



Adoption of Digital Technology in Rural Areas of India

Digital technology has brought about significant transformations in the lives of people, particularly in rural areas, by empowering and connecting them. The role of Digital India Programme has been instrumental in this as it helped provide increased access to technology in rural regions through high-speed internet networks, enhancing digital literacy, leveraging cutting-edge technology leading to a transformation of the rural service industry.

“We are the world’s No. 1 in digital transactions; we have the most inexpensive mobile data. Today, India has more rural internet users than urban users”

—Prime Minister Narendra Modi

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Recognising the potential for economic growth through information and communication technology (ICT), the government is positioning itself as a significant player at the global digital transformation platform. Enroute to becoming one of the key digitally transformed nations, India is offering evident benefits to all its citizens in the urban as well as the vast population residing in its rural areas, as exemplified by Digital India Program (DIP), is explicitly

linked to inclusiveness. The DIP’s efforts to provide digital access, resources, and services to all, especially those in rural areas, emphasise this inclusivity—today over 6 lakh km of optic fibre has been laid connecting almost 2 lakh gram panchayats. By bridging the digital divide, offering digital literacy, and promoting cashless transactions, digitalisation contributes to a more inclusive and empowered society by ensuring that even marginalised communities can benefit from digital technologies.

Strategy

The government has implemented strategies to transform the nation and create opportunities for its citizens through the utilisation of ICT tools, leading to the launch of the DIP initiative. The programme, initiated by Prime Minister, Shri Narendra Modi has embarked on a grand plan to empower India digitally and generate prospects for its citizens through the harnessing of digital technologies. The programme zeros in on three key areas: (1) digital infrastructure as a core utility to every citizen, (2) governance and services on demand, and (3) digital empowerment of citizens.

The programme is geared to provide high-speed internet access, mobile phones, and bank accounts to enable larger participation, easy access to Common Service Centres, and shareable private space on a public cloud. DIP aims to ensure that all government services are available electronically through an enhanced and effective online infrastructure. By increasing internet connectivity and empowering the country with digital technologies, the Indian government aims to achieve electronic governance (e-governance) of public services, leveraging innovative ICT tools.

It would make -

- Citizen entitlements portable and available on the cloud
- Promote electronic and cashless financial transactions
- Integrate services seamlessly across departments
- Providing real-time availability of services through online and mobile platforms.
- It involves popularising universal digital literacy, collaborative digital platforms for participative governance, the availability of digital resources and services in Indian languages, and eliminating the need for physical submission of government documents or certificates.

Adoption

Thanks to the ongoing digital revolution, India's internet presence is today higher in rural India than in urban areas (rural India has a 20% higher presence of internet users than urban parts of the country). The penetration of smartphones, UPI, and government schemes such as the Pradhan Mantri Gramin Digital Saksharta Abhiyan, have facilitated internet access in

Digital Literacy Mission



remote parts of India. Numerous corporates, non-profits, and educational startups are reaching rural India with skill training, health and nutrition awareness, self-help group (SHG) empowerment programs, and more, by leveraging video conferencing and other technological platforms.

Some sectors enabling rural populations with opportunities through digitisation :-

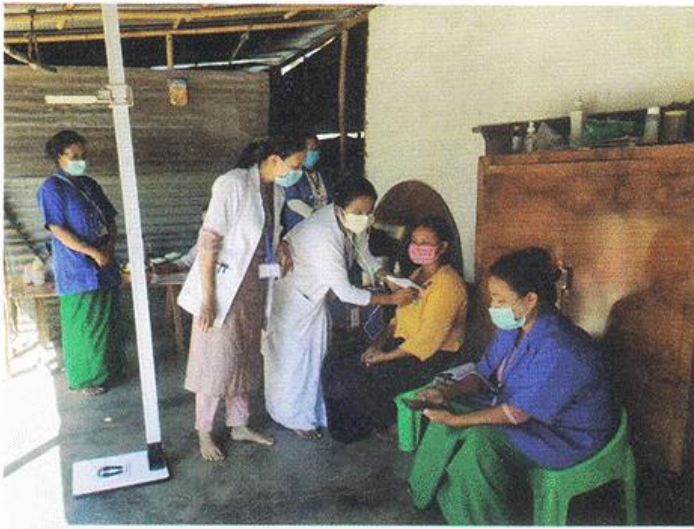
Education

The Indian edtech market is gaining a strong foothold in rural areas too. The government had introduced free digital e-learning platforms such as Diksha and E-Pathshala offering learning material, school curriculum to teachers, students, and parents. E-Pathshala developed by NCERT hosts educational e-resources including textbooks, audio, video, periodicals, and a variety of print and non-print materials through website and mobile app. Collectively the available apps offer host explanation videos, e-books, and interactive lessons, in 12 to 15 Indian languages -- a significant step towards an inclusive education.

Health

The Indian digital healthtech that has a potential to generate \$37 billion in revenue by 2030 today





Nurses and ASHA workers examining a resident of Awang Wabagai, Manipur

utilises NGOs, the private sector, and government through a competent network of -- Accredited Social Health Activist (ASHA)-- a network of community health workers employed by the Ministry of Health and Family Welfare. The *eSanjeevani app* (a national browser-based application facilitating doctor-to-doctor and patient-to-doctor tele-consultations) has facilitated over five million tele-consultations and was a boon during the pandemic, especially in rural areas. Through *eSanjeevani OPD*, one can seek medical advice as well as medication through audio and video. In addition to all this, startups have facilitated digitisation of single medical stores enabling patients in remote areas to access medicines.

eSanjeevani
WORLD'S LARGEST TELEMEDICINE SERVICE IN PRIMARY HEALTHCARE



Agriculture

Around 70 percent of India's rural households depends on agriculture, according to the Food and Agriculture Organization (FAO). Therefore, agritech is naturally drawing interest from farmers, governments, and private startups. Many startups are developing AI-enabled technology and apps to provide end-to-end solutions, which include soil testing, microfinance, weather updates, and more. An example in this direction is the Karnataka government's *e-Sahamathi app* which was developed by the e-governance department and the National Informatics Centre (NIC). Under this app, farmers must agree to share their crop information with the aggregator which, in turn, share details such as a farmer's name, his crop, landholding, etc. with the retailer. In essence, allowing the farmers to list their produce and directly sell it to retail chains—giving them the power to negotiate a fair price for their harvest. Multiple startups have created similar marketplaces.

Economic Empowerment

The *e-Shram portal* of the Ministry of Labour and Employment, a digital database of unorganised workers, is a fine example of a digital upgrade. The portal allows construction and migrant workers to



access job opportunities and provides social security to workers, offering a pension after the age of 60 Years with a Shramik Card. Given the unregulated nature of these markets, this is a great way to ease the process of seeking and employing skilled labour. Besides employment creation, the digital revolution has created opportunities for economic activities in rural India by making them an integral part of the market value chain for products and services—both as suppliers and consumers. The Jan Dhan Account-Aadhaar-mobile connectivity or JAM trinity, has further boosted the initiative.



NAMO Drone Didis: Self-Help Group members pioneering agricultural innovation in India

Women Empowerment

The government is committed to its mission of empowering rural women, not only through loans and subsidies, but also by equipping them with new technologies to boost their confidence. NaMo Drone Didi, which trains women to pilot drones in villages to spray pesticides and fertilisers on crops is a big step in the direction. Despite constituting approximately 40 percent of the rural workforce, the contributions of women in Indian agriculture have historically been undervalued. Reports indicate that female farmers now make a substantial contribution to GDP per capita. However, their invaluable contributions often fade into the background in the male-dominated agricultural narrative. Digital platforms can bridge knowledge gaps by providing women with access to information that was historically challenging to obtain. Precision farming tools such as sensors and drones optimise resource utilisation, thereby enhancing efficiency and increasing yields. Technology facilitates direct market access and enables women to sell their produce at fair prices without relying on intermediaries.

Challenges

Like all sincere attempts to provide facilities there are certain challenges in the process:

- A persistent challenge is the last-mile connectivity in remote and rural areas, where infrastructure development is more challenging due to geographical and logistical constraints.
- The affordability factor for internet and digital devices remains a barrier for certain sections of

society, limiting their access to the benefits of digital technologies.

- There is a scarcity of empirical studies specifically focused on rural areas, hindering a comprehensive understanding of the extent of digital information access and technology innovation among rural populations.
- Existing research predominantly concentrates on urban areas or provides a broader overview of the digital landscape in the country.
- There is a need for comprehensive frameworks that can systematically analyse the factors influencing the adoption and utilisation of digital information and technological innovation in rural areas.

Addressing these challenges requires a multi-faceted approach involving government, private sector, and civil society collaboration. Continued investment in digital infrastructure, expanding internet connectivity, and reducing the digital divide should be priorities. Simultaneously, efforts should focus on enhancing digital literacy and skills development programmes to ensure the sustainability of the Digital India campaign in rural India. Also, scientific research is needed to understand the extent of digital information access and technological innovation among rural populations.

Digital Empowerment of Rural India

Digital technology has brought about significant transformations in the lives of people, particularly in rural areas, by empowering and connecting them. The role of DIP has been instrumental in this as it helped provide increased access to technology in rural regions

through high-speed internet networks, enhancing digital literacy, leveraging cutting-edge technology leading to a transformation of the rural service industry:

- It has given the much-needed fillip to IT training for students and villagers, equipping them with the necessary skills for employment in the ICT sector.
- Rural residents have been trained by telecom service providers to address local internet needs, resulting in the creation of job opportunities in the service industry.
- One of the key impacts of DIP in rural areas has been the creation of community internet awareness. With the majority of Indians residing in rural regions, internet connectivity has played a crucial role in transforming these areas into digitally empowered societies, ensuring that everyone has access to the internet.
- The program has enabled rural communities, many of whom are economically disadvantaged, to access wireless internet, utilise digital platforms, and efficiently leverage e-Services.
- This initiative has not only reduced the reliance on paper-based processes but has also resulted in significant resource savings for poor rural communities.
- By spending less time and money on accessing services, these communities contribute to a cleaner environment and promote sustainable practices.
- DIP has extended its benefits to farmers by offering them digital services. This virtual platform has connected farmers to national agricultural markets and provided access to technological advancements.
- Farmers can access information on crop prices through mobile phones, enabling them to make informed decisions and optimise their agricultural practices. This integration of technology in the agricultural sector has opened up opportunities for increased productivity and income generation among rural farmers.
- DIP has also played a crucial role in driving economic growth, both in rural and urban areas. Government initiatives under the program, such as economic reforms, digitisation, and smart cities, have attracted foreign direct investments (FDIs) and facilitated relaxed economic policies.

- DIP has facilitated real-time education for rural communities, addressing the issue of teacher scarcity in India's education system through smart and virtual classrooms. Mobile devices have also been utilised to educate farmers and fishers on intelligent farming and fishing techniques, enhancing productivity and livelihoods.
- The availability of high-speed internet connectivity in rural areas has facilitated access to online education platforms, bridging the digital divide and providing supplemental educational resources to rural communities.
- The program has not only created job opportunities in the service industry, but has also facilitated the growth of businesses in rural and urban areas alike.

Conclusion

The effort to adopt digitalisation by the government has enhanced connectivity in rural India, bridging several gaps and enabling individuals and communities to access digital services and information. With community internet awareness, rural areas are fast transforming into digitally empowered societies where wireless internet and e-services have become accessible.

This has led to increased efficiency, reduced costs, and improved access to essential services for rural communities, ultimately contributing to their overall development. The BharatNet project aims to connect rural areas with high-speed broadband networks, providing access to digital services and empowering communities with knowledge and information. Bharat Sanchar Nigam Limited (BSNL) rolled out a notice inviting tender for the prestigious BharatNet – III programme to provide last-mile connectivity as well as upgrade existing 164,000-gram panchayats (village blocks) and connect 47,000 of them under the new model, based on ring topology.

Additionally, initiatives like the Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) have been instrumental in imparting digital literacy skills to rural populations, enabling them to leverage digital tools for personal and professional growth.

By aligning with international service standards and promoting a tech-empowered society, India has positioned itself as an attractive destination for global investments, leading to economic modernisation and improved export capabilities. □