
UNIT 2 MOBILE NATIONS

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2.0 INTRODUCTION

You must be familiar with the smartphone. Smartphones are devices that provide internet access to users through mobile networks. We can use smartphones and tablets to connect to the Internet on the go. You can use it to access any information you like. Be it online gaming, watching videos, surfing the Internet, using social media, or finding locations using the navigation service. The mobile phone allows people to easily access banking, news, and information. Users can access entertainment apps and learn new things from the comfort of their homes or even while travelling.

Mobile connectivity refers to the ability of devices to connect to the Internet and communicate with each other, mainly via cellular networks. The effects of mobile connectivity are pervasive and transcendental. It is used everywhere in healthcare, education, or space technology. The result is a society that can quickly progress by leveraging these benefits. For example, students can learn a foreign language, find translation jobs, and earn supplemental income using the correct apps. A farmer can use AI to predict which crops to grow and choose when to harvest using a mobile app. However, it is important to brace ourselves fully to deal with the challenges of this new environment by making ourselves digitally literate.

2.1 LEARNING OUTCOMES

After reading this unit, you should be able to :

- Understand the overview of mobile connectivity in the country and the world;
- Examine the global trends and their implications as a user of mobile phones;
- Perceive the benefits and disadvantages of being a mobile-first population; and
- Protect yourself from online harms and dangers of the mobile world.

2.2 OVERVIEW OF MOBILE CONNECTIVITY

2.2.1 Global Mobile Scenario

As per the report ‘State of Mobile Internet Connectivity 2023’, the share of the global population living in areas without mobile broadband coverage stood at 5% by the end of 2022. The report states that almost 400 million people are still not covered by a mobile broadband network. Of the 3.4 billion people who remain unconnected to mobile Internet, nearly 90% (3 billion) live in an area already covered by mobile broadband but do not use mobile Internet services. With mobile internet adoption outpacing network expansion, this usage gap has been shrinking slowly, from 40% in 2021 to 38% in 2022. However, the usage gap remains almost eight times the size of the coverage gap. (p 13, THE STATE OF MOBILE INTERNET CONNECTIVITY 2023).

At the beginning of 2023, India had about 692 million internet users, with a penetration rate of 48.7%. The penetration rate is calculated as a ratio between the total population and the number of SIM cards per country. It is estimated that 730 million people (over 51% of the population) were offline at the beginning of 2023.

China is home to the most internet users (1.09 billion), 76.4 per cent of China’s total population. Just 52.4 per cent of the population in India is connected to the Internet. We still have over 680 million offline in 2024 compared to China’s 336 million. These numbers are also true for the world’s highest number of smartphone users, with China boasting a staggering 974.69 million subscribers and India with around 659 million smartphone users. The penetration rate is the highest for Macao at 413%, while North Korea has the lowest internet penetration with a staggering zero per cent rate.

Globally, we had nearly 8.9 billion mobile phone subscriptions in 2023, suggesting that 80 per cent of the world population now has a smartphone. Even though connectivity improved in 2021 due to the pandemic, only 31% of South Asian people were using mobile Internet on their phones by the end of 2022, while around 69% of people in Africa use mobile Internet. Globally, more than 60% of internet traffic comes from mobile phones. Mobile phones surpassed laptops and computers as preferred mediums for internet access for the first time in 2017. After that, we have seen a persistent rise in mobile-led traffic on the Internet. Today, around 61% of all global traffic on the Internet comes from mobile phones.

Mobile adoption figures also vary region-wise. While it stands at 82% in North America and 79% in Europe, the figure is much lower at 64% for Sub-Saharan

Africa (as of 2021). East Asia and the Pacific have the third highest levels of connectivity (with 71% of the region's population using mobile Internet) after North America and Europe & Central Asia. In the Pacific Islands, mobile internet adoption is much lower at 27%. There is a gap between people owning smartphones and accessing the Internet. In simple terms, not all people with internet-enabled phones use mobile Internet. This could be due to the high cost of internet access or poor connectivity. The Mobile Connectivity Index (MCI) ranks 170 countries against the four key enablers of mobile internet adoption: infrastructure, affordability, consumer readiness, and content and services on a scale of 1-100. While the infrastructure head indicates mobile network coverage, affordability means cheaply available Internet, and consumer readiness measures people's digital ability to use the Internet. Content relevance implies the ability of the population to access online content for informed decision-making. There could be several reasons for low internet penetration in countries:

- **Infrastructure:** The Internet is difficult for hard-to-reach communities, such as those in Islands, hilly areas, and remote regions.
- **High cost of access or Affordability:** Indian consumers have seen a drop in data prices, increasing mobile adoption. However, low internet speeds and high cost of phone devices can be an inhibiting factor when it comes to affordability.
- **Gender and other limiting factors:** Women and other disadvantaged groups find it difficult to have the same opportunities to access the Internet. This is a global phenomenon and not restricted to less developed countries alone.
- **Media and digital literacy:** As you know, the Internet can only show information you search for. If your search capabilities are restricted due to language or other barriers, you may not be able to locate the content you are looking for. This could drive people away from the Internet.
- **Regulations around access:** If the government blocks internet access, it is difficult for people to remain online. Similarly, governments could block some websites from time to time, which may make it difficult for people to access critical information.

India ranks 61.5 on the Mobile Connectivity Index, indicating that information is widely available and that the infrastructure for accessing the Internet has significantly improved.

Mobile video and gaming are also on the rise due to rising connectivity in the country. We had 467 million YouTube users, while Facebook had 315.6 million in 2023. The average time spent online stands at six hours 23 minutes, while time spent using the Internet on mobile phones is three hours 55 minutes. While 26.7% use mobile for accessing banking services, 32.8% use mobile payment gateways such as UPI, PayTM, etc. Youth use the Internet to watch videos, connect with peers, gain news and information, and study. India is expected to have 900 million mobile internet users by 2025.

Activity 1

List the app you use most frequently and state what you use it for.

Check Your Progress: 1

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this unit.

1. Which country has the most significant number of internet users?

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2. What is the Mobile Connectivity Index?

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3. What factors affect internet penetration?

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2.3 WHAT DOES ACCESS MEAN AND WHY IT IS IMPORTANT

Access means the ability of the individual to connect to the Internet using their mobile device. Access is crucial for several reasons:

1. The mobile phone enables many services. It is easy to access health-related content and use it for educational purposes, banks, etc.
2. The main use of mobiles is to facilitate connectivity among people. Depending on the network and device type, connecting with friends and family is possible over video and voice. This allows citizens to work remotely, stay abreast of developments, and access courses online.
3. Laptops and computers are costly. A basic laptop costs around Rs 10,000, while a basic internet-enabled Android phone starts as low as Rs 3000. This allows a large section of the population to access the Internet. These people can get a vast amount of information as India has one of the lowest rates for data access in the world at Rs 7.5/GB. This is much cheaper than the United States, which costs up to \$8 (Rs 668/GB).
4. In many places, access to the Internet is restricted for certain sections of the population due to traditional norms. For example, women are not allowed to access services because it may mean they have to travel far from home to access them if the mobile network is better. Mobile Internet allows this section to access the Internet from their homes, making information available to all.

5. Pandemics such as COVID-19 have taught us that whenever movement is restricted, it becomes easy for us to remain connected when we use mobile Internet. Children could access online classes, health services could be made available online via telemedicine, and information about vaccination was made available through the COWIN app.

Other than these, access to mobile Internet is important for administrative and logistical purposes. In India, access to daily wages is often tied to the authentication of the Unique Identification Number you have registered using your mobile phone. This Aadhar number is your social identity for all matters related to citizenship and governance. You need to quote the Aadhar number to avail yourself of daily wages, direct benefit schemes, and health schemes offered by the government.

2.4 ADVANTAGES OF HIGH MOBILE PENETRATION

It has several advantages:

1. We have a large user base in India that still needs to be connected to the Internet. When everyone can come online, we will have over 600 million people who need to come online to avail themselves of the above benefits. It is estimated that a 10% increase in mobile penetration can increase Total Factor Productivity in the long run by 4.2 percentage points.
2. Businesses can benefit from enhanced connectivity by delivering products and services to those unconnected by retail outlets. This will help 'off-grid' communities to receive a wide variety of products. Imagine a supermarket shelf with several options for shampoos instead of whatever your neighbourhood shop sells. It empowers the consumer to have more choices and the ability to decide based on cost and preference instead of relying on local shopkeepers to make these choices on their behalf.
3. Mobile Internet also promotes inclusivity by allowing customers to place orders with local businesses through WhatsApp. Mobile-based payments enable people to purchase groceries, transfer money and buy medicines, eliminating the need to carry cash. It allows persons with disabilities to use voice-based tools and other accessibility options to communicate with the outside world and get groceries delivered to their doorstep without stepping out of their homes.
4. Using mobile phones has enhanced the digital and technological capabilities of users. However, low levels of digital literacy also make us vulnerable to cyber-attacks and scams. This is a hindrance to greater adoption of mobile phones.

Mobile banking, while generally safe and convenient, does come with certain risks. We have seen in the previous unit that open or public WiFi spots can be a source of danger while using mobiles. We should avoid using such open spots when accessing banking or confidential websites on our phones. Clicking unauthorised links can lead to ransomware being planted on your device. Fake apps or phishing apps (apps that look like they are from your bank but are from fake actors and mean to steal your data) are also a real threat online. The

most significant danger is losing your mobile device. Since your device carries confidential information, losing it can create many problems. It is advisable to use a remote locking feature to delete and lock your data remotely to keep us safe. Another way to keep oneself safe is to regularly update the apps and software on the phone and install anti-virus software.

In the previous unit, we learned that we should not download suspicious apps, share our online banking passwords or confidential information with anyone over the phone, or click any link received over SMS or WhatsApp, as these could lead to scams.

Other benefits of mobile services in India

In India, mobile devices play a crucial role in Aadhaar authentication. As per the new Telecommunication Bill of 2023 provisions, biometric authentication will become mandatory to purchase SIM cards. This is supposed to strike down fraudulent activities and enhance security. However, there have been some concerns around data protection and surveillance due to the widespread use of Aadhar and mobile-based authentication.

If we lose our credit card, we can block it and get a new one issues. However, if we lose our biometric data due to a data breach, anyone accessing it could misuse it. They could use our data to plant evidence, such as fingerprints. Since we cannot access the biometric data we create, it is impossible to know if such a record has been replaced with inauthentic or fraudulent data. For example, a daily wager may have his fingerprint data replaced with that of his supervisor, who can now claim his wages as he has access to them due to the biometric fraud.

Check Your Progress: 2

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of the unit

- 1. What do you mean by access? Why is it important?

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- 2. What are the advantages of high mobile penetration?

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2.5 ADVANTAGES OF BEING ‘MOBILE FIRST’

Globally, the mobile and telecom industry is poised for growth on the back of the 5G network. As we have studied previously, 5G can enable many mobile phone services, leading to efficiency and enhancements in our lives. Of these, Artificial Intelligence (AI) is the most important. AI can help in the following ways:

- AI uses our phone settings and search history to analyse the information we type and predict our search. It also offers predictive text suggestions that save us time and effort. For example, AI auto completes the text when we type ‘good’ on our phone by suggesting that we follow it up with ‘morning’ or ‘evening’, depending on the time of day.
- In the previous unit, we learned about Generative AI and its uses. The new content we can create with this feature has many applications in every field.

Mobile devices can be used in telemedicine in several ways:

- Patients in far-flung areas can use mobile devices to consult with doctors in real time. Imagine you are camping out in a forest with your friends, and one of them is suddenly injured. You can quickly check possible options for first aid using the mobile phone and even consult a doctor in another part of the world for quick relief. You can send pictures or videos of the injury, and the doctor or health care practitioner could also provide video/image guides on handling the injury over the mobile phone.
- Telemedicine apps allow doctors to monitor patients remotely. Data such as oxygen and blood pressure levels are collected through apps and relayed to medical professionals, who can make decisions based on this information. It is even possible to perform surgeries using robotic instruments remotely.
- The medical apps can help you keep track of diagnostic schedules, appointments and prescriptions.
- Online consultations with specialists are beneficial for women who are sometimes unable to access doctors because of their inability to travel to far-off locations and cultural hindrances in seeking treatment for intimate illnesses. Telemedicine is also useful in supporting long-term care for patients who are bedridden due to illness or injury.

Check Your Progress: 3

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of the unit

1) What are the advantages of being mobile first?

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2) How can mobiles be used for telemedicine?

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2.6 CHALLENGES AND SOLUTIONS

Even with all the significant advancements in satellite connectivity, remote areas need more infrastructure, such as mobile towers, to connect and fully leverage mobile connectivity’s benefits. Remote and rural regions often need more robust mobile network infrastructure.

The costs of spectrum and installing and managing mobile networks can be prohibitive. For telecom operators to continue offering their services, the average revenue per user may need to be higher. Confusion around policies and environmental considerations can affect telecom companies’ operational challenges.

There are areas of overlapping connectivity, whereas some areas have coverage gaps, meaning they do not receive mobile signals from any provider. It is challenging to encourage the adoption of mobile phones among people who have yet to be introduced to them. It translates into additional costs, and the benefits do not seem exciting enough for them to use the device. Many people also believe that radiation from cell phones can cause fertility issues and health problems, leading to non-adoption. Lack of awareness about the benefits of mobile Internet and digital literacy hinders adoption.

Mobile operators, government and mobile device manufacturers need to work together to develop a strategy that fosters last-mile connectivity and allows consumers a wide range of technological options. More awareness of the benefits of mobile connectivity is required. The users must also be made digitally literate to handle the deluge of messages they are exposed to once they come online. Robust mechanisms are needed to protect people and redress their grievances when they face scams and other mobile-based crimes. Better advocacy is required around data protection and surveillance fears. Transparency in data practices is needed at every step.

Check Your Progress: 4

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of the unit.

1. What are the challenges that hinder the adoption of mobile connectivity?

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2. What are the solutions that can enhance the adoption of mobile connectivity?

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2.7 FUTURE POSSIBILITIES

As of present data, there is hope that the adoption of mobile phones with the Internet will continue to grow. Coverage and usage gaps are expected to narrow. The digital economy is expected to drive the real economy. However, fake videos, images, and texts often found on social media are a cause of concern. These messages can lead to violence. Digital and media literacy that helps individuals tap into the information universe is paramount.

The widespread availability of 5G will enable a new era in the Internet's story. The world of the Internet of Things (IoT), which will allow you to connect your phone to your microwave and cook a meal from thousands of miles away, is a reality waiting for us to unravel.

2.8 LET US SUM UP

Mobile connectivity has become an important part of our lives. They are everywhere. Their portability and ability to perform a range of things, from calculations to clicking pictures to accessing social media, have made them highly relevant to today's connected world. Smartphones have enabled people to work seamlessly regardless of their location. The online services enabled by the mobile device allow users to connect effortlessly. They can also use AR, VR and AI simulations to communicate their ideas better with friends and colleagues. You are familiar with the food delivery apps that help you order your favourite food.

Similarly, there are apps for anything you want to do on the Internet. You can access world cinema, documentaries and even news from other parts of the world. Gaming is a big source of entertainment for youth. However, there is also a darker side to the web. There can be numerous scams, cybercrimes and difficulties you may face online. It is very important to be aware of these and take preventive steps such as using secure passwords, not clicking on random links and never downloading apps from unauthorised app stores.

Another interesting use of mobile phones is accessing news and information. This has enabled citizen reporters and witnesses to live-stream or record instances of abuse or major developments as they unfold. In many cases, their narratives differ greatly from those of mainstream media. This helps people seek accountability and enhance transparency in governance. The mobile phone also allows us to send and receive information immediately.

In conclusion, mobile connectivity has transformed how we live, work, and interact with the world. It has opened new opportunities for communication, information access, and digital services and will continue to play a crucial role in shaping our future.

2.9 KEYWORDS

- **Coverage Gap:** Those who live in an area not covered by a mobile broadband network.

- **Usage gap:** Those who live within the footprint of a mobile broadband network but do not use mobile internet services.
- **Internet of Things (IoT):** The Internet of Things (IoT) refers to a network of physical devices, vehicles, appliances, and other physical objects embedded with sensors, software, and network connectivity, allowing them to collect and share data. IoT devices—also known as “smart objects”—can range from simple “smart home” devices like smart thermostats to wearables like smartwatches and RFID-enabled clothing to complex industrial machinery and transportation systems. Technologists even envision “smart cities” predicated on IoT technologies.
- **Telemedicine** is a term that covers the use of technology to deliver clinical care at a distance. It ensures that a person receives healthcare when needed, especially for those with limited access to care. (Telemedicine: Definition, uses, benefits, and more (medicalnewstoday.com))
- **Generative AI:** Generative artificial intelligence (AI) is a type of AI that generates images, text, videos, and other media in response to inputted prompts.
- **Total factor productivity:** It measures productive efficiency by measuring how much output can be produced from certain inputs.

2.10 FURTHER READINGS

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2.11 CHECK YOUR PROGRESS: POSSIBLE ANSWERS

Check Your Progress: 1

1. China has the most significant number of internet users, with over 1 billion internet users as of recent estimates.
2. The Mobile Connectivity Index is a tool developed by GSMA to measure the performance of countries in enabling mobile internet connectivity. It considers four key enablers: infrastructure, affordability, consumer readiness, and content and services.
3. Factors affecting internet penetration include infrastructure availability, affordability of services and devices, digital literacy, government policies and regulations, socio-economic factors, and cultural attitudes towards technology.

Check Your Progress: 2

1. Access refers to the ability to obtain or make use of something, in this context, it often pertains to the availability and utilization of digital technologies and the internet. Access is important because it allows individuals to participate fully in the digital world, benefiting from information, communication, services, and opportunities for education, employment, and civic engagement. Ensuring broad and equitable access helps bridge digital divides, promotes social inclusion, and fosters economic growth and innovation.
2. High mobile penetration offers numerous advantages, significantly enhancing connectivity by ensuring widespread communication capabilities, enabling people to stay connected with family, friends, and colleagues. This connectivity facilitates economic opportunities, allowing individuals to engage in economic activities such as mobile banking, e-commerce, and remote work, which in turn contribute to economic growth. Additionally, high mobile penetration provides easy access to a wealth of information and services, including educational resources, health information, and government services. This accessibility promotes social inclusion by bridging social gaps and providing marginalized communities with vital digital services and information. Moreover, the prevalence of mobile technology spurs innovation and the development of new technologies and applications, driving technological advancement and improving overall quality of life.

Check Your Progress: 3

1. Adopting a mobile-first approach offers several significant advantages. Firstly, it ensures wider reach and accessibility, as it allows content and services to be readily available to a larger audience, particularly in regions where mobile devices are the primary means of internet access. This approach also prioritizes an improved user experience by designing for smaller screens first, which results in a more intuitive and seamless interaction for users, thereby enhancing engagement. Moreover, mobile-

first designs typically lead to enhanced performance, as websites and applications optimized for mobile devices tend to load faster and function more efficiently, accommodating the limitations of lower bandwidth and processing power commonly associated with mobile usage.

2. Mobile devices have revolutionized the field of telemedicine by enabling remote consultations, where patients can use video calls and chat features to consult with healthcare professionals from the comfort of their homes. This capability is particularly beneficial for individuals in remote or underserved areas who might otherwise have limited access to medical services. Additionally, mobile health applications and connected devices facilitate continuous health monitoring by tracking and transmitting vital health data, such as heart rate, glucose levels, and physical activity, directly to healthcare providers. This continuous monitoring allows for timely medical interventions and better management of chronic conditions. Furthermore, mobile apps provide patients with easy access to their medical records, educational resources, and reminders for medications and appointments, thus improving patient engagement, adherence to treatment plans, and overall health outcomes.

Check Your Progress: 4

1. One of the primary challenges hindering the adoption of mobile connectivity is economic barriers. The high costs associated with mobile devices and data plans can be prohibitive for low-income populations, making it difficult for them to access and maintain mobile connectivity. Additionally, infrastructure limitations pose a significant obstacle. In many rural and remote areas, inadequate telecommunications infrastructure leads to poor network coverage and unreliable service, which discourages the use of mobile technology. Furthermore, a lack of digital literacy also impedes the adoption of mobile connectivity. Many individuals lack the necessary digital skills and awareness to effectively use mobile technology, thereby reducing their ability to benefit from its advantages.
2. To enhance the adoption of mobile connectivity, several solutions can be implemented. Subsidies and affordable pricing are crucial in making mobile devices and data plans more accessible to low-income users. By reducing the financial burden, more people can afford to adopt and maintain mobile connectivity. Additionally, investing in the expansion and improvement of telecommunications infrastructure, particularly in underserved areas, is essential. Enhanced network coverage and reliable service will encourage greater use of mobile technology. Finally, digital literacy programs play a vital role in empowering individuals. Providing education and training to improve digital skills and awareness enables more people to utilize mobile technology effectively and participate fully in the digital economy.