze the increase or decrease in the same due to the global coronavirus pandemic. The analysis of the paper was primarily based on secondary data collected from the report on "The Indian Telecom Services Performance Indicators" issued by the Telecom Regulatory Authority of India for June 2019 and June 2020. Percentage analysis was employed to comprehend the trend of the digital divide in terms of access for the years 2019 and 2020. The results disclosed that there was an increase in internet access in the rural population during the time frame of COVID-19, and this increase has led to a decrease in the digital divide in terms of access to the internet. Moreover, the study revealed that COVID-19, to some extent, has resulted in bridging the rural-urban digital divide in India in terms of access. The study further highlighted the importance of digital literacy and access to ICT, and suggested ways to improve digital literacy in India.

Keywords : **COVID-19, digital divide, digital literacy, and internet access**

JEL Classification Codes : I24, O14, O18, O33, L86

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COVID-19 has become a public health hazard, and the spread of the novel coronavirus has left sizeable impacts worldwide (Tiwari et al., 2020). COVID-19 led to an economic downturn in developing countries, devastated by unemployment and hunger (Ghosh et al., 2020). About 1.6 billion students in about 190 countries worldwide were agonized by the advent of the coronavirus pandemic, with 94% of the world's schools remaining shut (United Nations, 2020). The internet played a vital role during the pandemic and was a boon that connected everyone with the world by maintaining social distancing (Subudhi & Palai, 2020). Not having access to the internet means going out of business or being unemployed, distancing from education, and

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lack of access to health care services and other crucial services (Cancella, 2020). Though the internet acted as a boon during the pandemic, a negative factor that affected the use of the internet is the digital divide.

The digital divide can be understood as a social unfairness between individuals regarding access to information and communication technology, recurrence of usage of technology, and the potential to apply information computing technology (ICT) for various purposes (Hohlfeld et al., 2008). The presence of the digital divide hampers the use of the internet and forces a group of people to be deprived of essential services during the pandemic. In India, the rural area lacks infrastructure facilities to use ICT (Malhotra, 2014). As a result, rural students find it extremely difficult to adapt to the online learning mode (Kumar, 2021). Women in India still face inequality in the usage of information technologies, which leads to broadening the digital divide gap (Bala & Singhal, 2018). Rural self-employment training institutes in India are working on bridging the rural-urban digital divide by incorporating online channels of doing business in their training programs (Kumar & Kumra, 2021). Prior studies established the presence of the digital divide in India. However, with the advent of COVID-19, it became necessary to understand the effect of the pandemic on the existing digital divide.

This paper aims to understand the phenomenon of a rural-urban digital divide in terms of internet access in the present scenario of the pandemic in India. The paper further aims to know if the pandemic has paved the way for the gradual reduction of or instead aggravated the digital divide. The scope of the paper is limited to internet access, and factors like digital literacy and the availability of various devices to access the internet like laptops, mobiles, etc., are not under the purview of the study paper. However, the paper highlights the importance of digital literacy and access to information and communication technology (ICT) for the nation's development and effective utilization of the ICT infrastructure.

Review of Literature

The digital divide includes technological, immaterial (relating to life chances), material (relating to financial resources), social (relating to position, power, and participation), and education (relating to capabilities and skills) inequalities (van Dijk, 2006). Developed countries have higher adoption of information and communication technologies (ICT); whereas, developing countries are trying to keep up the pace in adopting ICT (Singh, 2010). Moreover, geography and socioeconomic conditions play significant roles in accessing ICTs (Otioma et al., 2019). Besides, geographically isolated areas lack proper roads and communications technology; thus, installing telecommunication and internet facilities in these areas becomes cumbersome and infrastructural development is crucial for implementing digital technologies (Tripathy & Raha, 2019). Nevertheless, the digital division is not attributed fundamentally to access to the internet, personal computers, or mobile phones but rather to skills and usage and general benefits (Gran et al., 2021).

Factors like gender, disability, access, lack of ICT skills, attitudinal factors, age, racial segregation, and lack of relevant content contribute to the digital division (Bansode & Patil, 2011). Moreover, the digital divide affects older persons as they may be less likely to get internet-based job opportunities due to the lack of internet-based skills (Krueger et al., 2018). Likewise, factors such as avoidance of technology, training and design, social customs promoting men, lack of free time, and financial constraints are the barriers that cease women from accessing the internet (Antonio & Tuffley, 2014). Innovative business ideas and models often go unrecognized and eventually disappear if they fail to adapt to the technological changes and digital innovation (Bashir & Verma, 2016). The lack of adequate infrastructure to support technological transformation acts as a significant roadblock to accepting digitalization by manufacturing SMEs (Arora & Rathi, 2019). However, factors like ease of information access, connectivity, personal amusement, social upliftment, social assistance and coaching, individual characteristics (curiosity, confidence, and being adventurous), and broadening knowledge act as motivators that induce the use of ICTs among people (Fang et al., 2019). Upcoming digital divide studies should

focus on fostering motivation, skills, and consciousness, paving the way to the proper usage of the Internet (Onitsuka et al., 2018).

In India, the inter-state digital divide has narrowed down during the period from 2001 to 2012, and the lagging states of Orissa, Uttar Pradesh, Bihar, West Bengal, and Assam should consider expanding their socioeconomic infrastructure to derive the gains from digital technologies (Kaur & Neena, 2014). Furthermore, only 20.66% of rural scholars utilized computers for diverse needs; whereas, 69.70% of the urban scholars utilized computers, indicating the presence of a digital divide (Sampath Kumar & Shiva Kumara, 2018). The continued rural-urban digital divide is a hurdle on the path to achieving nationwide financial inclusion (Siddiqui & Siddiqui, 2020). Besides, the Indian public education system needs a significant appraisal by securing inclusivity for scholars from disadvantaged categories when mapping out and utilizing ICTs in education (Tewathia et al., 2020). In the bargain, the various state governments in India have been actively involved with several IT-oriented projects to bridge the digital divide with programs like Gyandoot; Bhoomi Project; Sourkaryan; and Fast, Reliable, Instant Efficient Network for Disbursement of Services (FRIENDS) Project (Swalehin, 2017). Further attempts have been made to encourage rural wooden handicraft SMEs to adopt e-commerce to increase the customer base and reconcile the prevailing rural-urban digital divide (Yadav & Mahara, 2018).

During the scenario of COVID-19, it is vital to comprehend the negative presumption of shifting various activities online as the supposition that everyone can smoothly utilize the internet for work and education is deceptive (Kuc-Czarnecka, 2020). Besides, comparatively advantaged individuals are likely to utilize the internet to gain information and communications for their benefit; thereby, COVID - 19 can act as an impetus to creating inequalities (Deursen, 2020). Moreover, the parents' ability to afford an internet connection, sufficient technological devices, continuous and uninterrupted electricity, and private tuition impact the children's learning during the pandemic (Azubuike et al., 2021). Yet, of late, COVID-19 will reform how health facilities are provided, and there will be an increase in the dependence on technology; however, the digital divide problem will remain a threat (Ramsetty & Adams, 2020). Nevertheless, the internet should be a public utility service available to all, as COVID-19 has transformed many activities online (Lai & Widmar, 2021). The shift to online modes of business and digital transformation in the payments collection process has raised questions about the sustainability of small rural merchants who neither have the knowledge nor the infrastructure to pace with the changing technological environment (Priya et al., 2019).

Developing countries should consider a three-edged strategy to get out of the jaws of the digital divide, first by monitoring the upcoming digital skills essential for employment, followed by implementing a comprehensive digital skills development strategy into national education programs, and finally, integrating skilling programs within existing socio-cultural customs (Chetty et al., 2018). Furthermore, the problem of the digital divide cannot be solved merely by equipping more computers and the internet, but literacy and education should be promoted, and so should developing content in diverse digital languages along with access to computers and the internet (Warschauer, 2003). Moreover, a multiple-stakeholder approach that encompasses the endeavors of the government along with the corporation of the civil society and the private sector is essential in encouraging a digitally inclusive society for all (Wong et al., 2009). However, implementing ways to overcome the digital divide can be treacherous as pursuing to do so may lead to the development of an unusual usage divide (Min, 2010).

After a careful and comprehensive review of the literature, we have identified the existence of the rural-urban digital divide in India. The rural-urban digital divide is a significant concern and must be addressed to reduce the spatial inequalities in the context of digital technologies. Previous studies have highlighted the possible reasons for such a digital divide and have reflected upon the probable outcomes of the rural-urban digital divide in India. However, the impact of COVID-19 on the rural-urban digital divide with regard to internet access remains unexplored in India. The present study is an attempt to address the mentioned research gap.

Methodology

In this descriptive study, we analyze the increase or decrease in the digital divide by considering the access to the internet between India's rural and urban areas amid the COVID-19 pandemic. The study is wholly dependent on secondary data collected from the report on "The Indian Telecom Services Performance Indicators" issued by the Telecom Regulatory Authority of India (TRAI). TRAI issues this report yearly to provide a perspective on the telecom services in India and serves as a document of reference for analysts, researchers, and various stakeholders. We believe in the utmost reliability and authenticity of the data used for the study as it is collected and published by the regulatory authority of the Indian government. The data collected includes the rural-urban break up of internet subscribers in India as of June 2019 and June 2020. The time period selected for the study is crucial to understanding the role of the pandemic in bridging the digital divide. The first data set was collected from the June 2019 report representing the level of rural and urban internet subscribers before the COVID-19 pandemic. India was hit by the first wave of COVID-19 in March 2020, followed by a nationwide lockdown. The second set of data was collected from the June 2020 report representing internet subscriptions and usage by Indian customers during the pandemic.

The paper incorporates the method of percentage analysis and trend analysis to analyze the extent of increase or decrease in the digital divide in India during the first wave of the COVID-19 pandemic. Percentage analysis provides a clear picture of rural and urban internet subscribers' share in India and the changes in the same due to the pandemic.

Analysis and Results

Table 1 presents the breakup of India's rural-urban internet subscriber base and the percentage increase from June 2019 to June 2020. It shows an increase of 83.76 million in overall internet subscribers in India, from 665.31 million in June 2019 to 749.07 million in June 2020. It shows that India is moving towards a more digital world. However, there still exists a rural-urban digital divide in India. In June 2019, out of the total 665.31 million internet subscribers, only 238.26 million belonged to rural regions of India. Following the trend, even in June 2020, rural internet subscribers were 293.09 million compared to the overall internet subscribers of 749.07 million. This indicates that India's rural regions lag behind in internet access, leading to a continuous rural-urban digital divide in India. On the contrary, during the COVID-19 pandemic, the rural internet subscribers (54.83 million) increased in comparison to the urban internet subscribers (28.93 million), implying that with the spread of the novel coronavirus, the rural population is moving toward the digital era.

Furthermore, there was a significant increase of 12.58% in India's overall internet subscribers from June 2019 to June 2020. This is a considerably good amount of increase and shows the progressive mood of the Indian population toward the digital world. However, it is essential to note that rural internet subscribers have increased by 23.01% ; whereas, urban internet subscribers have increased just by 6.77%. This shows that during the

Table 1. ***Breakup of Rural-Urban Internet Subscriber Base in India for June 2019 and June 2020***

Subscribers	June 2019 (in millions)	June 2020 (in millions)	Increase (in millions)	Percentage Increase (%)
Rural internet subscribers	238.26	293.09	54.83	23.01
Urban internet subscribers	427.05	455.98	28.93	6.77
Total internet subscribers	665.31	749.07	83.76	12.58

Source : Report on Indian Telecom Services Performance Indicators - issued by TRAI - June 2019 and June 2020.

Table 2. ***Percentage Analysis of the Rural-Urban Digital Divide in India***

Subscribers	June 2019	June 2020	Increase/Decrease
Percentage of rural internet subscribers	35.81	39.13	3.32
Percentage of urban internet subscribers	64.19	60.87	–3.32

Source: Report on Indian Telecom Services Performance Indicators - issued by TRAI – June 2019 and June 2020.

COVID-19 pandemic, the Indian rural population became more aware of the importance of going digital and accessed internet services more than the Indian urban population. This brings us to the conclusion that amid COVID-19, there has been a decrease in the rural-urban digital divide in India. This has brought a positive change in India's journey towards a digital world.

Table 2 shows the percentage analysis of India's rural-urban digital divide during the study's time frame. In June 2019, urban internet subscribers comprised 64.19% ; whereas, rural internet subscribers accounted for 35.81%. This shows the extent of the gap between rural and urban internet subscribers, indicating the existence of the digital divide in India. In June 2020, similar trends are noted, whereby rural internet subscribers comprised 39.13% of the overall internet subscribers in India, and urban internet subscribers accounted for 60.87%. However, it is surprising that there was an increase of 3.32% in June 2020 in the percentage of rural internet subscribers when compared to June 2019. This results from the decrease in excess of urban internet subscribers over rural internet subscribers of around 25.9 million from June 2019 to June 2020. This clearly shows that amid COVID-19, more and more rural Indians moved toward digital platforms and understood the importance of going digital in the modern world. As a result, we can say that COVID-19 has bridged the rural-urban digital divide in India to some extent.

Discussion

The analysis of the study proves that there had been a decrease in the digital division considering the aspect of access to the internet in the rural and urban areas in the circumstances of COVID -19. This can be mainly due to the shift of many activities like schooling, work, and other activities online due to COVID -19. However, in contrast, Aissaoui (2021) opined that COVID-19 has aggravated the digital divide.

In line with Gran et al. (2021), access alone cannot be relied upon to state that the digital divide has decreased; the proper skill and usage of the internet is also a crucial factor. Providing internet access along with proper internet skills can narrow the digital divide (van Deursen & van Dijk, 2019). The rural population should acquire the proper digital competence to utilize the internet for various purposes, merely having an internet connection does not suffice to overcome the digital gap. The proper and holistic use of the internet depends on digital training and competence. Digital literacy includes a heterogeneous set of skills that encompasses information skills and computer and digital competence (Chetty et al., 2018). Therefore, it is vital that effective digital literacy programs are in place along with the increase in internet access to surpass the digital gap.

Data from the National Sample Survey (NSS) 75th round national survey of 2017 – 2018, regulated by the Ministry of Statistics and Programme Implementation, revealed that 64.7% of the urban population had the ability to operate a computer; however, only 19.6% of the rural population was competent in handling a computer (National Statistical Office, 2019). Furthermore,73.6% of the urban population had the ability to use the internet, whereas only 25.6% of the rural population was competent in using the internet. This clearly brings to light that the rural population lacks digital skills as compared to the urban population.

The post-COVID-19 scenario of the digital divide largely depends on how we respond to the increase in internet access among the rural population during COVID-19. The problem of the digital divide can be reduced to

a larger extent post-COVID-19 if we are able to use the opportunity of the spike in internet access in the rural areas due to the present scenario of work from home, online classes, and other digital transformation during the period of COVID-19, coupled with proper digital literacy and digital skills programs focusing on the rural population.

Implications

Theoretical Implications

Several theories revolve around the acceptance and adoption of technologies. Some of these are the technology acceptance model (TAM), unified theory of acceptance and use of technology (UTAUT), innovation diffusion theory (IDT), and spatially aware technology utilization model (SATUM) (Pick & Sarkar, 2016). This study's findings reveal a decrease in the rural-urban digital divide in India amid the COVID-19 pandemic. This indicates that the rural population is showing interest in adopting and accepting digital technologies. The results of the study can be connected to the innovation diffusion theory. The innovation diffusion theory seeks to comprehend the rate at which new technology or idea penetrates among people. There are five significant stages in the diffusion of innovation: knowledge of the technology, the extent of social persuasion, the decision to adopt or reject the technology, implementation and use of the technology, and finally, confirmation and encouragement for continued use of the technology (Rogers, 2003). The easier it is for individuals to predict and foresee the benefits of innovation, the more prompt they are to adopt it.

The results of the study reveal that there was an increase of 3.32% in rural internet subscribers during the pandemic. This implies that the Indian rural population has shifted from the first stage of innovation diffusion, "knowledge of the internet," to the third stage, "decision regarding adoption" of the internet for day-to-day activities. The rural population had knowledge of internet facilities prior to the pandemic. However, the internet was not seen as a necessity for survival. COVID-19 acted as an influence and sowed the seeds of persuasion for the adoption of the internet among the rural citizens of India, Ultimately resulting in an increase in the adoption of internet services.

Managerial Implications

The present study proves that the digital divide is narrowing in rural areas in terms of access to the internet. However, targeting access alone cannot solve the problems of the digital divide. Policies must be devised to improve the rural population's digital literacy and skills, and initiatives should be taken to spread awareness about the importance of digital skills. Intensive campaigns partnered both by government and private digital service providers can create and develop more programs to improve digital skills and access to the internet. Targeted policies and initiatives should be prepared for specific states that lack access to the internet and digital skills. Preparing e-content in all regional languages can also be beneficial for improving digital skills (Nedungadi et al., 2018).

Nevertheless, priority should still be given to formulating policies to ensure and increase access to the internet at affordable rates, as the non-availability of the internet is the starting point to overthrow the digital division. Once the availability of the internet is attained, it acts as a motivator to learn, understand, and exploit the various dimensions of the internet. The narrowing digital divide provides an opportunity for the service providers to target rural areas. Service providers can try to understand the usage characteristics of the rural population and devise services to cater to their needs. Policymakers and service providers could look at implementing lower-cost technology innovations, which in turn can provide continuous connectivity at a lower rate to the rural population (Malhotra, 2014).

Conclusion

This study explores the state of the rural-urban digital gap in India, taking into consideration access to the internet. Moreover, the paper tries to analyze the increase or decrease in the rural-urban digital division in India amid the current COVID-19 scenario. The analysis of the study reveals a considerable rural-urban digital divide in India in June 2019, with rural internet subscribers comprising only 35.81% of the total internet subscribers. However, during June 2020, this number increased to 39.13%, indicating a 3.32% increase in rural internet subscribers. This clearly shows that during the COVID-19 pandemic, there was a decrease in the rural-urban digital divide in India, with the rural population switching to digital modes to cope with the pandemic's challenges.

The study further highlights the importance of digital literacy and access to the internet to get the maximum benefit from internet usage. Increased access to the internet will not produce effective results until and unless people have the desired skills and competence to harness the benefits of the internet. The study further shows the gap in the level of digital knowledge and skills between India's rural and urban populations and tries to bring the issue to light. With proper implementation of government policies and programs concerning rural digital literacy, this gap can be reduced. The pandemic provides a blessing in disguise to overcome the threat of the digital divide; the right policies and steps today can help us move to a digitally empowered country post-COVID -19. This would be the best time for the government to initiate a 'National Mission for Digital Inclusion' to surpass the digital gap in India.

Limitations of the Study and Scope for Further Research

The outcome of this study should be comprehended in light of a few limitations and shortcomings. The study mainly focused on internet access, and concepts of digital literacy and skills were not given due focus as we believe that access to the internet was the starting point to bridge the digital divide. Further research can focus on other aspects of the digital divide like digital literacy and skills and employ primary data to understand the opinions of the users and non-users of the internet. However, we are confident that despite the limitations mentioned above, the study results can provide valuable insights to government authorities and other stakeholders in formulating and implementing appropriate policies and actions to eliminate the ills of the digital divide in the near future.

Authors' Contribution

All the authors fairly and significantly contributed to the inception, drafting, and editing of the paper. Indu conceptualized the idea of the paper. Greeshma Benny Thadikaran took the idea forward, designed the research objectives, and collected the data. Indu and Greeshma Benny Thadikaran collectively analyzed the results and provided the interpretation. Dr. Karthigai Prakasam Chellaswamy provided a review of the paper and suggested improvements. All authors read and approved the paper.

Conflict of Interest

The authors certify that they have no affiliation with or involvement in any organization or entity with any financial and non-financial interest in the subject matter or material discussed in this manuscript.

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