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**Comments to the Telecom Regulatory Authority of
India on the Consultation Paper on Digital Inclusion
in the Era of Emerging Technologies**

Comments on behalf of the Research Group on TRAI,
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I. Introduction

The Telecom Regulatory Authority of India released the Consultation Paper on Digital Inclusion in the Era of Emerging Technologies on 14th September 2023. It is evident that economies around the world are rapidly becoming digitalised. Digital technologies have become extremely essential to the everyday functioning of the economy. It is thus, essential that the digitalisation is all-encompassing and inclusive to ensure that it does not lead to a divisive growth. Thus, it is required that digital inclusion becomes the cornerstone of this development. The consultation paper highlights the relevance of Digital Connectivity, Digital Affordability, Digital Literacy and Digital Public Infrastructure, among other things as strategies for digital inclusion.

The mandate of the GNLU Centre for Law and Economics Working Paper and Policy Recommendations Vertical is to engage with such regulatory documents and to provide relevant, substantive inputs. Therefore, the Centre for Law and Economics constituted a Research Group to study the Paper and research on the proposals to suggest comments which would further the aims of the policy draft. Comments have been provided on several questions posed by the regulator and are numbered according to the numbering provided in Chapter 5 – Summary of Issues For Consultation.

The Centre has based on its area of expertise and the body of knowledge, decided to attempt some of the questions that were presented in the consultation paper, while the ones that did not align with the area of expertise for the centre have not been attempted, to ensure the quality of recommendations and that only the relevant and the apt suggestions and recommendations are made. Therefore, not all the questions and issues in the consultation paper have been addressed, rather only some of them have been addressed.

II. Specific Analysis and Comments

1. QUESTION 1

WHAT SHOULD BE THE DEFINITION OF DIGITAL INCLUSION? WHAT PARAMETERS SHOULD IT INCLUDE TO HIGHLIGHT DISPARITIES ACROSS DIFFERENT SEGMENTS OF SOCIETY TO HAVE A REALISTIC ASSESSMENT FROM A POLICY PERSPECTIVE?

The term “digital divide” was introduced in the mid-1990s and defined as the gap separating those who have access to new forms of information technology from those who do not.¹ Digital divide can be understood with respect to a number of theories that have been applied to it. One such theory by mission and hacker explains it by diffusion of innovation theory, according to which as a new technology is invented, it is not readily adopted by everyone rather as the popularity and personal resources of the ones using the technology increase it is adopted by others in the society. While, another theory propounded by van Dijk², notes that the digital divide may follow an s-type curve for adoption which follows that some cultural groups and ethnic communities may adopt digital technology faster than others thereby creating an s-type in its adoption³. Thus, the concept of the digital divide must be understood as a complex phenomenon with regard to multiple dimensions and as continuously evolving, the difference in adoption of technology should be seen as a range of factors acting together to lead to the given outcome.

All the definitions of the digital divide, as provided in the consultation paper above, are majorly focused on analysing the access to digital services rather than focusing both on access as well as use of those services.⁴ The gap in use at all levels needs to be

¹ Srinuan, Chalita; Bohlin, Erik (2011) : Understanding the digital divide: A literature survey and ways forward, 22nd European Regional Conference of the International Telecommunications Society (ITS2011), Budapest, 18 - 21 September, 2011: Innovative ICT Applications - Emerging Regulatory, Economic and Policy Issues.

² Van Dijk, J. (2000). *Widening information gaps and policies of prevention*. In Hackers, K., van Dijk, J. (Eds.), *Digital Democracy: Issue of Theory and Practice*. SAGE PUBLICATIONS, London, 166-18.

³ CPMI (Committee on Payment and Settlement Systems) and World Bank. 2016. *Payment Aspects of Financial Inclusion*. Basel: Bank for International Settlements, and Washington, DC: World Bank.

⁴ DPGA (Digital Public Goods Alliance). 2022. “Rwanda Ministry of ICT and Innovation Joins the DPGA.” Digital Public Goods Alliance Blog, September 1, 2022. <https://digitalpublicgoods.net/blog/rwanda-ministry-of-ict-and-innovation-joins-the-dpga/>.

investigated further and also be considered an important determinant in analysing the digital divide in any country including India. Culture refers to the values, beliefs and practices that influence the ways individuals interpret the world and can manifest itself in a variety of social settings, including homes, schools and communities. Technologies are not culturally neutral or value-free, and can impact significantly on the habits, folkways, outlooks and identities normally associated with culture.⁵ This is further analysed while answering question 3, how the use of technological services has varied across different cultures and ethnicities where they despite having access to such services, are not utilizing them.

It has been highlighted by various scholars over a period of time that liberalisation and computation in the telecommunication sector will ensure and rep better results for the diffusion of Internet services to the remote corners of the country.⁶ It has been highlighted that subsidies and intervention by the government may lag behind but competition and a liberalized telecommunication sector might be quick to reach the far and remote corners of the country⁷.

Thus, an important parameter that needs to be studied while analysing the divide in the country is that of competition among firms and the number of firms striving to provide for the internet services.

2. QUESTION 3

ARE DIGITAL CONNECTIVITY, DIGITAL AFFORDABILITY AND DIGITAL LITERACY THE MAIN FACTORS RESPONSIBLE FOR DIGITAL INCLUSION IN THE COUNTRY? DO YOU AGREE THAT DIGITAL INCLUSION CAN BE ACHIEVED IN THE COUNTRY BY ADDRESSING THESE? IF NOT, PLEASE SUGGEST ANY OTHER FACTORS RESPONSIBLE FOR THE DIGITAL DIVIDE THAT NEED TO BE ADDRESSED TO ENSURE DIGITAL INCLUSION.

⁵ Hill, R., Beynon-Davies, P., & Williams, M.D. (2008). Older people and internet engagement: Acknowledging social moderators of internet adoption, access and use. *Information Technology & People*, 21 (3), 244 – 266.

⁶ Norris, P. (2001). *Digital divide: Civic engagement, information poverty, and the Internet worldwide*. New York: Cambridge University Press.

⁷ McKinsey Global Institute. 2016. *Digital Finance for All: Powering Inclusive Growth in Emerging Economies*. McKinsey&Company.<https://www.mckinsey.com/featured-insights/employment-andgrowth/how-digital-finance-could-boost-growth-in-emerging-economies>.

Although these are the major determinants that seek to explain the digital divide in the country, one important variable, as is highlighted in various reports and studies related to the impact of the media policy of the state as well as culture on the digital divide in the country. It is perceived that different cultures have been responding to digital technologies differently. Given India's large variety of cultures, it becomes even more pertinent to look at the cultural aspect in the digital divide⁸.

Various research has been conducted by researchers across the world⁹, wherein they have highlighted the digital divide that exists in the country due to cultural and ethnic differences.

In the last decades, policies and measures to prevent digital exclusion, such as improved technological infrastructures, cheap and easy access to technologies and digital literacy programmes to increase digital engagement, are considered to be key instruments in overcoming new forms of inequality across the world. Scholars have underlined the importance of and identified several approaches to policies aimed at solving the digital divide problem.

Some scholars, however stress that fundamental political and economic changes, beyond the development of telecommunication infrastructures and IT industries, are required as well¹⁰.

Some national contexts, especially post-Socialism ones, like Russia, might prove that even increased legislative activities, supported by the introduction of economic subsidies as part of the media policy, create better conditions for access to technologies, networks and services and increase socially significant media content production.

Research has proved that, although higher levels of digital literacy have been achieved, it is still not obvious how to create a favourable environment for learning or how to nurture the capabilities of citizens. This can probably explain why many international organizations and nations have shifted their focus in their struggle against

⁸ UNESCO. (2013). Global media and information literacy. Assessment framework: Country readiness and competencies. France: UNESCO.

⁹ Vartanova, Elena & Gladkova, Anna (2019). New forms of the digital divide in Josef Trappel (ed.) Digital media inequalities: Policies against divides, distrust and discrimination, pp. 193-213. Göteborg: Nordicom

¹⁰Fuchs, C. & Novak, E. (2008). Africa and the digital divide. *Telematics and Informatics*, 25: 99-116.
Gladkova, A. (2015). Linguistic and cultural diversity in Russian cyberspace: Examining four ethnic groups online. *Journal of Multicultural Discourses*, 1: 49-66.

the digital divide from general strategies to less holistic but more realistic educational programmes aimed at developing digital skills for different social groups, starting in schools and continuing with training programmes in lifelong learning formats for adults and senior citizens.

In the context of post-Soviet Russia, the digital divide has been influenced by various geopolitical and cultural factors, particularly the country's diverse ethnic structure and vast territory. With over 190 ethnic groups and 170 languages spoken alongside Russian, the unevenly distributed transportation and ICT infrastructure has led to the dominance of federal television channels transmitted via terrestrial and satellite networks¹¹.

The growth of the internet and digital media in Russia began in the mid-1990s and significantly expanded in the mid-2000s, with a major breakthrough in the early 2010s when internet connections reached over half of the population. The internet has become the second main source of information for Russians after television, with a growing level of trust in online news sources¹².

During the 1990s, Russia faced various forms of digital divides, including access, information literacy, and demographic disparities. However, inequalities in digital access among different federal districts have lessened over the years, with the North-Western federal district having the highest monthly internet audience and the Volga federal district the lowest in 2017¹³.

The digital divide in Russia is affected by factors such as economic disparities, technological development, and media openness. A survey showed that there are two main groups of Russians who do not use the internet: those who lack access but want to use it (10%) and those who do not wish to use it at all (40%)¹⁴.

¹¹ Sivalingam, I., and V. Bhandari. 2023. From 1% to 30%: The Key Drivers behind the Philippines' Acceleration towards Responsible Digital Payment Systems. Case Study. Better Than Cash Alliance. <https://www.betterthancash.org/alliance-reports/from-1-percent-to-30-percent-the-journey-of-the-philippines-toward-responsible-digitalpayments>.

¹² Deviatko, I. (2013). Digitizing Russia: The uneven pace of progress towards ICT equality. In M. Ragnedda & G. W. Muschert (eds.), *The digital divide: The Internet and social inequality in international perspective* (pp. 118-133). New York: Routledge.

¹³ Natarajan, H. 2023. "Financial Infrastructure in the FinTech Era and Implications for Policymakers." *Journal of Digital Banking* 7, no. 4: 301-8. <https://www.ingentaconnect.com/content/hsp/jdb001/2023/00000007/00000004>.

¹⁴ Natarajan, H. 2023. "Financial Infrastructure in the FinTech Era and Implications for Policymakers." *Journal of Digital Banking* 7, no. 4: 301-8. <https://www.ingentaconnect.com/content/hsp/jdb001/2023/00000007/00000004>.

Media policy in Russia plays a crucial role in addressing the digital divide, with government initiatives aimed at providing better access to digital technologies, especially for ethnic and linguistic minority groups. Legal frameworks protect the rights of Russians to access information in their native languages and promote media diversity.

However, challenges remain in narrowing the digital divide, particularly concerning the uneven regional development and the availability of resources for implementing policies. Ethnic and linguistic minority groups often face limited access to digital technologies and a lack of digital competencies.

At present, no such data is available in the Indian case wherein the digital divide has been analysed from the standpoint of the cultural differences amongst different cultural groups; however, given the fact that India is home to diverse cultures. Thus, it is advised that the digital divide and the related issues must be looked at from the point of the cultural divides.

It is important to remember that overcoming digital inequalities requires a systematic, complex approach. Such an approach should combine top-down and bottom-up initiatives and programmes, be aimed at creating better public engagement, stimulate citizens to develop their digital skills to benefit from digital inclusion and involve state, business and public institutions when it comes to overcoming the digital divide in society.

3. QUESTION 9

WHAT MEASURES ARE REQUIRED FOR ADOPTING A COLLABORATIVE APPROACH TO UTILISE DIGITAL CONNECTIVITY INFRASTRUCTURE CREATED BY THE SERVICE PROVIDERS OR THROUGH GOVERNMENT-AIDED SCHEMES TO EXTEND CONNECTIVITY TO THE PEOPLE IN UNSERVED AREAS? PLEASE PROVIDE YOUR ANSWER WITH SUITABLE JUSTIFICATION.

A. INCREASING EFFICIENCY BY INCREASING COMPETITION IN MARKET

The first major obstacle to businesses using digital technology is frequently a lack of affordable access to digital infrastructure. In particular, it is essential to have access

to digital technologies like (mobile) broadband, even in rural and isolated places, as well as to the data that is becoming the infrastructure for innovation that is driven by data. The foundational technology for the unrestricted data flow that supports and powers digital services is high-speed broadband. Since smart mobile devices are increasingly serving as a major platform for digital innovation, mobile broadband is crucial. High-speed mobile broadband is furthermore crucial to enhancing connection in isolated and underdeveloped areas. Because of increased competition, mobile access prices have decreased significantly, which is the key driver behind the expansion of mobile subscriptions, and calls for continuous efforts to strengthen competition in the telecommunication services markets¹⁵. The best method for policy to support SMEs using networks is to increase access, which calls for sensible telecommunications regulations with a strong emphasis on competition and equitable access. With a particular emphasis on SMEs and high value-added services (such as data analytic and data-driven services)¹⁶, it is essential to encourage investments in broadband, smart infrastructure, the Internet of Things, and data and analytics. Governments should support the open, free, decentralised, and dynamic nature of the Internet in order to promote digital technologies as all-purpose platforms for innovation and information sharing¹⁷. Policymakers must simultaneously evaluate market concentration and competitive impediments. Innovation fueled by Information and Communications Technology (ICT) is upending established strategies for assuring competitiveness¹⁸.

Increasing competition for digital inclusion is a crucial aspect in promoting equal access to digital technologies and bridging the digital divide. Adequate regulation can play a significant role in maintaining competitive conditions and fostering inclusive growth in the era of digitalization.

¹⁵ The Economist Intelligence Unit (2013), "Information Risk. Managing digital assets in a new technology landscape", www.eiuperspectives.economist.com/technology-innovation/information-risk, accessed 30 November 2016.

¹⁶ Tompson, P. et al. (2011), "SME Characteristics and the Use of the Internet to Expand the Scale and Geographic Scope of Sales: Evidence from the United Kingdom", in Sharma, S. K. (ed.) , E-Adoption and SocioEconomic Impacts. Emerging Infrastructural Effects, IGI Global, Hershey, Pennsylvania.

¹⁷ UNGA (United Nations General Assembly) (2015), "United Nations Guidelines for Consumer Protection", A/C.2/70/3, para 5(e), Resolution 70/186 of 22 December.

¹⁸ UNCTAD (2016), "UNCATD B2C E-commerce Index 2016", UNCTAD, http://unctad.org/en/PublicationsLibrary/tn_unctad_ict4d07_en.pdf.

Competition in the digital inclusion space can drive innovation, affordability, and availability of digital infrastructure and services. It encourages service providers to expand their coverage and improve the quality of their offerings. Additionally, competition can lead to lower prices, making digital technologies more accessible to individuals and businesses.

To promote digital inclusion, it is important to address the barriers that hinder access to digital technologies. These barriers can include affordability, lack of skills and digital literacy, and inadequate infrastructure in certain areas.

Governments, regulatory bodies, and policymakers can facilitate competition in the digital inclusion landscape by implementing policies and initiatives that promote entrepreneurship and technology diffusion. These efforts can include providing financial incentives, creating conducive regulatory frameworks, and encouraging partnerships between the private and public sectors¹⁹.

Moreover, promoting financial inclusion along with digital inclusion is essential. This involves ensuring that individuals from less privileged socio-economic backgrounds have access to affordable financial services and tools that enable them to participate in the digital economy 2.

In conclusion, increasing competition for digital inclusion is crucial in promoting equal access to digital technologies. Adequate regulation, along with efforts to address barriers and promote financial inclusion, can help foster a competitive environment that drives innovation, affordability, and availability of digital infrastructure and services.

4. QUESTION 10

PLEASE SUGGEST THE BEST PRACTICES BEING FOLLOWED INTERNATIONALLY THAT CAN BE ADOPTED IN THE COUNTRY TO PROVIDE UNIVERSAL CONNECTIVITY TO ALL INDIVIDUALS, HOUSEHOLDS, AND COMMUNITIES?

¹⁹ United States Department of Commerce (2016), "Quarterly Retail E-commerce Sales, 2nd Quarter 2016", United States Department of Commerce, www.census.gov/retail/mrts/www/data/pdf/ec_current.pdf

A. CHIEF INCLUSION OFFICER

Appointing a Chief Digital Inclusion Officer or similar roles at the federal, state, and local levels to coordinate and drive digital inclusion efforts. One notable Chief Digital Inclusion Officer in the US is Joshua Edmonds²⁰. He serves as the Chief Information Officer (CIO) at the City of Detroit and has a background in digital inclusion. Through his role, he aims to address digital equity issues and promote digital inclusion in the city. This position was created to specifically tackle the challenges related to digital divide and ensure that all residents have access to digital resources and opportunities. However, it is not uncommon for cities to have positions or initiatives related to digital inclusion and equity, although the specific titles may vary. Some cities across the US have taken steps to address the digital divide and promote digital inclusion. These efforts often involve partnerships with the private sector, community organizations, and government agencies. To find specific examples of cities with Chief Digital Inclusion Officers or similar positions, it would be helpful to conduct a targeted search or reach out to relevant organizations and government entities in different cities. Joshua Edmonds has implemented several initiatives to address digital equity issues in Detroit. One of his key accomplishments was helping Detroit respond to the COVID-19 pandemic by quickly getting unserved residents connected to the Internet, especially school children who needed a connection at home for online education. Within about 30 days of the pandemic, Detroit had a \$23 million private investment in place to help connect roughly 51,000 students to online learning²¹. This effort was supported by digital inclusion staffers who took calls, facilitated connections, and quickly built solutions.

Additionally, Edmonds helped design and implement a regional digital transformation strategy focused on improving economic outcomes for Detroit residents. He established Detroit's first Digital Equity Fund, raising a combined \$70 million for digital equity initiatives in the city. He also worked on infrastructure planning and helped create the city's first municipal broadband plan. Detroit's digital inclusion work is being

²⁰ Schoechle, T. (2009), "Standardization and Digital Enclosure: The Privatization of Standards, Knowledge and Policy in the Age of Global Information Technology", Information Science Reference (an imprint of IGI Global), Hershey, Pennsylvania.

²¹ Rigby, M. (2015), "Future-proofing UK manufacturing: Current investment trends and future opportunities in robotic automation", Barclays, www.barclayscorporate.com/content/dam/corppublic/corporate/Documents/research/automationreport.pdf.

carried forward by other city officials, including Detroit CIO Art Thompson, Operations Director for Connect 313 Autumn Evans, and the city's new digital equity manager, Oscar Chapa²². Detroit's regional digital transformation strategy included several key components aimed at creating a more digitally inclusive and connected city. These components are designed to address the digital divide and promote equal access to technology and digital resources for all residents. The key components of Detroit's regional digital transformation strategy are:

Office of Digital Equity & Inclusion (DEI): The DEI plays a crucial role in implementing the city's digital transformation strategy. It provides solutions and resources to close the digital divide in Detroit by offering affordable high-speed internet, access to devices, digital literacy training, tech support, and upgraded city-wide internet infrastructure.²³

Certified Tech Hub Initiative: The Certified Tech Hub Initiative was launched to ensure that residents have access to tech hubs equipped with safe, clean, open Wi-Fi, tech programming, devices, and tech support. These hubs are assessed and can receive the City of Detroit Certified Tech Hub Seal, indicating that they offer digital resources and tools.

DEI Interactive Data State of Digital Equity in Detroit: The DEI utilizes an interactive digital dashboard to analyze vital demographic data points related to digital equity. This data analysis allows for transparency in resource allocation and enables the creation of customized digital equity plans for each district and neighbourhood.

Partnership with Connect 313: The DEI works in collaboration with Connect 313 to address digital equity issues and bridge the digital divide²⁴. This partnership involves

²² Smit, J. et al. (2016), Industry 4.0, European Parliament, Directorate General for Internal Policies, Policy Department A: Economic and Scientific Policy, February.

²³ Sullivan, G. P. et al. (2010), "Operations & Maintenance Best Practices: A Guide to Achieving Operational Efficiency, Release 3.0," Pacific Northwest National Laboratory, US Department of Energy, August

²⁴ Pantea, S. and B. Martens (2014), "The Value of the Internet for Consumers", JRC Technical Reports, European Commission, <http://dx.doi.org/10.2139/ssrn.2446962>.

collaborating with local industry and philanthropic leaders to create a sustainable plan that aims to close the digital divide for good.

These key components of Detroit's regional digital transformation strategy focus on providing affordable access to technology, digital literacy training, and technical support, particularly for underserved communities. The strategy aims to promote digital inclusion and ensure that all residents have equal opportunities to participate and thrive in the digital economy.

Director of digital inclusion works directly with the Department of Innovation and Technology. He is tasked with developing a citywide strategy that will help Detroit improve on those numbers.²⁵

Positions such as this one are still relatively rare, compared to more widespread tech and innovation roles within local government such as CIO or even chief data officer. They are, however, increasing in prevalence as high-speed Internet becomes seen as less of a luxury and closer to something like a utility, vital for obtaining necessities such as health care, education and employment.

5. QUESTION 11

WHETHER VARIOUS MEASURES TAKEN BY THE GOVERNMENT SUCH AS FOCUSING ON LOCAL MANUFACTURING ARE SUFFICIENT TO BRING DOWN THE PRICES OF SMARTPHONES IN INDIA? IF NOT, WHAT ADDITIONAL MEASURES ARE REQUIRED TO BE TAKEN TO MAKE IT MORE AFFORDABLE? PLEASE EXPLAIN YOUR ANSWER WITH SUITABLE JUSTIFICATION.

A. VARIOUS MEASURES UNDERTAKEN BY THE GOVERNMENT

1. Make in India Initiative: Launched in 2014, this initiative aims to facilitate investment, foster innovation, build infrastructure, and make India a hub for manufacturing, design, and innovation.

²⁵ OECD (2009), Top Barriers and Drivers to SME Internationalisation, Report by the OECD Working Party on SMEs and Entrepreneurship, OECD, Paris, www.oecd.org/cfe/smes/43357832.pdf.

2. Industrial Corridor Development Programme: This involves developing industrial corridors in partnership with state governments to create greenfield industrial regions with sustainable infrastructure.
3. Ease of Doing Business: An initiative focused on simplifying, rationalizing, digitizing, and decriminalizing government interfaces with businesses and citizens.
4. National Single Window System: Launched to provide end-to-end facilitation and support to investors, including pre-investment advisory and clearance facilitation at the central and state levels.
5. PM Gati Shakti National Master Plan: A GIS-based platform launched to facilitate data-based decisions for integrated planning of multimodal infrastructure, aiming to reduce logistics costs.
6. National Logistics Policy: Introduced to lower logistics costs and make Indian products more competitive in the global market.
7. Production Linked Incentive Scheme: Designed to enhance manufacturing capabilities and exports across 14 key sectors with an outlay of Rs. 1.97 lakh crore.²⁶
8. Indian Footwear Leather Development Programme: A central sector scheme with an allocation of Rs.1700 crore to develop the footwear and leather sector.²⁷

Increase in Local Manufacturing:

Local smartphone manufacturing in India saw growth, with 48 million shipments in Q1 2022, marking a 7% year-on-year growth. This indicates resilience in domestic manufacturing despite global component shortages.²⁸ The government's incentive

²⁶ Pib.gov.in. (2022). *Initiatives taken by the government to boost manufacturing*. <https://pib.gov.in/PressReleasframePage.aspx?PRID=1882145> (Last Visited 4 Dec. 2023).

²⁷ Pib.gov.in. (2022). *Initiatives taken by the government to boost manufacturing*. [online] Available at: <https://pib.gov.in/PressReleasframePage.aspx?PRID=1882145> [Accessed 4 Dec. 2023].

²⁸ Bureau, E. (2022). *Local smartphone manufacturing accounted for 48 million shipments in Q1 2022, posting 7% on year growth*. [online] The Economic Times. Available at: <https://economictimes.indiatimes.com/industry/cons-products/electronics/local-smartphone-manufacturing-accounted-for-48-million-shipments-in-q1-2022-posting-7-on-year-growth/articleshow/92259876.cms>

schemes have attracted both global and domestic manufacturers, leading to an increase in mobile phone production from 6 crore units in 2014-15 to 33 crore units in 2020-21.²⁹

Government Incentives:

Initiatives like the production-linked incentive schemes have been successful in boosting local electronics manufacturing and exports.

Import Duties:

The government imposed a 10% customs duty on multiple imported smartphone parts from October 1, 2020. While this move is aimed at promoting local manufacturing, it may result in increased prices of smartphones, at least in the short term, as companies might pass on the added costs to consumers.

Additional Measures for Affordability:

Cost of Production: Addressing the cost of production is crucial. This could include further incentivizing local sourcing of components, providing subsidies or tax breaks to manufacturers, and investing in infrastructure and technology to reduce manufacturing costs.

Economies of Scale: Encouraging large-scale manufacturing can lead to economies of scale, which in turn can reduce the cost per unit of smartphones.

Research and Development (R&D): Investing in R&D can lead to innovations that reduce production costs. Collaboration between the government, industries, and academic institutions can be fostered to drive innovation.

Regulation and Competition: Ensuring a competitive market and preventing anti-competitive practices can also contribute to lowering prices. Moreover, streamlining regulatory processes can reduce the bureaucratic costs associated with smartphone manufacturing.

Consumer Awareness and Digital Literacy: Educating consumers about cost-effective alternatives and promoting digital literacy can also play a role in making smartphones more affordable.

²⁹ Pib.gov.in. (2022). *ECONOMIC SURVEY 2022-23: HIGHLIGHTS*. [online] Available at: <https://pib.gov.in/PressReleasePage.aspx?PRID=1894929#:~:text=India%20has%20become%20the%20second,US%20%24699%20million%20in%20FY22>

The measures by the government have indeed bolstered local manufacturing, but the imposition of import duties could potentially raise smartphone prices in the short term. For long-term affordability, a holistic approach addressing production costs, encouraging innovation, and promoting competition, among other factors, could be more effective.

Economic Implications of Local Smartphone Manufacturing:

1. **Employment and Skill Development:** Local manufacturing initiatives can lead to job creation and skill development. As the domestic smartphone manufacturing sector expands, there's a greater need for skilled labour, which can, in turn, encourage educational and vocational training programs.
2. **Foreign Investment:** Government incentives can attract foreign smartphone manufacturers to set up local facilities, bringing in Foreign Direct Investment (FDI). This can have a positive impact on the country's economy.
3. **Export Potential:** With the right infrastructure and policies in place, countries can become hubs for smartphone manufacturing and exports. For example, China is a major global player in smartphone manufacturing and exports, which significantly contributes to its economy.
4. **Technology Transfer:** Foreign firms setting up local manufacturing plants may result in technology transfer, which can further boost the local ecosystem of suppliers and related industries.
5. **Cost Implications:** While import duties and other measures aimed at promoting local manufacturing can initially lead to higher smartphone prices due to increased production costs, over time economies of scale and local sourcing of components can potentially lower production costs and, consequently, smartphone prices.

International Examples:

China: China's rise as the “world's factory” is a testament to the potential benefits of promoting local manufacturing. Through a combination of government incentives, infrastructure development, and a vast labour pool, China has become a global leader in smartphone manufacturing.

Vietnam: Vietnam has also emerged as a notable player in smartphone manufacturing, with companies like Samsung setting up manufacturing units. Government incentives and a strategic geographic location have played crucial roles in attracting foreign investment.

Brazil: Brazil has implemented a program called “Lei do Bem” (Law of Good), which offers tax incentives to tech companies that invest in R&D and local manufacturing. However, high taxation on imported goods has led to high smartphone prices, illustrating the delicate balance governments must strike to promote local industry while keeping prices affordable.

India in Comparison:

India's efforts to boost local smartphone manufacturing through various schemes and incentives have shown promise, as evidenced by the growth in local manufacturing and attracting global players. However, there are challenges to overcome. The imposition of import duties, while aimed at promoting local manufacturing, has the potential to increase smartphone prices in the short term.

B. ADDITIONAL MEASURES FOR INDIA:

1. **Infrastructure Development:** Investing in infrastructure to support local manufacturing, including reliable power supply, transportation, and technological advancements, is crucial.
2. **R&D Incentives:** Encouraging R&D through incentives can lead to innovations that may reduce manufacturing costs and eventually the prices of smartphones.
3. **Streamlining Regulations:** Simplifying regulatory processes and reducing bureaucratic hurdles can also contribute to a more conducive environment for local manufacturing.
4. **Educational and Vocational Training:** Developing a skilled labor force through educational and vocational training programs is essential for sustainable growth in local smartphone manufacturing.

5. **Competitive Market:** Ensuring a competitive market, free from anti-competitive practices, can promote innovation and potentially lead to lower smartphone prices.

In conclusion, promoting local smartphone manufacturing can have significant economic benefits. However, a balanced and multi-faceted approach is necessary to ensure that the goal of making smartphones more affordable is achieved. Through learning from international examples and adopting a mixture of policy, infrastructure, and education initiatives, India can further its ambitions in the smartphone manufacturing sector while working towards making these devices more affordable for its population.

6. QUESTION 12

WHETHER MARKET FOR SECOND-HAND SMARTPHONES IS A VIABLE STRATEGY FOR INCREASING THE AFFORDABILITY OF SMARTPHONES TO THE PEOPLE? PLEASE INDICATE THE OPPORTUNITIES AND CHALLENGES THAT MAY ARISE DUE TO THIS STRATEGY

Strategy of marketing second-hand smartphones can indeed play a vital role in increasing the affordability of smartphones for a broader demographic. Here's an economic analysis based on the opportunities and challenges associated with this strategy:

Opportunities:

1. **Growing Market:** The market for used and refurbished smartphones is projected to expand from USD 56.61 billion in 2023 to USD 71.91 billion by 2028, indicating a significant growth trajectory.³⁰

³⁰ Mordorintelligence.com. (2023). *Refurbished and Used Smartphones Market - Size*. [online] Available at: <https://www.mordorintelligence.com/industry-reports/used-and-refurbished-smartphone-market#:~:text=The%20Used%20and%20Refurbished%20Smartphone,2028>.

2. Consumer Demand: The demand for second-hand smartphones has been driven by the high cost of flagship new smartphones, with the global second-hand smartphone shipments growing by 15% year-on-year in 2021.³¹
3. Supply Chain: Rapid upgrade cycles, driven by Original Equipment Manufacturer releasing new models frequently, create a steady supply of good-quality second-hand phones. In India, this has been exacerbated during festive periods when new smartphone purchases peak, subsequently increasing the supply of second-hand phones.³²
4. Value for Money: Second-hand smartphones, often retailing at half the price of new ones, appeal to price-conscious consumers, especially in countries with large middle-class populations like India.
5. Digital Inclusion: The second-hand smartphone market has facilitated digital inclusion by enabling individuals to upgrade from feature phones to smartphones, thus accessing a wider range of digital services including banking and identity services.
6. Environmental Benefits: Refurbishing and reusing smartphones reduce e-waste and the carbon footprint associated with the energy-intensive manufacturing and mining processes required for producing new phones.

Challenges:

- i. Quality Assurance: Ensuring the quality and functionality of second-hand smartphones can be a challenge. This market often lacks the same level of quality assurance that comes with new smartphones, which can deter some consumers.
- ii. Warranty and Support: Second-hand smartphones may not have the same warranty or customer support as new smartphones, which could be a concern for consumers.

³¹ Robuck, M. (2022). *Second-hand smartphone market grows*. [online] Mobile World Live. Available at: <https://www.mobileworldlive.com/news-devices/second-hand-smartphone-market-grows/#:~:text=Second,of%20flagship%20smartphones%2C%20>

³² ET Retail (2023). *Why secondhand smartphones are a top choice for customers today*. [online] ETRetail.com. Available at: <https://retail.economictimes.indiatimes.com/blog/why-secondhand-smartphones-are-a-top-choice-for-customers-today/97793635>.

- iii. Perceived Value: Some consumers might perceive second-hand smartphones as inferior or less desirable compared to the latest models, which could affect market acceptance.
- iv. Data Security: There could be concerns regarding data security, especially if the smartphones are not properly refurbished or reset.
- v. The above analysis underscores the potential of the second-hand smartphone market in bridging the affordability gap while also highlighting some challenges that need to be addressed to ensure consumer confidence and market growth. Through regulatory frameworks, quality assurance mechanisms, and consumer education, the challenges in the second-hand smartphone market can be mitigated, thus fostering a sustainable and inclusive digital economy.

7. QUESTION 13

WHETHER SCHEMES UNDERTAKEN BY VARIOUS STATES FOR DISTRIBUTION OF SMARTPHONES AND LAPTOPS TO STUDENTS AND SUPPORT FOR THE CONNECTIVITY ARE EFFECTIVE MECHANISMS TO INCREASE DIGITAL AFFORDABILITY IN THE COUNTRY? IF YES, WHAT ARE THE MEASURABLE PARAMETERS TO ASSESS THE EFFECTIVENESS OF SUCH SCHEMES? IF NOT, WHAT COULD BE THE ALTERNATIVE POLICY INTERVENTIONS/ SCHEMES WITH MEASURABLE OUTCOMES THAT CAN SUPPORT AFFORDABILITY OF THE DEVICES? PLEASE SUPPORT YOUR ANSWERS WITH SUITABLE INFORMATION.

AIMS AND OBJECTIVES OF SCHEMES IMPROVING DIGITAL AFFORDABILITY

To understand whether schemes aiming to improve digital affordability are truly effective, firstly, the aims and objectives of such schemes or what they are trying to achieve through such schemes should be clearly defined and focused on. The following are the potential objectives which the government wants to achieve identified through the consultation paper:

1. Digital inclusion through the process of bridging the digital divide whereby all sectors of the society including the marginalised community participate actively in the digital world.

2. Providing the means of earning through vocational training and more job opportunities with the skills of using digital tools.
3. Increase digital literacy by providing individuals and communities with training and resources.
4. Improving the quality of education by providing students with digital tools that help in online learning and increased access to educational resources.

A. EFFECTIVENESS OF SCHEMES DISTRIBUTING LAPTOPS BY THE GOVERNMENT

Digital affordability means the financial means to get online or be connected to the digital world. While, at the outset, schemes providing free digital resources to the underprivileged sections of the society might seem like a step in the right direction, however, this success depends upon various factors, primarily the execution of the scheme and how well the scheme is able to reach the target population evaluated through the eligibility criteria.³³

While taking an example of the **Laptop Sahay Yojna scheme**³⁴ of the Government of Gujarat which provides free laptops to students between the ages of 18 to 30, the process for the application to avail benefits under the scheme could happen through submitting an online application. There lies a big assumption under this scheme that the students or the parents applying for such schemes have access to online resources especially when the eligibility criteria mentions that the annual income of the family, trying to avail benefits under this scheme, must not exceed Rs. 3 lakh. It is quite a bold assumption that the targeted population of income criteria below the threshold of Rs. 3 lakh would have access to avid online resources and would also be aware of such a scheme, to begin with.³⁵

Secondly, while this is a debatable area, the eligibility criteria of providing access of such digital resources to only certain castes, as done in many policies of the

³³ NEW IDEAS FOR DIGITAL AFFORDABILITY TELSOC, <https://telsoc.org/journal/ajtde-v2-n2/a42> (last visited Oct 16, 2023)

³⁴ LAPTOP SAHAY YOJANA - ELIGIBILITY: APPLICATION PROCEDURE AND MUCH MORE! - SCPS ASSAM SCPSASSAM.ORG, <https://scpsassam.org/education/scholarship/laptop-sahay-yojana/> (last visited Oct 16, 2023)

³⁵ LAPTOP SAHAY YOJANA: લેપટોપ સહાય યોજના 2023, ઓનલાઇન અરજી કરો SSA GUJARAT, <https://www.ssagujarat.in/2023/04/laptop-sahay-yojana-2023.html> (last visited Oct 16, 2023)

government, especially without mentioning an income criterion may backfire. It is the suggestion of the author that instead of making the caste status of the applicant an eligibility, which is a social factor, the economic factor should be the sole eligibility providing everyone falling within that economic criterion, without social limitations hindering them, the benefits of the scheme which would surely contribute greater to increasing digital affordability.

Thirdly, providing the latest laptops with an active internet access is only one aspect of ensuring digital affordability. It is also necessary to protect against potential misuse, which includes theft, data privacy breaches, and general misapplication of these gadgets. The approach should go beyond simply provisioning and include full guidance on how to use these resources wisely. The advantages derived from these tools will not be realized until the first step towards digital literacy is not taken guiding the targeted population on how to use these digital devices to derive maximum benefits. It is quite true that the sharing of these tools, while necessary, is merely the first step towards obtaining the intended results. The remaining half of the equation must be borne by the general public. To realize the full potential of these laws, they must be used properly and wisely. Thus, while resource provision is critical, it is only one aspect of a more holistic solution.³⁶

In conclusion, while the schemes providing laptops and other digital devices to the poor and marginalized are essential for promoting digital affordability which will eventually lead to digital inclusivity, it is essential that certain caveats are kept in mind while making such schemes and proper implementation, execution, and reach of the scheme should be paid close attention to so that the far-reaching advantages of such schemes do not drive out the potential disadvantages.

B. PARAMETERS TO MEASURE THE EFFECTIVENESS OF SUCH SCHEMES

It is essential that to achieve a policy deriving its optimum efficiency, its effectiveness must be measured and therefore, the author suggests the following measures or ways to evaluate the efficiency of such policies:

³⁶ HOME - ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT - OECD OECD.ORG, <https://www.oecd.org/digital/broadband/lac-digital-toolkit/Home/toolkit-text-chapter6.htm> (last visited Oct 16, 2023)

1. Firstly, the parameters to assess the effectiveness of a scheme depend upon the nature of the scheme. For example, if the scheme is related to providing free laptops to students to improve the quality of education and instil digital skills as vocational training, then the government could draw a mechanism whereby a correlation is drawn between the students who are distributed such freebies and education outcomes if a small generalized number of students who are given such freebies (making sure that this number of students are representative of the entire population in the sense of IQ, economic status, social status, information regarding digital technology and its proper use) are studied and their general test scores or their general information level is studied and seen whether the necessary impact of such technologies is trickling down to the beneficiaries.
2. Secondly, monitoring the increase in the number of persons who are active Internet users could be a good strategy for assessing digital affordability. The laptops, mobile phones and other digital devices provided could be instilled with an active internet connection of a public-sector telecommunication company whose data could be assessed and then the impact of providing these goods could be assessed through the increase in the number of active users in a particular area where these goods have been provided or if no general area can be specified, observing these numbers and seeing whether there is a slight surge or increase of active users and correlating it to the effect of such schemes.³⁷
3. Since many of these schemes are based on filling up online application forms whereby the applicants have to prove their eligibility through documents etc., these forms could also include certain demographic questions such as gender, religion, area of residence, caste, etc. to assess whether the scheme is reaching multi-plural and diverse population and whether the effects of the scheme are reaching the population at the bottom rung of the ladder and further analysis of these responses in the application form could also show certain trends whereby maybe a population from only a specific area or a specific

³⁷ MEASURING THE EFFECTIVENESS OF DIGITAL INCLUSION APPROACHES IDEALS, <https://www.ideals.illinois.edu/items/123109> (last visited Oct 16, 2023)

gender is availing the scheme will direct the government to direct attention towards those specific areas and sector of the population.

4. The schemes of the government providing free digital resources also require proper maintenance and technical support in case of issues with digital devices and internet connectivity, thus, it is imperative that with the scheme the government also employs an authority for such purpose and when these technical support visit these targeted households, a social worker could accompany them to assess the effect of such schemes including the opinion of parents and teachers to evaluate the long-term impact of these schemes.

Finally, the suggestion of the author when it comes to schemes providing free digital devices is related to a tandem of different policies and not an isolation of a single policy. While these policies do increase digital affordability, the functioning of these schemes in isolation without schemes increasing digital literacy, digital inclusivity, and other schemes increasing awareness etc. might increase the efficiency of all these schemes to their optimum level. In other words, for the purpose of increasing digital affordability, a scheme of providing free devices and internet connections might not work in isolation, and along with-it other schemes such as digital literacy training, subsidized internet plans, and collaboration with telecom companies may also be needed to secure some of the shortcomings of the scheme of the govt with regards to the giving away of digital devices.

8. QUESTION 14

IS THERE ANY NEED FOR POLICY INTERVENTIONS TO INCREASE DIGITAL AFFORDABILITY (DIGITAL DEVICES AND DIGITAL CONNECTIVITY) AMONG SPECIFIC SECTIONS OF SOCIETY, FOR EXAMPLE, WOMEN, STUDENTS, FARMERS, FISHERMEN, ECONOMICALLY WEAK, ETC.? PLEASE RESPOND WITH A SUITABLE JUSTIFICATION.

The population, all around the world and especially in India is highly diverse and pluralistic and while there is unity to a certain extent there are divisions based on certain criteria such as gender, occupation, caste, social criteria, economic criteria, etc. Thus, as is already known there are differences among these communities, and thus, the policies of the government should also be made keeping in mind such

differences so as to cater to these specific sections of the population. This also applies to schemes related to digital affordability, since the use of such digital devices would be different for each section of the population and thus, policy interventions might be needed to cater to the same.³⁸

Women - When concerned with half of the population of the world, i.e., women, these digital affordability schemes could help in the personal safety of such women since these mobile phones could have these helpline numbers instilled into them and other such safety schemes of the government. There is always a possibility that a female in India may be stalked or followed while walking on the road and with a mobile phone with her, she has the capacity to call a helpline number or send an emergency SOS text to a family member or other such safety mechanisms. Without these digital devices, these women would feel even more unsafe without any recourse to reach the authorities immediately before further action ensues.³⁹

Farmers - Furthermore, when concerned with the farmer-specific population of India, which is a country whereby the primary sector of the economy i.e., still contributes to a considerable amount to the economy of the nation, digital inclusivity and connectivity could directly help in their occupation. Recently, there have been AI tools such as farmer.ai and other such websites that answer crop-related questions and best practices to be followed by the farmers in vernacular language. Thus, while giving such digital devices to these farmers, awareness could be raised regarding such websites and other schemes of the government which could help the farmers and eventually help the economy. Additionally, digital connectivity is important as it also leads to bank connectivity, in this era of digital payments, these farmers could accept payments for their produce through digital payments as it is an easier form of payment and could also operate their bank account through online means only.⁴⁰

³⁸ TRAI SEEKS VIEWS ON WAYS TO BOOST DIGITAL CONNECTIVITY/LITERACY THE ECONOMIC TIMES, <https://economictimes.indiatimes.com/industry/telecom/telecom-news/trai-seeks-views-on-ways-to-boost-digital-connectivity/literacy/articleshow/103667798.cms?from=mdr> (last visited Oct 16, 2023)

³⁹ BRIDGING THE DIGITAL GENDER DIVIDE - OECD OECD.ORG, <https://www.oecd.org/digital/bridging-the-digital-gender-divide.pdf> (last visited Oct 16, 2023)

⁴⁰ LEARN HOW ARTIFICIAL INTELLIGENCE IS TRANSFORMING THE AGRICULTURE INDUSTRY WIPRO, <https://www.wipro.com/holmes/towards-future-farming-how-artificial-intelligence-is-transforming-the-agriculture-industry/> (last visited Oct 16, 2023)

Students - It is known that students are the population going to contribute most to the economy in the coming years and every student in India should have access to digital devices and resources equipped with their study material and other websites contributing towards their education, this will also develop their vocational skills as today, technical skills are the sine qua non in the employment sector. Thus, digital affordability schemes specifically catering to children are essential especially in light of the COVID-19 pandemic, since the haltering of the world also means haltering of education without these digital devices and digital connectivity. To add to this, there are numerous instructional materials and resources available online. Digital devices are required for students to access textbooks, research materials, online courses, and educational software. These materials enrich the learning experience and enable students to investigate a wide range of topics.

Fishermen and other tribal population - There are many tribal populations among occupations such as fisherman, agriculture, carpentry, weaving, hunting, etc. and digital inclusivity is a way for them to showcase their culture while learning more about the same. Furthermore, multiple government schemes for the tribals require an online application which is not possible to fulfill without a digital device and awareness of such schemes could be made possible through digital connectivity. Furthermore, Digital solutions will make it easier to sell indigenous products and services.⁴¹

9. QUESTION 19

WHAT STEPS SHOULD BE TAKEN TO MONITOR THE IMPACT OF DPIS ON UNDERSERVED AND VULNERABLE SEGMENTS OF THE SOCIETY? KINDLY INDICATE THE KEY PARAMETERS THAT NEED TO BE MONITORED TO ASSESS SUCH IMPACT AND ACTIONS REQUIRED TO PROMOTE ADOPTION CITIZEN CENTRIC SERVICES BY THESE SEGMENTS OF THE SOCIETY?

Digital Public Infrastructure has three main pillars:

1. Network open technology standards built for public interest
2. Enabling governance

⁴¹ TRIBAL DEVELOPMENT WITH DIGITAL INCLUSION MINT, <https://www.livemint.com/Opinion/D690VlyjUVXGSpT3HvMUFI/Tribal-development-with-digital-inclusion.html> (last visited Oct 16, 2023)

3. Community of innovative and competitive market players working to drive innovation, especially across public programs

The United Nations truly believes and propagates the presence of powerful digital technologies as a means to achieve sustainable development goals by 2030. Greater digitalization is also linked to economic resilience; more advanced digital economies were on track to experience smaller downward GDP adjustments in 2021.⁴²

Enhancing digital accessibility can aggravate the digital divide among the members of the society if the demands and needs of the marginalized and the undeserved communities are not kept in mind.

A. THE DIVIDE BETWEEN THE RICH AND THE POOR

“During the course of the pandemic, as schools increasingly turned to online education to avoid exposure to the young children to the pandemic, the digital divide produced stark consequences... children belonging to the economically weaker sections / disadvantaged groups had to suffer the consequence of not having to fully pursue their education or worse still drop out because of the lack of access to internet and computer”, noted a three-judge Bench of the Supreme Court of India comprising of Justices D.Y. Chandrachud, Vikram Nath and B.V. Nagarathna, which warned that the digital divide will defeat the fundamental right of every poor child to education.⁴³

The UN Deputy Secretary-General Amina Mohammed has even claimed that the digital divide has the potential to be the “new face of inequality”⁴⁴

The metropolitan cities are at par with some of the most developed countries, but rural areas in states like Bihar and Orissa are worse off than several of the least-developed countries

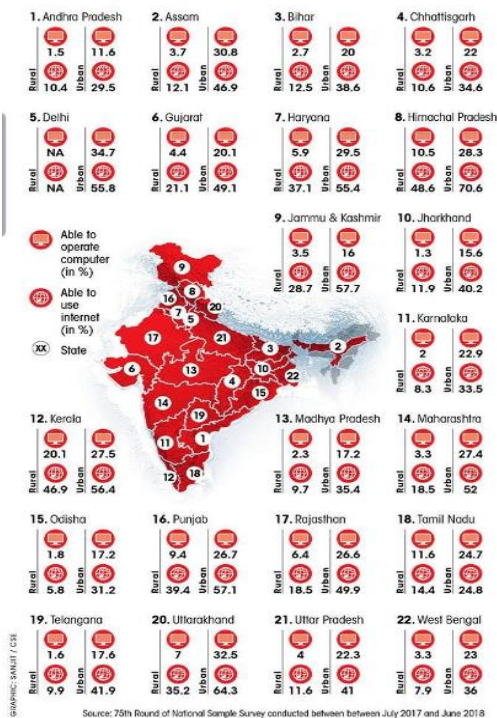
⁴² THE UNDP, DIGITAL PUBLIC INFRASTRUCTURE | UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP.ORG), (LAST VISITED OCT 11, 2023)

⁴³ THE HINDU, SUPREME COURT FLAGS CONSEQUENCES OF GROWING DIGITAL DIVIDE - THE HINDU (LAST VISITED OCT 11, 2023)

⁴⁴ OXFAM INDIA, DIGITAL DIVIDE_INDIA INEQUALITY REPORT 2022_PRINT WITH CROPMARKS.PDF (D1NS4HT6YTUZZO.CLOUDFRONT.NET). (LAST VISITED OCT 11, 2023)

Regional disparity

There is significant difference among states in their ability to access internet and operate computers



Regional disparities in internet access in India Image: Sanjit/CSE

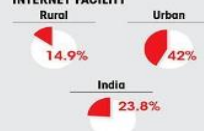
Network strength

Urban and rural India greatly differ in access to internet and computers

HOUSEHOLDS THAT OWN COMPUTER



HOUSEHOLDS WITH INTERNET FACILITY



PERSONS OF AGE 5 YEARS AND ABOVE WHO:

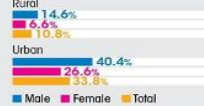
Can operate a computer



Can use internet



Have used internet in last 30 days

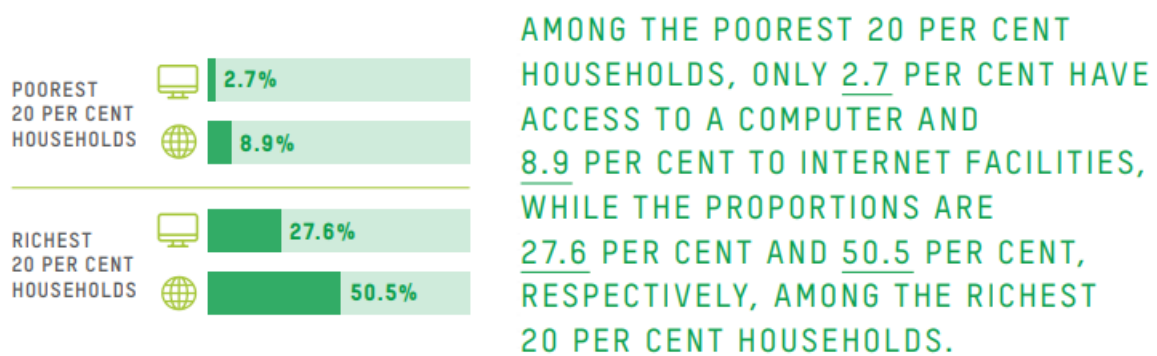


As per UN's e-participation index (2022) which is a composite measure of three important dimensions of e-government, namely provision of online services, telecommunication connectivity and human capacity, India ranks 105 out of 193 nations.⁴⁵ As per National Sample Survey Office, only one-fifth of the population can operate a computer or use the internet.⁴⁶ Among the poorest 20 per cent households, only 2.7 per cent have access to a computer and 8.9 per cent to internet facilities, while the proportions are 27.6 per cent and 50.5 per cent, respectively, among the top 20 per cent households.⁴⁷

⁴⁵ UNITED NATIONS, DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS, [HOME \(UN.ORG\)](https://www.un.org/) (LAST VISITED OCT 9, 2023).

⁴⁶ SINGH, SUMANJEET, *DIGITAL DIVIDE IN INDIA: MEASUREMENT, DETERMINANTS AND POLICY FOR ADDRESSING THE CHALLENGES IN BRIDGING THE DIGITAL DIVIDE*. IJIDE, 1. 1-24. 10.4018/IJIDE.2010040101.(2010).

⁴⁷ PROTIVA KUNDU, *INDIAN EDUCATION CAN'T GO ONLINE – ONLY 8% OF HOMES WITH YOUNG MEMBERS HAVE COMPUTER WITH NET LINK*, CBGA (OCT. 10, 2023, 9:29 PM), INDIAN EDUCATION CAN'T GO ONLINE – ONLY 8% OF HOMES WITH YOUNG MEMBERS HAVE COMPUTER WITH NET LINK - CBGA INDIA



Those with lower levels of income are less likely to purchase a laptop or computer. The section looks at monthly expenditure which has been divided into INR 100, INR 400 and INR 400 and above. The cheapest monthly prepaid plan of Airtel is INR 149, BSNL is INR 187, and Reliance Jio is INR 199. Those people who have less than INR 100 as their monthly income do not have access to monthly data, unlimited calls and some beneficial subscriptions.

SUGGESTION:

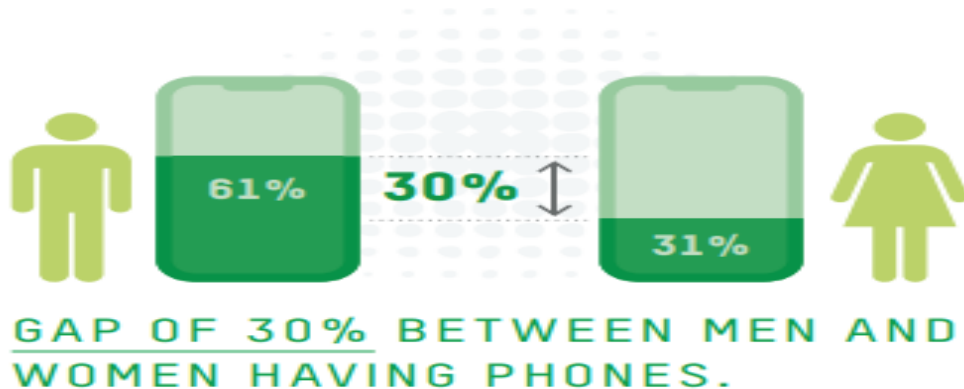
1. Incentivizing manufacturers of digital devices who set up industries in rural areas. This will in turn increase awareness and promote digital inclusivity reducing the digital divide among rural and urban areas.
2. Public transportation plays a significant role in rural and urban areas, inculcating UPI interface in public commutes like government buses will make travel easier and quicker while also promoting the establishment of bank accounts and digital literacy.

B. GENDER DIVIDE

Gender: The percentage of men with phones is more than women, with as many as 61 per cent of them having a mobile by the end of 2021 as compared to 31 per cent females, a gap of 30 per cent.⁴⁸ In India, 70 per cent of the population has poor or no

⁴⁸ PORTER, G., HAMPSHIRE, K., ABANE, A., MUNTHALI, A., ROBSON, E., DE LANNOY, A., TANLE, A., & OWUSU, S. *MOBILE PHONES, GENDER, AND FEMALE EMPOWERMENT IN SUB-SAHARAN AFRICA: STUDIES WITH AFRICAN YOUTH. INFORMATION TECHNOLOGY FOR DEVELOPMENT*, 26 (1), 180- 193 (2020).

connectivity to digital services.⁴⁹ India accounts for half of the world's gendered digital divide. A mere one-third of its internet users are women. Indian women are 15 per cent less likely to own a mobile phone, and 33 percent less likely to use mobile internet services than men.⁵⁰ As per the 75th round of the National Sample Survey (NSS), 25% of the men can use the internet while only 14.9% of the women are able to use the internet highlighting the gender gap in terms of the basic digital literacy in the country. At the same time, the rural-urban gap is also present in terms of the digital literacy with 37.1% of the urban population being able to use the internet while this number in the rural areas is only at 13%.⁵¹



SUGGESTIONS:

1. Enabling bank accounts and promoting the use of digital interface among small-scale women entrepreneurs in rural and urban areas will pave the way for more gender inclusive digital practices and will allow for economic independence and stability of the individual.
2. Countries with high mobile money account ownership have less gender inequality.⁵² While inculcating practices like UPI into day to day transactions helps

⁴⁹ KUMAR, S. K. A., IHITA, G. V., CHAUDHARI, S., & ARUMUGAM, P. (2022, JANUARY). *A SURVEY ON RURAL INTERNET CONNECTIVITY IN INDIA*. IN *2022 14TH INTERNATIONAL CONFERENCE ON COMMUNICATION SYSTEMS & NETWORKS (COMSNETS)*, IEEE. PP. 911-916.

⁵⁰ MITALI NIKORE, *INDIA'S GENDERED DIGITAL DIVIDE: HOW THE ABSENCE OF DIGITAL ACCESS IS LEAVING WOMEN BEHIND*, ORF (OCT. 10, 2023, 9:29 PM), *INDIA'S GENDERED DIGITAL DIVIDE: HOW THE ABSENCE OF DIGITAL ACCESS IS LEAVING WOMEN BEHIND | ORF (ORFONLINE.ORG)*.

⁵¹ MINISTRY OF STATISTICS AND PROGRAM IMPLEMENTATION, [HTTPS://WWW.MOSPI.GOV.IN/DOCUMENTS/213904/301563/KI_EDUCATION_75TH_FINAL1602590967945.PDF/4d0dc4c4-a8f0-0795-df06-be25f2b3a6f7](https://www.mospi.gov.in/documents/213904/301563/KI_EDUCATION_75TH_FINAL1602590967945.PDF/4d0dc4c4-a8f0-0795-df06-be25f2b3a6f7) (LAST VISITED OCT 7, 2023).

⁵² THE WORLD BANK, TOPICS (WORLDBANK.ORG) (LAST VISITED OCT 9, 2023).

curb the problem of digital inclusivity in the financial sector, more and more people are driven to open bank accounts and learn basic functioning of UPI apps like GPAY and PHONEPAY facilitating digital literacy.

C. DIGITAL LITERACY

The Ministry of Electronics and Information Technology defines digital literacy as *“The ability of individuals and communities to understand and use digital technologies for meaningful actions within life situations. Any individual who can operate a computer/ laptop/ tablet/ smartphone and use other IT related tools is being considered as digitally literate.”*⁵³

Nikore and Uppadhayay found anecdotal evidence, which revealed that digital illiteracy and unfamiliarity with digital platforms deterred women entrepreneurs from moving to online marketplaces post COVID-19. They write, *“Jhuri-makers (bamboo artisans) in West Bengal were reluctant to move to online platforms due to limited knowledge of social media and digital marketing channels, combined with high data costs. Women Self-Help Group (SHG) members across states like Maharashtra, Telangana, Andhra Pradesh, and Gujarat shared that even though women in their community were using phones for personal use, they were unable to make financial transactions online, and did not use phones for their businesses.”*⁵⁴

As per the Indian Telecom Services Performance Indicators for July-September 2020, on 30 September 2020, the total number of internet subscribers per 100 people in India stands at 57.29, with this number being around 3 times higher for urban India (101.74) compared to rural India (33.99). In the years 2014 to 2016, two schemes—the National Digital Literacy Mission and the Digital Saksharta Abhiyan were implemented by the government, under which 53.67 lakh beneficiaries were certified. In 2017, the Pradhan Mantri Gramin Digital Saksharta Abhiyan was launched in rural India to usher in digital literacy by covering 6 crore rural households (1 person per household). So far, a total of around 5.78 crore candidates have been enrolled and 4.90 crore have been trained, out of which around 3.62 crore candidates have been certified under this scheme.

⁵³ VENUGOPAL. (2021).

⁵⁴ NIKORE AND UPPADHAYAY. (2021).

SUGGESTIONS:

1. The government owned BSNL strays significantly far away from the dominant market players and occupies the 4th position with just 3 million internet subscribers and accounts for only 4% of the market share. Private players like Jio, Airtel and Vodafone creates a monopoly and controls the internet game. The government must ensure quality services for affordable prices while also promoting healthy competition among private players.
2. The Government of India must also support startups and other industries to start manufacturing and production of its own mobile phones, this will help the country to address problems in relation to affordability and availability. This venture will also increase employment prospects among the youth of the nation ultimately increasing their economic security.

D. LACK OF ACCESSIBILITY TO HEALTHCARE FACILITIES

While the Co-Win platform was a commendable initiative, it should not be forgotten that it caters to a specific group of people who are digitally literate, have a smartphone and have access to the internet. The marginalized sections of society are more susceptible to diseases and other health disparities. according to government statistics, there is a shortfall of 8503 sub-centres, 1464 primary health- centres and 347 community health centres.⁵⁵ While Co-Win in the case of the covid-19 pandemic and other digitalized platforms may facilitate ease of acquiring knowledge with regard to medical dispensaries or hospitals located near us to cater to our day to day needs, they are of little use to us when the primary institutions of health care are in shackles.

SOLUTIONS:

1. Develop digital interfaces along with primary health care institutions to ensure basic availability of healthcare facilities to the Indian population. The effort from the government must address both the concerns of ease of accessibility and the lack of availability of adequate health dispensaries

⁵⁵ RURAL HEALTH STATISTICS, 2020-2021, [RURAL HEALTH STATISTICS, 2020-21 \(RURALINDIAONLINE.ORG\)](http://RURALHEALTHSTATISTICS,2020-21(RURALINDIAONLINE.ORG)) (LAST VISITED OCT 8, 2023).

2. In 2018, a new national scheme – the Pradhan Mantri Jan Aarogya Yojana (PM-JAY) replaced the earlier Rashtriya Swasthya Bima Yojana (RSSY) and integrated health insurance schemes of several state governments under one umbrella. The PM-JAY seeks to cover 500 million people with a benefit package entitlement of INR 500 000 annually to a household, involving over 1500 packages provided free to patients from poor, and economically and socially disadvantaged groups. The scheme focuses on inpatient services and has a high population coverage, this can be made more accessible and wide ranging if its digitally promoted which in turn ensure better health options for the public.
3. A robust health care system lies not only in its institutions but also its workforce, subsidizing education for the NEET entrance exam will bring quality inflow of doctors into the country's system. The government can create its own portal to facilitate E-learning among young aspirants for the same.

10. QUESTION 20

HOW CAN EMERGING TECHNOLOGY BE LEVERAGED TO ENHANCE THE DIGITAL LITERACY PROGRAMMES OF THE GOVERNMENT? PLEASE GIVE YOUR INPUT WITH REASONS. BEST PRACTICES BEING FOLLOWED BY OTHER COUNTRIES AND PRIVATE SECTOR MAY ALSO BE REFERRED TO.

Emerging technologies can be used in the following mechanisms to improve learning:

- Virtual reality (VR) and augmented reality (AR) can be used to create immersive and engaging learning experiences.

Engaging all the senses of the student can help create a more immersive and interactive learning process. Students can visit geographically distant places without having to incur the expense of traveling to that place. this would only involve an initially expensive capital investment, as compared to regular capital expenditure of going to the physical locations.⁵⁶

- Artificial intelligence (AI) can be used to personalize learning and provide feedback to learners.

⁵⁶ K Zhang & Ayse Begum Aslan, *AI technologies for education: Recent research & future directions*, 2 Science Direct, 2021.

AI can be used to adapt the curriculum to the needs of the individual and improve overall learning by allowing each individual to learn at his/her own pace.⁵⁷

- Emerging technologies such as the Internet of Things (IoT) and 5G can be used to expand access to digital literacy training.

IoT and 5G can be used to create interactive learning experiences in public settings such as libraries and museums. It can also be used to provide high-speed internet facility to remote communities and enable them to access such resources.⁵⁸

11. QUESTION 21

WHAT STEPS SHOULD BE TAKEN TO ENSURE THAT AI AND NEW TECHNOLOGIES DO NOT RESULT INTO FURTHER DIGITAL DIVIDE AND EVERY SECTION OF THE SOCIETY HAS ACCESS TO THE NEW TECHNOLOGIES AND RESULTANT ECONOMIC OPPORTUNITIES?

Historically, a learner's education has been limited by the resources found within the four walls of his school. Technology-enabled learning allows a user to tap resources and expertise anywhere in the world, starting with their own communities. However, the integration of information technology in education is still poor. Information technology can be a key tool in enhancing access to quality education and improving the literacy of the country. As per a survey conducted in over 1500 US schools, technology is the most significant focus area for school innovation in the next 1-2 years. However, there exists a significant divide in terms of access to resources, with similar conditions in India. The schools existing in urban areas would have better access to resources as compared to their counterparts in rural areas. There would be further sub-divisions in this divide. Those schools in metropolitan areas would be better equipped than their counterparts in smaller cities. There would be a need for

⁵⁷ eLearning Industry, <https://elearningindustry.com/evolving-education-the-impact-of-ai-and-vr-technology-on-the-future-of-learning#:~:text=AI%20and%20VR%20technology%20have,interaction%20and%20traditional%20teaching%20methods>(last visited Oct. 15, 2023).

⁵⁸ LinkedIn, <https://www.linkedin.com/pulse/5g-its-impact-education-faster-connectivity-new-possibilities/> (last visited Oct. 15 2023).

targeted government programmes to address these divisions and ensure equal access to resources.⁵⁹

Further, resources are useless without the knowledge and wherewithal to use them. Emerging technologies would not prove to be effective in education and learning without the means to utilise such resources. There would need to be a focus on improving knowledge of technology fundamentals. Training of teachers would also be a key focus area to improve digital literacy.⁶⁰

Working on these key areas will ensure that digital literacy achieved is not merely that on paper but also in reality. The overall digital literacy programme would be ineffective without a corresponding improvement and work on key areas mentioned above to improve knowledge of skills imperative in accessing such resources.⁶¹

Policies should be framed to promote fair and ethical use of AI and new technologies. This includes policies to prevent discrimination and bias in the use of technology, and ensuring the security and privacy of the users. Investments should be made to develop new technology to make it accessible, affordable and inclusive. Necessary infrastructure must be put in place to ensure access to high-speed and stable internet connectivity.

⁵⁹ CompTIA, <https://www.comptia.org/content/research/technology-and-digital-literacy-education-trends>, (last visited Oct. 14, 2023).

⁶⁰ *Id.*

⁶¹ *Id.*