Digital India: Paving the Way Towards a Sustainable Digital Economy

Mohd. Hanif
Department of Commerce
Vidyant Hindu P.G. College
University of Lucknow

Manisha Joshi
Research Scholar
Department of Commerce
University of Lucknow
joshimani1998@gmail.com

Abstract

Digital India, is an initiative by the Government of India for transforming India into a digitally-empowered knowledge hub. The Honourable Prime Minister Sri Narendra Modi launched this initiative on 1 July 2015, with a vision to bring three goals as aprt of this initiative. The major areas of the vision include providing digital infrastructure to every citizen, bringing service and governance on demand and digitally empowering the citizens of India. This dream will make India a digital economy and will help achieve the goal of sustainability. Digital infrastructure, advanced technologies and digital platforms will help reduce carbon footprints. This paper highlights how the concept of Digital India is working on transforming India into a digital economy. It shows how the vision of digital India takes India on the road towards sustainability. The opportunities and challenges for sustainability in the digital economy are also highlighted in the paper.

Keywords: sustainability, sustainable development, Digital India, financial inclusion, digital infrastructure, circular economy, digitalization

Introduction

Digital India is an innovative tool of technological advancement that has been implemented in the form of the Digital India initiative by the Government of India. This flagship program envisioned India as a knowledge hub. The dream was to provide digital infrastructure to all

the citizens, on-demand governance and services and the empowerment of citizens digitally. With these initiatives the programme was launched on July 1, 2015, by our honourable Prime Minister Sri Narendra Modi. This program was launched as a beneficiary scheme for other programs of the Government of India which includes Startup India, Make in India, Bharatnet, Sagarmal, Bharatmala. The vision was inclusive growth in various areas like manufacturing, electronic services and job opportunities. Broadband highways, public internet access, universal mobile connectivity, e-Kranti, e-governance, information for all, electronic manufacturing, IT for jobs and early harvest programs are the nine pillars of Digital India. This campaign has left its impact on various fields since its launch which include electronic linkage of around 1200 post office branches in rural areas, improvement of electronic manufacturing sector, improvement in health care and education sector and betterment of online infrastructure. The GDP also be boosted up to $1 trillion by 2025. Digitalization is a way to empower society and its citizens. The innovations and various technological advancements gave birth to this era of digitalization.

Objectives of the Study

1. To understand the concept of digitalization by studying the Digital India initiative of the Government of India.
2. To explore the relationship between digital economy and sustainability.
3. To highlight the various opportunities for sustainability in the digital economy
4. To point out the challenges for sustainability in the digital economy.

Literature Review

1. *Ha & Chuah (2023)* in their paper have tried to assess the impact of digital transformation in Southeast Asia. They have majorly taken the impact on the human and physical capital development of digital transformation and tried to give certain recommendations for the policymakers regarding the better implementation of digital transformation. Through their findings, they gave certain suggestions for the improvement of the digital

skills of the workforce by providing them with the necessary training, increasing cybersecurity at the regional level and a common platform for data and payment.

2. *Zheng & Wong (2023)* conducted a study in China to analyse how the digital economy put its impacted on renewable energy development. In their research, they discovered that the impact of digitalization of the economy was on renewable energy development. When compared to solar and wind energy, the positive impact of the digital economy was found to be greater in the case of hydro energy. According to their findings, central and western provinces had more renewable energy growth due to a more significant impact of digitization than in the eastern provinces.

3. *Kumar et al. (2022)* aimed to investigate and highlight the factors that have an impact on coordinating sustainable supply chains and behavior. They emphasized evaluating strategies to reduce supply chain risks in the age of digitization. They concluded that decarbonization and environmental performance are the most significant factors in the development of sustainable supply chain coordination in the digitization context, while speed to market is the least important.

4. *Xu et al. (2022)* in their research have tried to identify and measure the relationship between the digital economy and the pollution in the environment from 2008 to 2018 in 287 cities of China. They found that digital economies have suppressed environmental pollution at the local level. They concluded that good coordination and balance between digital transformation and the green economy will lead to high-quality development.

5. *Gomez-Trujillo & Gonzalez-Perez (2021)* have summarized various findings in the previous research on the relationship between digitalization and sustainability.

6. *Ordieres-Meré et al. (2020)* tried to explore how digitalization contributes to sustainability by covering two different cases of manufacturing and service industries.

7. *Kunkel and Matthess (2020)* analyzed the digital and industrial strategies of Sub-Saharan African and East Asian and Pacific countries to assess the potential impact of digital technology on environmental sustainability across sectors. They examined four Sub-Saharan African countries (South Africa, Rwanda, Kenya, and Nigeria) as well as three East Asian and Pacific countries (China, Thailand, and the Philippines) for this aim. The findings revealed that the majority of expectations centered on the positive indirect effects of using digital technologies.

8. *Kar et al. (2019)* in their paper have tried to give a better understanding of digital nations. They explored the concept of digital nations while taking into consideration sustainability.

9. *Savina (2018)* in their research tried to identify various opportunities, challenges and prospects of the digital economy in Russia. They concluded that digitization's paradigm has positive as well as negative impacts and through this research, various strategies and policies could be made and implemented in the Russian economy.

10. *D. Borremans et al. (2018)* in their article have described the relationship between digitization and socio-economic development of society by assessing the impact of digital technologies on society's social and economic development. Based on the volume of business capitalization it has also provided ratings to the largest IT companies. They have found out the various problems that would come with digitally transforming the economy.

Research Methodology

The research is exploratory. It uses Secondary data collected through an examination of the literature, publications, articles, and websites to throw light on the concept of Digitalization and Digital economy. It explores the impact of the digital economy on sustainability and highlights the various opportunities for sustainability in the digital economy. It also points out the challenges for sustainability in the digital economy.

Digital Economy

The term digital economy came into being in the early 1990s. This term focuses on digitalizing all economic activities. So, the economy

that is based on digital economies is termed a digital economy. The term 'Digital Economy' was coined by 'Don Tapscott' in 1995, for the first time in his book "The Digital Economy: Promise and Peril in the Age of Networked Intelligence". The digital economy is more advanced in comparison to the internet economy. The invention of smartphones, tablets, computers, etc. has revolutionized the economies into a digital economy and has transformed them into more advanced and complex structures. These economies are characterized by their higher connectivity features, effective collection and analysis of big data and rapid innovation.

Features of Digital Economy

- **High interdependence and connectivity:** The digital economy is characterized by its high reach whereby people can connect at anytime and anywhere in the world and can access published content online. Apart from that it has become easier for consumers and businesses to connect through social platforms.

- **Effective use of data:** Data is now easily available and through innovative technologies, the collection and analysis of data becomes easier. It helps the companies to gather information about the behaviour of consumers, the trends in the market and other relevant information for making important decisions.

- **Disruptive technologies:** Continuous innovation and disruption is the result of disruptive technologies. As a result, companies are producing and launching new products and services.

- **Economic growth:** Dissemination of information and quick analysis of data leads to innovation and launching of new products and services for consumers. This leads to economic growth.

- **Greater productivity and efficiency:** Companies are automating repetitive tasks and working to increase their efficiency and accuracy by leveraging digital technologies and setting up digital infrastructure.

Government Policies and Initiatives for Promoting Digital Economy

The key initiatives implemented by Government of India as part of the Digital India program can be summarized as follows:

- **Aadhaar:** It offers a unique 12-digit biometric and demographic-based identity that is online, lifelong and verifiable. It was provided legal support by the Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016 which was officially notified on March 26, 2016. According to the Unique Identification Authority of India (UIDAI) data, more than 138.08 crore residents have been enrolled as of September 29, 2023.

- **Common Services Centres:** CSCs facilitate the delivery of digital government services in rural areas by Village Level Entrepreneurs (VLEs). Presently, these CSCs offer over 400 digital services, and as of December 2023, there are 5.9 Lakh functional CSCs (including both urban and rural areas) across the country. Of these, 4.69 Lakh CSCs are operational at the Gram Panchayat level. As per the data from Ministry of Electronics & IT (MeitY), a total of 439.25 transactions have been conducted through CSCs till December 2023.

- **DigiLocker:** DigiLocker, a digital ecosystem, offers a digital platform comprising gateways and repositories for issuers to upload documents. As of December 2023, DigiLocker boasts a user base exceeding 24.5 crore, with over 628 crore documents accessible from 1684 issuer organizations.

- **Unified Mobile Application for New-age Governance (UMANG)**: It serves as a unified platform enabling citizens to access multiple government services (Central, State/UT & Municipal) via mobile. As of January 2024, UMANG has garnered more than 6.09 crore registered users, providing access to 1882 e-Services from 207 government departments.

- **e-Sign:** It facilitates the immediate online signing of forms and documents in a legally acceptable manner for citizens. Various applications leverage these services through OTP-based authentication services of UIDAI. Over 34.41 crore e-Signs have been issued by all agencies, with CDAC contributing 8.22 Crore e-Signs.

- **MyGov**: MyGov is an engagement platform for citizens designed to foster participatory governance, boasting a current user base of over 3 crore individuals actively participating in numerous activities available on the platform.

- **MeriPehchaan:** In July 2022, the National Single Sign-on (NSSO) platform named MeriPehchaan was launched to simplify citizens' access to government portals, integrating a total of 5057 services from various Ministries and States.

- **Digital Village:** MeitY initiated the 'Digital Village Pilot Project' in October 2018, covering 700 Gram Panchayats/Villages per District per State/UT. This project provides digital services such as Education, Digital Health, Financial Services, Solar panel-powered street lights, Skill Development and various Business to Citizen (B2C) and Government to Citizens (G2C) Services.

- **eDistrict MMP:** eDistrict, a Mission Mode Project (MMP), focuses on the delivery of high-volume citizen-centric services electronically at the district or sub-district level in India. As of December 2022, 4,671 different e-services have been introduced in 713 districts.

- **Open Government Data Platform:** The Open Government Data Platform has been established to enhance data sharing and encourage innovation with non-personal data. As of February 9, 2024, over 6.20 lakh datasets spanning 13081 catalogues have been published on the platform, leading to 1.01 crore downloads, promoting transparency and accessibility.

- **E-Hospital and Online Registration System (ORS):** The e-Hospital application serves as a Hospital Management Information System, managing internal processes and workflows for 620 active hospitals on the portal as of February 9, 2024, with a total patient registration count exceeding 38.77 crore. The Online Registration System (ORS) has been adopted by 586 hospitals nationwide, facilitating over 88.15 lakh appointments to date.

- **Pradhan Mantri Gramin Digital Saksharta Abhiyaan:** This scheme was endorsed by the government to promote digital literacy in rural India. The initiative targets 6 crore households

in rural areas, with 4.38 lakh registered training centers across the country. Currently, there are 6.63 crore candidates have registered, of which 5.69 crore have undergone training and 4.22 crore have received certification.

- **Future Skills Prime:** FutureSkills PRIME, a joint effort between NASSCOM and the Ministry of Electronics and Information Technology (MeitY), is dedicated to enhancing the skills of IT professionals through re-skilling and up-skilling in 10 emerging technologies. These technologies include Artificial Intelligence, Internet of Things, Augmented/Virtual Reality, Big Data Analytics, Robotic Process Automation, Cloud Computing, Additive Manufacturing/3D Printing, Blockchain, Social & Mobile and Cyber Security.

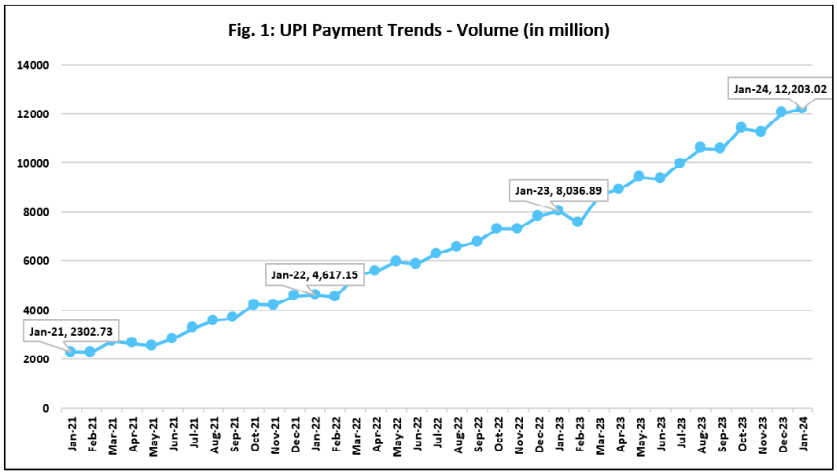
- **Cyber Security:** To address challenges related to data privacy and security, the government has implemented measures through the Information Technology Act 2000, which contains provisions for ensuring data privacy and cyber security. On June 29, 2021, India made a significant mark in the Global Cybersecurity Index (GCI) 2020 released by the International Telecommunication Union (ITU). The country climbed 37 positions, securing the tenth position globally, in recognition of its commendable performance across essential cyber safety parameters.

- **Electronic Manufacturing Clusters (EMC):** This scheme has given the green light to 19 Greenfield EMCs and 3 Common Facility Centres (CFCs), spanning 3,464 acres and totalling a project cost of Rs. 3,732 crores. This includes a Government Grant-in-aid of Rs. 1,529 crore and covers 15 states nationwide. After concluding the application period for the EMC scheme, the Ministry of Electronics and Information Technology (MeitY) introduced the Modified Electronics Manufacturing Clusters (EMC 2.0) Scheme on April 1, 2020. The objective of this initiative is to further augment the infrastructure for the electronics industry in the country and strengthen the electronics value chain.

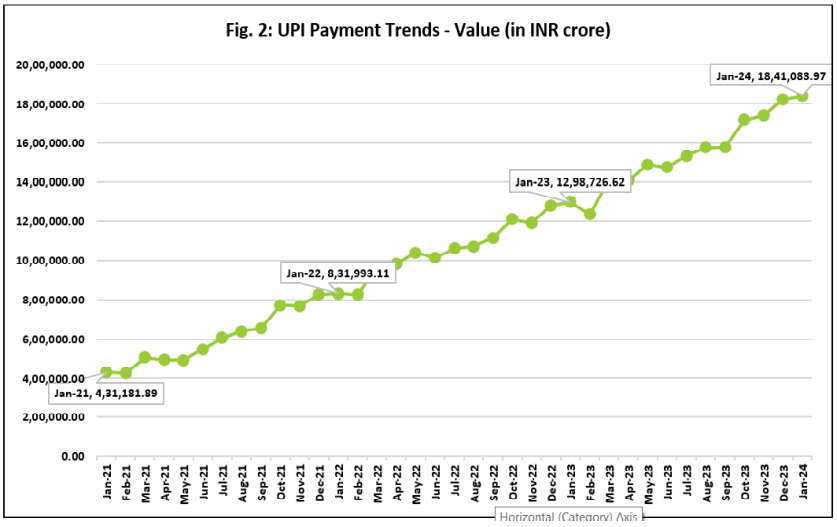
- **Unified Payment Interface (UPI):** The leading digital payment platform is the Unified Payment Interface (UPI), an immediate

real-time payment system developed by the National Payments Corporation of India (NPCI). UPI, an indigenous payment system, enables users to connect multiple bank accounts in a single smartphone app, facilitating fund transfers without the need for IFSC codes or account numbers. As of January 2024, it has successfully integrated 550 banks that have facilitated 1220 crore transactions by volume, amounting to Rs 18.41 lakh crores.

The trends of UPI payment in India are as follows:



Source: National Payments Corporation of India (NPCI)



Source: National Payments Corporation of India (NPCI)

Digital Economy and Sustainability

The concern of policymakers, businessmen and researchers all over the world is bent towards sustainability. Sustainability is a new global concern, and economies all around the world are striving for it. The concept of sustainable development entails addressing the requirements of current generations without jeopardizing the needs of future generations. Sustainable development focuses on three major dimensions: social, economic and environmental. Digital economy and sustainability are interconnected. A digital economy supports sustainability in many ways. The economies can achieve sustainability by using such technologies which can help in reducing carbon emissions. Companies can use advanced technologies to trace their carbon footprints and outline the measures to reduce them. The makers of policy can also collect data easily and analyze it by using innovative technological measures and implementing legal frameworks for businesses to adopt sustainable practices. Energy companies can help in optimizing the distribution of electricity by developing smart grids and thus can help in the generation of renewable energy. The digital economy promotes a circular economy model which contributes to sustainability by reusing and regenerating products and services. Thus, it helps in ensuring sustainable consumption by reducing waste. A digital platform can also be developed for the customers where they can sell or exchange those products which are no longer in use. Moreover, such products can also be used to manufacture other products or be sold as second-hand products at reduced rates. This ensures a reduction of wastage. In this advanced stage of technology, consumers have all the information about all the products and services and their environmental impacts. The smart packaging allows the customers to easily scan QR codes and have all the information about its production and sourcing. Thus, they can make informed purchase decisions and consumptions. Customers who are sensitive to the environment will surely choose products that are environment-friendly and sustainable. The latest technology of blockchain makes the supply chain transparent and increases accountability. It promotes sustainable production and consumption. Thus, the concepts, of digital economy and sustainability go hand in hand when digital technologies are put into use to promote positive environmental impact.

Opportunities for Sustainability in the Digital Economy

The world is witnessing severe environmental issues and, in this situation, it becomes significant to explore the opportunities for sustainable development in the digital economy. The opportunities that can be availed by digital economies are as mentioned below:

1. **Developing renewable energy:** The economies can switch to digital solutions to harness the opportunities for renewable energies. They can monitor and control renewable energy systems efficiently and effectively through the use of innovative technologies and can also install smart grids for efficient energy distribution.

2. **Innovative technological solutions:** Sustainable technological solutions promote sustainable production and consumption. The digital economy provides sustainable technologies like 3D printing which focuses on on-demand production reduces waste and increases efficiency.

3. **Huge data and analysis:** Through advanced technologies companies can easily collect big data and do the analysis. They can use that data to trace their carbon emissions and the environmental impact of their activities. Accordingly, they can make informed decisions to reduce emissions, promote renewable energy and increase the efficiency of resources. Companies can also optimize their supply chains through big data and analysis for sustainability.

4. **Smart cities:** The population moving towards urban areas has increased the level of carbon emissions and degraded the environment. Thus, there is a need for sustainable urbanization. The digital economy can help in implementing the concept of smart cities and ensuring sustainable urbanization. Installation of smart sensors to monitor traffic, air quality and energy consumption can help to ensure sustainability. Through online platforms, awareness can be created among consumers about sustainable living practices.

5. **Sustainable consumption:** The digital economy promotes a circular economy model that addresses the global issue of plastic waste. The concept of circular economy encompasses reuse,

recycling and repair. These sustainable practices help reduce waste and ensure proper waste management. Thus, it ensures sustainable consumption.

6. **Sustainable production:** Modern companies are incorporating socially responsible models into their business practices. Digital technologies can help companies develop such business models and sustainable business strategies. It increases the transparency and accountability of the companies and ensures sustainable production.

7. **Consumer empowerment:** Online power has empowered the consumers by making available all the information for them. They are more aware of the digital platforms that provide them with every inch of information. They make informed purchase decisions by comparing various products available. Thus, they can choose products that are environmentally friendly and drive production towards sustainability.

8. **Value co-creation**: Companies produce according to the customer needs to ensure that the production meets the expectations of consumers. The digital economy promotes the collaboration of producers and consumers. This leads to value co-creation.

9. **Intervention through sustainable policies**: Through digital technologies economies can make policies to reduce carbon emissions of businesses and ensure sustainability.

Challenges For Sustainability in the Digital Economy

Although there are various opportunities yet digital economy is full of challenges. Its impact on society, environment and economy is not always positive. Various challenges are as follows:

1. **E-waste:** Newer technologies and rapid innovation are generating e-waste. Lack of infrastructure, e-waste management system and lack of resources to dispose of e-waste add to the problem. The practice of illegally exporting e-waste to developing countries and dumping it in landfills has become a common practice and challenge for the digital economy. This leads to the degradation of the environment and air, water and soil pollution.

2. **Increasing carbon emissions and energy consumption:** The biggest players of the digital economy i.e., electronic devices are doing more energy consumption and more carbon emissions. With growing demands for efficient and high-performing technology devices, manufacturers are producing more of them. It requires more energy inputs. Also, various data-intensive applications, cloud-based services and media streaming are consuming energy and emitting carbon.

3. **Digital divide:** The digital economy is increasing inequality in terms of access to technology. Thus, it increases disparity in social, economic and educational terms and leads to a digital divide.

4. **Job insecurity:** Rapidly changing technology is changing the job markets and increasing the insecurity regarding jobs of people. With robotic technology, the tasks are being done easily. Thus, automation is displacing manual labour. It leads to unemployment and affects the standards of living of people.

5. **Data insecurity:** To use technology, data is required in the form of digital information. Increasing cyber-crimes and hacking leads to the risk of loss of personal information. Privacy and data protection is the biggest challenge in this era of digitalization.

6. **Growing monopolies in the market:** Many large corporations have access to digital technologies, a high-skilled workforce and access to various data-intensive applications which help them to exploit the market dominantly. This leads to the concentration of power and the creation of market monopolies. They have the power to limit the variety of products and services available to customers and this reduces the options to choose for customers.

Conclusion

Digitalization and sustainability are the two concepts that could prove beneficial for economies if mixed in the right manner. When the digital economies exploit digital resources to avail several opportunities and face the challenges with a responsible approach only then they can attain sustainability. The digital economy has played a crucial role in

reducing emissions, energy consumption, providing sustainable technological solutions, big data and analytics, sustainable urbanisation and smart cities, sustainable production and consumption. It will play its role smoothly when we face the challenges of e-waste, the digital divide, job displacement, privacy and data protection and concentration of power. Digitalization is a road that must be taken for the optimal use of technology to reach our destination i.e., sustainability.

References

Common Services Centres. (n.d.). Ministry of Electronics & IT (MeitY), Government of India. Retrieved February 8, 2024, from https://csc.gov.in/

D. Borremans, A., M. Zaychenko, I., & Yu. Iliashenko, O. (2018). Digital economy. IT strategy of the company development. *MATEC Web of Conferences*, *170*, 01034.

DigiLocker. (n.d.). Ministry of Electronics & IT (MeitY), Government of India. Retrieved February 8, 2024, from https://www.digilocker.gov.in/statistics

eHospital. (n.d.). Ministry of Electronics & IT (MeitY), Government of India. Retrieved February 9, 2024, from https://dashboard.ehospital.gov.in/ehospitaldashboard/

Electronic Manufacturing Clusters (EMC). (n.d.). Ministry of Electronics and Information Technology, Government of India. Retrieved February 9, 2024, from https://www.meity.gov.in/content/electronic-manufacturing-clusters-emc-0

Gomez-Trujillo, A. M., & Gonzalez-Perez, M. A. (2021, July 23). Digital transformation as a strategy to reach sustainability. *Smart and Sustainable Built Environment*, *11*(4), 1137–1162.

Ha, H., & Chuah, C. P. (2023, May 15). The digital economy in Southeast Asia: challenges, opportunities and future development. *Southeast Asia: A Multidisciplinary Journal*, *23*(1), 19–35.

Kar, A. K., Ilavarasan, V., Gupta, M. P., Janssen, M., & Kothari, R. (2019, May 31). Moving beyond Smart Cities: Digital Nations for Social Innovation & Sustainability. *Information Systems Frontiers*, *21*(3), 495–501.

Kumar, P., Mangla, S. K., Kazancoglu, Y., & Emrouznejad, A. (2022, July 4). A decision framework for incorporating the coordination and behavioural issues in sustainable supply chains in the digital economy. *Annals of Operations Research*, *326*(2), 721–749.

Kunkel, S., & Matthews, M. (2020, October). Digital transformation and environmental sustainability in the industry: Putting expectations in Asian and African policies into perspective. *Environmental Science & Policy*, *112*, 318–329.

Online Registration System. (n.d.). Ministry of Electronics & IT (MeitY), Government of India. Retrieved February 9, 2024, from https://ors.gov.in/dashboard/

Open Government Data Platform. (n.d.). Retrieved February 9, 2024, from https://data.gov.in/analytics

Ordieres-Meré, J., Prieto Remón, T., & Rubio, J. (2020, February 15). Digitalization: An Opportunity for Contributing to Sustainability from Knowledge Creation. *Sustainability*, *12*(4), 1460.

Pradhan Mantri Gramin Digital Saksharta Abhiyan. (n.d.). Retrieved February 9, 2024, from https://www.pmgdisha.in/

Savina, T. (2018, March 27). Digital economy as a new paradigm of development: Challenges, opportunities, and prospects. *Finance and Credit*, *24*(3), 579–590.

UMANG. (n.d.). Retrieved February 9, 2024, from https://web.umang.gov.in/landing/dashboard

Unified Payments Interface (UPI) Product Statistics. (n.d.). National Payments Corporation of India. Retrieved February 9, 2024, from https://www.npci.org.in/what-we-do/upi/product-statistics

Unique Identification Authority of India. (n.d.). Retrieved February 8, 2024, from https://uidai.gov.in/en/about-uidai/unique-identification-authority-of-india.html

Xu, S., Yang, C., Huang, Z., & Failler, P. (2022, April 21). Interaction between Digital Economy and Environmental Pollution: New Evidence from a Spatial Perspective. *International Journal of Environmental Research and Public Health*, *19*(9), 5074.

Year End Review 2022: Ministry of Electronics and Information Technology (MeitY). (n.d.). https://pib.gov.in/PressReleasePage.aspx? PRID=1883839

Zheng, M., & Wong, C. Y. (2023, March). The impact of the digital economy on renewable energy development in China. *Innovation and Green Development*, *3*(1), 100094.