



To cite this article: Dr. Muniraju G (2025). INDIA: JOURNEY FROM DIGITAL DIVIDE TO BEING A 5G HUB - DIGITAL DIVIDE AND INCLUSIVE DIGITALISATION, International Journal of Research in Commerce and Management Studies (IJRCMS) 7 (5): 374-385 Article No. 511 Sub Id 919

## **INDIA: JOURNEY FROM DIGITAL DIVIDE TO BEING A 5G HUB - DIGITAL DIVIDE AND INCLUSIVE DIGITALISATION**

**Dr. Muniraju G**

ASSISTANT PROFESSOR  
Department of Commerce  
Government College for Women, Kolar

DOI: <https://doi.org/10.38193/IJRCMS.2025.7529>

### **ABSTRACT**

India, the emerging economy of contemporary times, was once known as the land of snake-charmers. Similarly, the country with poor track of digitally literate people today boasts of being a 5G hub. The paper ponders over the comprehensive affordability and feasibility of internet to the masses; the strides in digital technology; its application in governance and commercial applications; the emergence of India into a 5G hub and the future potential and challenges with respect to India in the field of digitalization. The paper briefly looks into how digitalization evolved in India over the period, particularly post- LPG.

India, given its demographic dividend, has potential market for digital expansion, offers avenues for employment in the digital sector and research and development in the arena of digitalization. India can attract foreign investments from abroad for the same. The Unified Payments Interface (UPI) for instance, is creating wonder with wide networking across all sections of the society. India's standalone capability in the development of 5G is next only to US and China, just three months within the initiation of the 5G development programme. The digital outreach in India with its track-record of being an IT/BT/ silicon valley to emerging 5G hub is worth a serious study. The inclusive nature of the digital expansion and its penetration in all the sectors of the society, commerce and polity and the way digitalization has evolved to being an integral part of day-to-day affair of a common man's life enables such research more interesting. The development of Artificial Intelligence and Machine Learning (AI & ML) and their applications in all sectors at a rapid pace is another example of the widening digitalization.

**KEYWORDS:** Digitalization, development, hub, commerce and governance

### **INTRODUCTION**

At a high level, the digital divide is the gap between those with Internet access and those without it. But the digital divide is multifaceted and includes many factors such as access, affordability, quality,

and relevance. Michael Kende writes, “the digital divide is not a binary.” **Important questions determining digital divide are-** Is there available access to the Internet in your area? Is there a nearby point of connection to the Internet? If yes, this is just the first step to having Internet access. Is that access affordable? How does the cost compare to other essential goods? What percentage of your income do you need to pay for access? Are the upload and download speeds sufficient for the local needs of Internet users? Does the connected community have the necessary skills and technologies? Is there local interest and understanding of the relevance of Internet access? Are there locally available mobile [apps](#)? Is there content in the local language and relevant to the people in the community? Other areas that can create digital inequality include [security](#), inter-connectivity, digital literacy, and access to equipment. These gaps in availability, affordability, interest, and digital literacy exist at the international level as well as the neighborhood level.

Countries that have high overall connectivity rates often still have stark inequalities in rural, remote, and even urban areas. Often these gaps fall along other disparities such as income and gender-based inequality. For instance, the United States has high overall connectivity rates, but there is a [marked gap in availability of affordable and sustainable Internet access on Indigenous lands](#).

The digital divide in India refers to an unequal distribution of access to, usage of, or influence of information and communication technology among any number of separate groups, which can be characterised using social, geographical, or geopolitical criteria, or in any other way. One of the reasons for the widening of already extreme levels of inequality and the drag on economic development is that many people still lack the resources and expertise necessary to use the internet. Although the gap does not just exist in India, it is particularly pronounced in a country where more than half of the 1.3 billion inhabitants are under the age of 25. Around 600 million people in India use the internet, which accounts for more than 12% of all users worldwide, according to Bloomberg. Yet just 20 per cent of Indians, according to official data, are proficient in using digital services, even though half the country's population lacks access to the internet. Only 43 per cent of people in India utilise the internet, according to the ITU's World Telecommunication/ICT Indicators Database. According to the IAMAI-Kantar Report ICUBE 2020, 58 per cent of men and 42 per cent of women in India use the internet. The rural-urban split is used as an additional basis for data segregation. Only 48.7 per cent of rural males and 24.6 per cent of rural females meet this requirement, compared to 72.5 per cent of urban males and 51.8 per cent of urban females who have ever used the internet. It's noteworthy to observe that urban men make up the majority of the population throughout all states, whilst rural women make up the minority.

Governments have attempted to enhance internet connectivity in the nation during the last decade. The BharatNet project was initiated in 2011 to connect 0.25 million panchayats by optical fibre (100



MBPS) and connect India's communities. Its installation only began in 2014.

The government also established the National Digital Literacy Mission and the Digital Saksharta Abhiyan in 2014. It also announced many programmes in 2015 as part of its Digital India drive to link the whole country. This includes the PM Gramin Digital Saksharta Abhiyan, which was established in 2017 to bring digital literacy to rural India by reaching 60 million homes. The digital divide is a multifaceted challenge that has far-reaching implications for our society, economy, and individual well-being. It encompasses disparities in access to digital resources, technology, and the ability to navigate the digital landscape. The origins of this divide are deeply rooted in socioeconomic disparities and historical infrastructure limitations, but it has evolved with technological advancements.

In the context of India, the digital divide is a pressing concern. Urban areas typically enjoy better connectivity and access to technology, while rural regions face challenges related to infrastructure, affordability, and digital literacy. These disparities can lead to unequal opportunities in education, healthcare, and employment, perpetuating existing inequalities.

The COVID-19 pandemic underscored the urgency of addressing the digital divide, as it became evident that online education and telemedicine are essential services. Unfortunately, many individuals and communities were left behind due to inadequate access to digital resources.

Efforts to bridge the digital divide are ongoing. Governments, including the Indian government, have launched various programs and initiatives to expand digital infrastructure and promote digital literacy. Private organizations and NGOs are also actively engaged in this mission. To counter the digital divide, it is crucial to continue expanding digital infrastructure, providing affordable access, and promoting digital literacy among all segments of society. This collective effort will ensure that the benefits of the digital age are accessible to all, irrespective of their geographical location or socioeconomic background. The path ahead involves persistent efforts to make digital resources accessible to marginalized communities, thereby contributing to a more equitable and inclusive digital future. Individuals, government, and organizations all have a role to play in addressing this pressing issue.

In this rapidly evolving digital landscape, it is imperative to stay informed about the digital divide, support initiatives that promote digital inclusion, and advocate for policies that ensure equal access to digital opportunities for everyone. By working together, we can reduce the digital divide and create a more equitable and inclusive digital world for all.

### **Objectives of the Study**

This research aims to trace the journey from digital divide to 5G hub, emphasizing the significance of inclusive digitalization. It explores the challenges faced, innovative solutions adopted, and the impact on social and economic development.

### Digitalization in Commerce and Governance

Deep penetration of telecom and internet, combined with government's focus to develop digital infrastructure, have laid the foundation for a digital economy. The Digital India Stack is now the global benchmark for most countries and provides a competitive advantage for growing businesses. Wide-scale adoption of Unified Payments Interface (UPI) or digital payments by 260m unique users has enabled formalization of the digital economy. Digital India is a campaign launched by the Government of India to make its services available to citizens' electronically through improved online infrastructure and by increasing Internet connectivity. The initiative includes plans to connect rural areas with high-speed internet networks.

Digitalization is a big technological change which is underway and how countries adopt these technologies will lay the groundwork for the coming decades. It will increase economic efficiency and competitiveness, creating new businesses and products, and addressing challenges relating to increasing financial inclusion, improving governance and reducing disparities. For India, digitalization is especially important given the large population, with over 60% living in rural areas. Connecting the country together allows for greater access to the benefits and opportunities of a modern economy to a larger number of citizens, thereby bridging the economic divide. Further, the adoption of advanced technologies, such as [AI](#), Machine learning, [block-chain](#), cloud computing, among others, will improve the efficiency of Indian businesses, making them globally competitive, explore new markets, create new business models, and position them for strong growth over the next few decades.

India has been digitalizing at a rapid pace driven by a combination of factors, including growing broadband penetration, technological advancements, low costs of data usage and the government's thrust on building [digital infrastructure](#). This provided an impetus to the emergence of the start-up ecosystem and entrepreneurship among the relatively young population, which has been quick in adopting and using digital technologies.

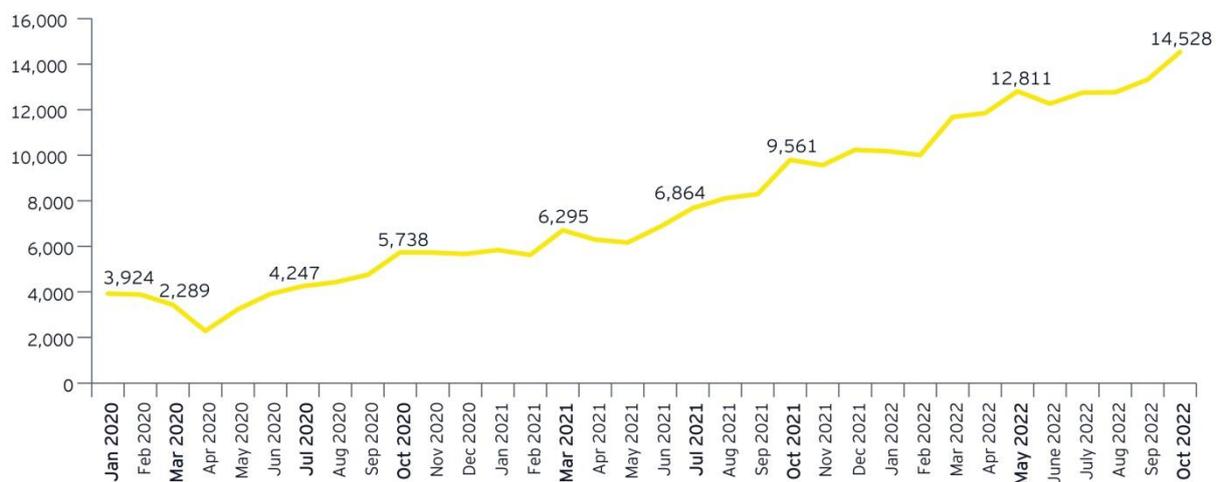
Underpinning this infrastructure is the "India Stack", a set of open Application Programming Interfaces (API), which are unlocking economic building blocks like identity, [digital payments](#) and data, thereby creating a platform for facilitating transactions and providing goods and services. The Aadhaar layer provides online bio-metric based digital identities to 1.35b individuals. Another layer of the Digital Indian Stack is the UPI. There are over 350 banks on the network with over 260m unique users and the network has grown to become India's largest digital payment network and world's fifth largest digital payment network by volume.

Development of the UPI interface has fundamentally changed behavior among Indians, with a long-term positive impact on-Formalization of the digital economy in India – through cashless and paperless transactions; Deepening of financial inclusion by bringing in a number of small businesses

and unbanked individuals into the formal economy by creating a financial record and credit history and allowing these businesses and individuals to access credit; Provision of an alternate retail payment system and lowering of the dependence on existing card-based payment systems; Provision of an architecture for private players to innovate and develop new business models, for example, fin-tech and [e-commerce](#) solutions. As a result of development of this stack, the impact of the pandemic and the growing e-commerce market, digital payments have been exploding with UPI leading the surge in India, confirming its bright future in the country.

### UPI Network in India

Digital payment trends - Total digital retail payments  
(in INR billion)



Note: Others include ECS, AEPS, APBS and BHIM  
Source: TRAI, RBI

The economic impact of digitalization can be seen across the Indian economy. India's core digital economy share in GVA increased from 5.4% in 2014 to 8.5% in 2019, with a digitally dependent economy estimated to be around 22% of GDP in 2019. In absolute US dollar terms, India's digital economy exhibited a growth rate of 15.6% over the period 2014 to 2019, which was 2.4 times faster than the growth of the overall Indian economy. Digital output multiplier has increased over time from 1.35 in 2014 to 1.52 in 2019, highlighting the role of investments to drive growth. 62.4m workers were employed in the digitally dependent economy in 2019.

Government of India has been progressively digitizing its interface with citizens and thereby making it easier to get licenses, certificates, payment of taxes and bringing efficiency in governance outcomes.

The government has also digitalized procurement of goods and services by creating a centrally managed marketplace - Government e-Marketplace (GeM), which is one of the largest procurement platforms with annual gross merchandise value of US\$14.2b. Social aspects of digitalization, of bringing relief to people during the pandemic, were driven on India's digital public infrastructure — COWIN36, a [technology](#) platform created by the government to control the rollout of the world's largest vaccination program.

Broadband usage in India has been growing at an unprecedented pace. Mobile broadband (MBB) subscribers have increased from 345m to 765m over the past five years. Data traffic per user has seen a jump of 31% over the last five years reaching 17GB as of December 2021. As a result, India's data traffic usage from 2017 to 2021 was among the highest in the world with a CAGR of 53%. India's Gen Z spends an average of 8 hours per day online. The next wave of smartphone adoption is happening in rural India. It is now expected that India would have the second largest universe of online shoppers by 2030, estimated at 500m to 600m. Online marketplaces have been exploding across all sectors of the economy. Reflecting the behavioral change, it is but logical that these metrics will continue to explode. The size of the e-commerce market is expected to grow to US\$350b by 2030.

#### **The nine pillars of Digital India were-**

**Broadband Highways**– This covers three sub components, namely Broadband for All – **Rural, Broadband for All** – Urban and National Information Infrastructure (NII).

**Universal Access to Mobile Connectivity**- This initiative focuses on network penetration and filling the gaps in connectivity in the country.

**Public Internet Access Programme**- The two sub components of Public Internet Access Programme are Common Services Centres (CSCs) and Post Offices as multi-service centres.

**e-Governance: Reforming Government through Technology**- Government Process Re-engineering using IT to simplify and make the government processes more efficient is critical for transformation to make the delivery of government services more effective across various government domains and therefore needs to be implemented by all Ministries/ Departments.

**e-Kranti – Electronic Delivery of Services**- To improve the delivery of public services and simplify the process of accessing them. In this regard, several e-governance initiatives have been undertaken by various State Governments and Central Ministries to usher in an era of e-Government. e-Governance in India has steadily evolved from the computerization of Government Departments to initiatives that encapsulate the finer points of Governance, such as citizen centricity, service orientation and transparency.

**Information for All**- This pillar aims to ensure transparency and availability of reliable data generated by the line ministries for use, reuse and redistribution for the people of India.

**Electronics Manufacturing**- This pillar focuses on promoting electronics manufacturing in the

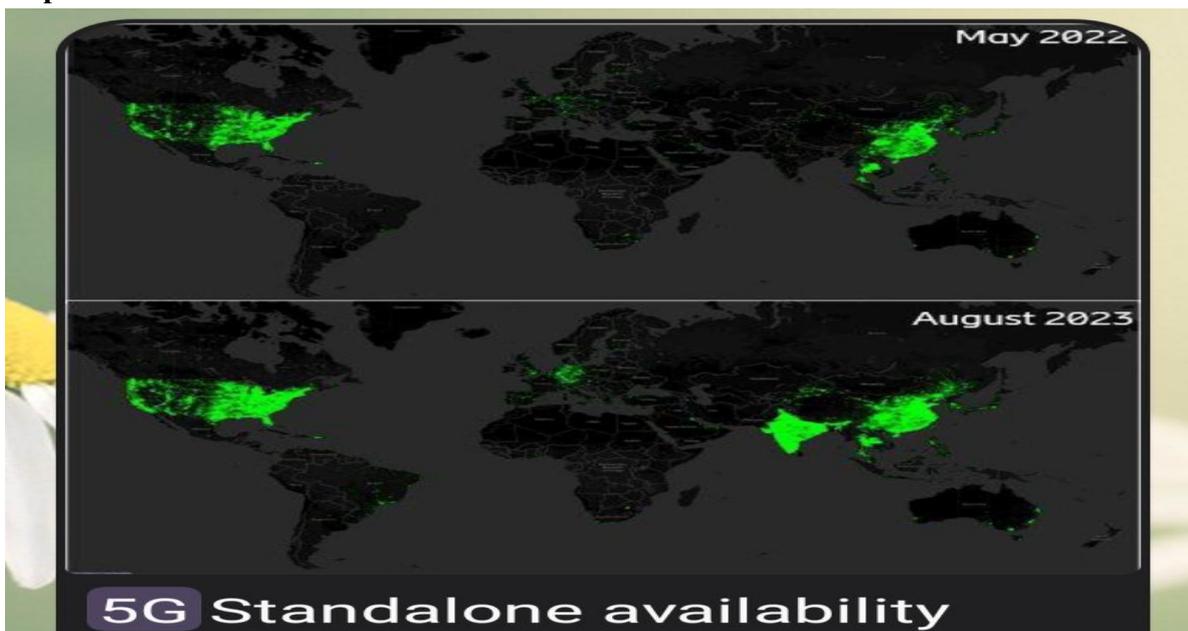
country.

**IT for Jobs-** This pillar focuses on providing training to the youth in the skills required for availing employment opportunities in the IT/ITES sector.

**Early Harvest Programmes-** This pillar consists of a group of different short-term projects which have immediate effect on the Indian digital ecosystem like IT platform for mass messaging, crowd Sourcing of eGreetings, biometric attendance in the government offices, WI-FI in all universities etc.

Digital India aims to provide high-speed internet in all gram panchayats. Digital India aims to provide easy access to Common Service Centre (CSC) in all the locality. Digital India is an initiative that combines a large number of ideas and thoughts into a single, comprehensive vision so that each of them is seen as part of a larger goal. The Digital India Programme also focuses on restructuring many existing schemes that can be implemented in a synchronized manner. The digital programmes integral to Digitalisation process in India are- DigiLockers initiative aims at ‘Digital Empowerment’ of the citizen by providing access to authentic digital documents to citizen’s digital document wallet; Hospital Management Information System (HMIS) which is a one-stop solution in connecting patients, hospitals and doctors through a single digital platform. Till February 2021, as many as 420 e-Hospitals had been established under the Digital India campaign; Developed by NCERT, e-Pathshala showcases and disseminates all educational e-resources including textbooks, audio, video, periodicals and a variety of other print and non-print materials through the website and mobile app; Bharat Interface for Money (BHIM) is an app that makes payment transactions simple, easy and quick using Unified Payments Interface (UPI).

### Development of 5G



India would shortly be emerging the 5G hub of the world says Ericsson. India stands third after US and China just three months after initiation of 5G programmes. The following are prove the same- 5G mobile subscriptions are growing in every region and forecast to top 1.5 billion globally by the end of 2023; Continued revenue growth in leading 5G markets; Average data traffic per smartphone in the India region is the highest globally

5G subscriptions are expected to reach 700 million and are estimated to account for 57 percent of mobile subscriptions in the region by the end of 2028. Average data traffic per smartphone is projected to grow from 26 GB per month in 2022 to around 62 GB per month in 2028 – a CAGR of 16 percent. Total mobile data traffic is estimated to grow from 18 EB per month in 2022 to 58 EB per month in 2028, growing at a CAGR of 22 percent.

4G continues to be the dominant subscription type driving connectivity and fueling data growth in the region. 4G subscriptions are forecast to decline from 820 million in 2022 to 500 million by 2028. Total mobile subscriptions in the region are estimated to grow to 1.2 billion in 2028. Nitin Bansal, Head of Ericsson India and Head of Network Solutions for South east Asia, Oceania and India, Ericsson says ” Mobile networks continue to play a pivotal role in driving social and economic inclusion in the country. The strong digital infrastructure being established in India will help the country bridge the digital divide, create jobs, drive entrepreneurship and boost the economy. ” The number of smartphone subscriptions is projected to grow at a CAGR of 5 percent, reaching over 1.14 billion by 2028 in India from 840 million at the end of 2022. Smartphone subscriptions in India as a percentage of total mobile subscriptions are expected to grow from 76 percent in 2022 to 93 percent in 2028.

### **Challenges & Future Ahead: Potential for Digitalization**

The daily internet speed, as well as the Wi-Fi hotspots, are slow as compared to other developed nations. Most of the small and medium scale industry has to struggle a lot for adapting to the new modern technology. Limited capability of entry-level smartphones for smooth internet access. Lack of skilled manpower in the field of digital technology. To look for about one million cybersecurity experts to check and monitor the growing menace of digital crime. There is lack of user education. There is an increase in electronic transactions related to e-governance. Around 12000 post office branches in the rural areas have been linked electronically. The Make in India initiative has improved the electronic manufacturing sector in India. Digital India plan could boost GDP up to \$1 trillion by 2025. Healthcare and education sector has also seen a boost. Improvement in online infrastructure will enhance the economy of the country

An optical fiber network of 2, 74,246 km has connected over 1.15 lakh Gram Panchayats under the Bharat Net programme. A Common Service Center (CSC) is created under the National e-Governance Project of the Indian government which provides access for information and communication

technology (ICT). Through computer and Internet access, the CSCs provide multimedia content related to e-governance, education, health, telemedicine, entertainment, and other government and private services. Establishment of digital villages along with well-equipped facilities such as solar lighting, LED assembly unit, sanitary napkin production unit, and Wi-Fi choupal. Internet data is used as a major tool for the delivery of the services and the urban internet penetration has reached 64%.

Cyber-crime is a severe threat to the process of digitalisation in India. The interplay between digital transformation services and cybersecurity is a complex dynamic that demands attention and strategic planning. When a product engineering team's main focus is on delivering the product on time, they might not give enough thought to having strong cybersecurity measures in place. When formulating a new product or service, it becomes essential to recognize the prerequisites essential for its success, security, and scale.

Digital transformation is not merely about adopting new technologies; it's a comprehensive change that reshapes how businesses operate, deliver value, and interact with stakeholders. Cloud computing, the Internet of Things (IoT), artificial intelligence (AI), and big data analytics are some of the cornerstones of this revolution. These technologies empower organizations to gather and analyze vast amounts of data, automate tasks, and make data-driven decisions.

From sensitive customer information to proprietary business strategies, safeguarding data is paramount. Cyber-attacks are on the rise, becoming more sophisticated and damaging. Consequently, as [businesses embrace digital transformation](#), they expose themselves to new and evolving cybersecurity risks. Digital transformation often involves adopting [cloud services](#), connecting numerous devices through IoT, and utilizing third-party applications. While these advancements improve efficiency, they also expand the attack surface for cybercriminals. Each entry point becomes a potential vulnerability that malicious actors could exploit. The collection and storage of vast amounts of data raise significant privacy concerns. Compliance with data protection regulations such as GDPR and CCPA becomes challenging as data flows across various systems and geographical boundaries.

Cybercriminals are quick to adapt to new technologies and exploit vulnerabilities. With AI-driven attacks and sophisticated phishing schemes, organizations must be equally innovative in their cybersecurity strategies. Access to data increases, so does the potential for insider threats. Unhappy employees or accidental data leaks can result in significant breaches. Growing awareness and a sense of responsibility among employees is crucial.

Cloud computing is a cornerstone of digital transformation, offering scalability and accessibility. However, the shared responsibility model in cloud environments means that organizations must actively secure their data and applications. Collaborating with cloud providers to implement robust security measures is essential. IoT devices offer real-time data and automation capabilities, but they are notorious for their weak security. A breach in one connected device can potentially compromise

an entire network. Digital transformation services can help organizations adopt IoT securely through device authentication, data encryption, and continuous monitoring. AI streamlines processes and enhances decision-making, but it can also be used by cybercriminals to launch more targeted attacks. Advanced AI-driven security solutions are necessary to stay ahead of potential threats. Data analytics drive insights, but the data being analyzed must be protected. Anonymization, encryption, and access controls are critical to ensuring data privacy while still benefiting from analytics. Digital transformation promotes remote work and collaboration, but the tools used must be secure to prevent data leaks. Implementing strong authentication and end-to-end encryption in communication tools mitigates risks.

The methods to overcome cyber threats include the following- Integrate cybersecurity considerations into every stage of digital transformation. Whether developing new applications or adopting IoT devices, security should be a primary concern; Human error remains a significant cybersecurity vulnerability. Educate employees about cybersecurity best practices, from recognizing phishing emails to maintaining strong passwords; Rely on a multi-layered security approach. Firewalls, intrusion detection systems, encryption, and regular security audits collectively strengthen your organization's defences; If you're partnering with digital transformation service providers, ensure they have robust cybersecurity practices. Thoroughly examine their security protocols and compliance with relevant regulations; Despite preventive measures, breaches can still occur. Have a well-defined incident response plan to minimize damage and recover swiftly.

[Digital transformation solutions](#) provide unprecedented chances for companies to foster innovation, optimize processes, and uphold their competitiveness. Nevertheless, this evolution carries a cautionary note: the increased cybersecurity vulnerabilities that arise alongside the integration of novel technologies. To truly capitalize on the advantages of digital transformation while ensuring the protection of valuable information, enterprises need to acknowledge the interconnected nature of digital progress and cybersecurity. Through the fusion of security measures into their transformative endeavors, staying abreast of emerging risks, and tapping into the proficiency of cybersecurity experts, organizations can confidently and resolutely navigate the changing terrain.

#### **CONCLUSION:**

The journey from digital divide to being a 5G hub represents a significant paradigm shift in global digital development. By prioritizing inclusive digitalization, policymakers, industry leaders, and communities can collectively contribute to a more equitable and connected world. This article advocates for sustained efforts to bridge the digital divide and harness the transformative power of 5G for the benefit of all.

## REFERENCES

- <http://play.google.com/store/apps/details?id=com.incognisys.digitalindia>
- <https://petapixel.com/2015/05/26/film-vs-digital-a-comparison-of-the-advantages-and-disadvantages/>
- <http://culturedigitally.org/2014/09/digitalizationand-digitization/>
- <http://www.dighist.org/wpcontent/uploads/2011/03/DigitizationBannerFinal1.png>
- <https://acloudin.wordpress.com/2016/04/09/impactof-digitalization-of-education-in-india/>
- <https://digitalculturist.com/what-is-digital-culture5cbe91bfad1b#.mlprjfl4z>
- <https://hbr.org/2016/03/the-4-things-it-takes-to-succeed-in-the-digital-economy>
- <https://googleweblight.com/i?u=https://www.accenture.com/in-en/insight-india-pathdigitalization&grqid=QSF1AXkz&hl=en-IN>
- [https://www.ey.com/en\\_in/india-at-100/digitalizing-india-a-force-to-reckon-with](https://www.ey.com/en_in/india-at-100/digitalizing-india-a-force-to-reckon-with)
- Khan, S., Khan, S. and Aftab, M, “Digitization and its Impact on Economy,” International Journal of Digital Library Services, vol. 5(2), pp.138-149, 2015.
- Kaul, M. and Mathur, P. “Impact of Digitalization on the Indian Economy and requirement of Financial Literacy,” Proceedings of International Conference on Recent Innovations in Engineering and Technology, pp. 100-105, 2017.
- Olalere, A.Q., Oyeyinka, O.T., Lateef, O, Olakunle, O.R., Kenneth, T.A., Rauf, G., Omolayo, J. and Nancy, N.O. The challenges of Digitization on the Broadcasting media in Nigeria, Arabian Journal of Business and Management Review, vol. 3(5), pp. 88-98, 2013.
- Gulati, M. “Digital India: Challenges & Opportunities,” International Journal of Management, Information, vol. 10(4): pp.1-4, 2016.
- Priyadarsini, K. and Vijayaratnam, N. “Digitalization of India: Smart Villages towards Smart India,” International Journal of Innovative Research in Information Security, vol. 9(3), pp. 33-37, 2016.
- Shamim “ Digital India – Scope, Impact and Challenges,” International Journal of Innovative Research in Advanced Engineering, vol. 12(3), pp. 90-93, 2016.
- Gupta, N. And Arora, K. “Digital India: A Roadmap for the Development of Rural India,” International Journal of Business Management, vol. 2(2), pp. 1333-1342, 2015.
- Maiti, M. and Kayal, P. “Digitization: Its Impact On Economic Development & Trade ‘With Special Reference To Services and MSME Sector of India’,” Asian Economic and Financial Review, vol. 7(6): pp. 541-549, 2017.
- Midha, R. “Digital India: Barriers & Remedies,” International Conference on Recent Innovations in Sciences, Management, Education and Technology, 256-261, 2016.
- Sheokand, K. and Gupta, N. “Digital India programme and impact of digitalisation on Indian economy, “ Indian Journal of Economics and Development, vol. 5(5), pp.1-13, 2017.



- India Tech & Infra Twitter page 21 October 2023: Source of the Image on 5G standalone availability in India