IAS BABA

➤ **NEW-AGE TECH**
➤ **RURAL TOURISM**

NEW-AGE TECH

Chapter 1: Digital Disruptor

Digitization in this age has to be the common link in all the sectors of any successful economy as well as in all the aspects of a progressive society. The indispensability of going Digital in any recent or future technological endeavor cannot be emphasized enough.

Some of the broad domain main areas which are witnessing the introduction of Technologies that have a potentially far-reaching positive impact, especially on developing countries like India are as follows

A. **Artificial intelligence (AI) and Machine Learning (ML):** AI Technologies provides a plethora of opportunities to complement human Intelligence and combat socio-economic issues

B. **Quantum Computing:** Applications in secure communication, disaster management through better prediction, computing, simulation, chemistry, Healthcare, Cryptography, imaging, etc.

C. **Semiconductor Technologies including semiconductor nanotechnology:** Aim to give a major push to the hardware industry by eliminating boundaries between the digital and physical world

D. **Smart manufacturing:** Use of internet of things (IoT), Blockchain, Big Data Analytics, AI and Robotics, as a part of Industry 4.0, commercial use of additive manufacturing

E. **Smart mobility:** Use of IoT and AI/ML in new-age transportation and logistics solutions, autonomous and remotely piloted vehicles, vehicles powered by renewable and clean fuels

F. **Advanced communication Technologies and its security:** Adoption of 5G, Cloud Computing penetration of Broadband Internet to remotest and least developed areas using satellite-based internet, Optical fiber, etc., for telehealth, remote learning, and much more. Advancements in cybersecurity and the hardening of communication systems are also expected to stay apace with the communication and networked technologies. This includes building a more secure Cryptography solution as well as the use of homomorphic encryption technologies.

G. **Space Technologies:** A plethora of futuristic technologies like Satellite-based Quantum Communication, Quantum Radar, Self-eating Rocket, Self-vanishing satellites, Self-healing materials, Humanoid Robotics, Space-based-Solar power, Intelligent Satellites and Space vehicles, Make-in-space concepts, AI-based space applications

H. **Blockchain-based Technologies:** Development of solutions in areas such as Decentralized Financing (DeFi), sovereign digital currencies and the possible creation of sovereign identities

I. **Biotechnology:** This includes advancements in areas such as synthetic DNA, development of vaccines, 4D Printing and Tissue Engineering, Gene Editing, Gene Sequencing, Quantum microscope, Biosensors, etc.

J. **Agri-food technologies:** Sustainable and remunerative Agriculture and its allied sectors are the key to the food security of societies, Technologies related to climate-resilient farming, development of high-yielding seed varieties, resource-conscious and frugal irrigation, seeding, harvesting, and post-harvest technologies will define the future of agriculture, especially for developing countries that have large percentages of their population dependent on it.

K. **Climate and environmental conservation:** Focus on green and sustainable technologies, renewable energy such as solar, green hydrogen, etc.

AADHAAR
In India, Aadhaar has played and continues to play an integral role in providing a Unified National Digital Identity Framework. Aadhaar is the world's largest digital identity platform which was planned and rolled out with a clear set of developmental objectives. The astounding success of Aadhar and its Digital Identity Platform with billions of authentication transactions already being performed on it has proved its reliability robustness and security to the entire international community.
Aadhar was conceived as an online identity platform that uses technology to deliver on its promises:
- Uniqueness - Ensuring one person = one ID
- Online verification and KYC to enable digital transactions
- Not requiring expensive credentials

Aadhar and UIDAI have always been at the forefront of developing or using state-of-the-art technologies so as to ensure that they are successfully meeting their mandate of providing reliable, secure, resident and industry-friendly identity solutions and services.

About UIDAI

- UIDAI was created with the objective to issue Unique Identification numbers (UID), named as "Aadhaar", to all residents of India that is (a) robust enough to eliminate duplicate and fake identities, and (b) can be verified and authenticated in an easy, cost-effective way.
- UIDAI is a statutory authority established under the provisions of the Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016.
- Prior to its establishment as a statutory authority, UIDAI was functioning as an attached office of the then Planning Commission (now NITI Aayog)
- Under the Aadhaar Act 2016, UIDAI is responsible for
  - Aadhaar enrolment and authentication, including operation and management of all stages of Aadhaar life cycle,
  - Developing the policy, procedure and system for issuing Aadhaar numbers to individuals and
  - Perform authentication and
  - To ensure the security of identity information and authentication records of individuals.
- It comes under the Electronics & IT ministry

UIDAI has conjured up state-of-the-art techniques and technological advancements in information security and conceptualized models and frameworks to explore some of the best ways to protect the integrity of the system from such actors and at the same time ensure its availability to legitimate users. Aadhar has a multilayered secured architecture. Regular security feeds from government security agencies are assessed for security strengthening. UIDAI also ensures continued adherence and compliance to the best practices in security by Aadhaar ecosystem partners through regular security audits of the partner infrastructure and processes.

Chapter 2: AI and Machine Learning

What is Artificial Intelligence?

- Intelligence displayed by machines – a set of computational tools that can be used to improve decision-making
- *Term devised by:* John McCarthy in 1956

AI, is the "science and engineering of making intelligent machines, especially intelligent computer programs". AI enables intelligent machines that can execute functions, similar to human abilities like speech, facial, object or gesture recognition, learning, problem solving, reasoning, perception and response.

AI enables machines to think intelligently, somewhat akin to the intelligence human beings employ to learn, understand, think, decide, or solve a problem in their daily personal or professional lives. Intelligence is intangible.

The present wave of enthusiasm in AI is backed by the industry, with Apple, Amazon, Google, Facebook, IBM, Microsoft and Baidu in the lead. Automotive industry is also unleashing benefits of AI for self-driving cars, led by Tesla, Mercedez-Benz, Google and Uber.

Real-world examples from around us:

- AI-empowereded cars are already under rigorous testing and they are quite likely to ply the roads soon.
- The social humanoid *robot Sophia became a citizen of* Saudi Arabia in 2017.
- Apple's intelligent personal assistant, Siri, can receive instructions and interact with human beings in natural language.
- Autonomous weapons can execute military missions on their own, and identify and engage targets without any human intervention.
- Facial detection has instated deep interest from law enforcement and security agencies. China is known to be building a massive facial recognition system, connected with its surveillance camera networks, to assist in detecting criminals and fugitives.

- AI is also changing the ways militaries command, train, and deploy their forces.

Applications of AI:

- **Gaming industry,** where AI-empowered computers can think of a large number of possible positions in games such as chess, poker, and go. These computers can test the skills of the human beings who are playing against these AI-enabled computers, in games or simulations which require the greater mathematical and strategic depth.
- **Computers with natural language processing capability** can understand and generate human language, including speech, imitating human capabilities of listening, comprehending, thinking, and responding.
- **Law enforcement or internal security** requirements for detecting and recognizing individuals or criminals, with multitudes of data streaming from police databases or the network of surveillance cameras.
- **Healthcare industry** to design optimized treatment plans, assistance in repetitive jobs, data management for medical records, or even assistance in clinical decision making with better analysis of diagnostics and interpretation of clinical laboratory results.
- **Banking and financial services** for fraud detection using advanced algorithms to identify patterns in transactions and consumer behaviors that are risk-prone.
- **Automotive industry** is already using AI algorithms to enhance fuel efficiency and safety in vehicles to build features such as automatic braking, collision avoidance systems, alerts for pedestrians and cyclists, and intelligent cruise controls.

Applications in Indian context:

Amidst the accelerated adoption of AI-based technologies, India seems to stand at the precipice of the fourth industrial revolution. The competitive advantage of low-cost labour may fade away in the near future as economies begin to reap the benefits of AI in the form of increased productivity and cost advantages, and become more profitable than labour. Hence, it would be a timely move for India to build its AI capabilities, lest the global digital divide widens even more and we are left behind.

- The report titled "Rewire for Growth" by Accenture estimates that AI has the potential to add $957 billion to India's economy in 2035. As the post-Covid economy begins to rebuild itself, AI will present an opportunity to leapfrog by opening up newer sources of value and growth, beyond the physical limitations of capital and labour.
- By 2025, data and AI can add over $500 billion and almost 20 million jobs to the Indian economy.

Use of Artificial intelligence and Machine learning to improve e-governance:-

- Many local municipalities or government departments can invest in and use **AI in call centres or customer service**. The vast majority of calls coming in are fairly basic, repeat questions or routine reports. It will reduce the burden of work on government officials and will also help to use that human capital for more productive work.
- **By making use of intelligent chatbots**, this process can be automated. This automation will improve service and user experience, as it will be faster and more accurate. The chatbots can answer questions, provide information, receive, and report information, and guide citizens with applications. For example, the United States Army uses an interactive virtual assistant to check qualifications, answer questions, and refer potential recruits to human recruiters. It does the work of 55 recruiters, and at a 94% accuracy rate that is improving as the machine learns
- **In the power department and meteorological department**, self-learning weather forecasting technology uses machine learning, sensor information, cloud-motion physics derived from sky cameras, and satellite observations to improve rain forecasting accuracy by 30%. It will in turn help to predict the amount of rainfall the region is going to receive and also helpful to declare guidelines regarding the crop sowing cycles, fertilizers etc.
- **Law enforcement, public safety, and criminal justice** can all benefit from the power of AI. Facial and image recognition software can quickly and more accurately analyze thousands of hours of video footage in crime or terrorist-related issues, narrowing the search down and showing where people should focus their attention.
- **Education:** In the education sector, AI and ML have a variety of use cases and applications. By analysing a student's past data, AI and ML can help the student in making decisions when choosing courses and electives at universities. AI chatbots can be used to interact with students for admission queries. The Central Board of Secondary Education has integrated AI in the school curriculum to

ensure that students passing out have the basic knowledge and skills of data science, machine learning and artificial intelligence. The Ministry of Electronics and Information Technology (MeitY) had launched a "Responsible AI for Youth" programme this year in April, wherein more than 11,000 students from government schools completed the basic course in AI.

- **Intelligence, Surveillance, and Advanced Robotics:** AI can be used to monitor and control unmanned autonomous vehicles for gathering intelligence and advanced surveillance purposes. Machine learning algorithms can help in evaluating border infiltration patterns and predict the possibility of infiltrations happening at certain times.
- **Traffic Control:** Traffic lights in most countries are set to a pre-set value to control the traffic. This value doesn't vary with the changing traffic conditions. AI can help in synchronizing traffic data and control the traffic based on the situation in real-time. It ensures a smooth flow of traffic without causing any inconvenience to commuters. e.g. A 3-D Smart Traffic Signal system is developed by engineering students in Chandigarh.
- **Medical:** Provide insights to healthcare providers in predicting future events for patients. It can also aid in the early detection and prevention of diseases by capturing the vitals of patients. AI-based applications have helped biopharmaceutical companies to significantly shorten the preclinical drug identification and design process from several years to a few days or months. This intervention has been used by pharmaceutical companies to identify possible pharmaceutical therapies to help combat the spread of COVID19 by repurposing drugs.
- **Rural development and Agriculture:** AI-based solutions on water management, crop insurance and pest control are also being developed. Technologies like image recognition, drones, and automated intelligent monitoring of irrigation systems can help farmers kill weeds more effectively, harvest better crops and ensure higher yields. Voice-based products with strong vernacular language support can help make accurate information more accessible to farmers. A pilot project taken up in three districts — Bhopal, Rajkot and Nanded — has developed an AI-based decision support platform combined with weather sensing technology to give farm level advisories about weather forecasts and soil moisture information to help farmers make decisions regarding water and crop management. ICRISAT has developed an AI-power sowing app, which utilises weather models and data on local crop yield and rainfall to more accurately predict and advise local farmers on when they should plant their seeds. This has led to an increase in yield from 10 to 30 per cent for farmers. AI-based systems can also help is establishing partnerships with financial institutions with a strong rural presence to provide farmers with access to credit.
- **Disasters:** An AI-based flood forecasting model that has been implemented in Bihar is now being expanded to cover the whole of India to ensure that around 200 million people across 2,50,000 square kilometres get alerts and warnings 48 hours earlier about impending floods. These alerts are given in nine languages and are localised to specific areas and villages with adequate use of infographics and maps to ensure that it reaches all.

Tackle Climate Change

The great strength of AI lies in its ability to learn by experience, collecting massive amounts of data from its environment, intuiting connections that humans fail to notice, and recommending appropriate actions on the basis of its conclusions.

- Entities looking to reduce their carbon footprint should turn the AI spotlight on all three components of the effort:
- **Monitoring Emissions.** Entities can use AI-powered data engineering to automatically track emissions throughout their carbon footprint.
  - They can arrange to collect data from operations and from every part of the value chain, including materials and components suppliers, transporters, and even downstream users of their products.
  - By layering intelligence onto the data, AI can generate approximations of missing data and estimate the level of certainty of the results.
- **Predicting Emissions.** Predictive AI can forecast future emissions across a the entities carbon footprint, in relation to current reduction efforts, new carbon reduction methodologies, and future demand. As a result, they can set, adjust, and achieve reduction targets more accurately.
- **Reducing Emissions.** By providing detailed insight into every aspect of the value chain, prescriptive AI and optimization can improve efficiency in production, transportation, and elsewhere, thereby reducing carbon emissions and cutting costs.

Benefits of integrating AI & ML in Justice delivery

- **Increases Speed:** AI-powered tools like SUPACE will not only help organise cases, but it will also bring references into the judgment at a speed not seen so far.
- **Improves Efficiency:** It can unclog processes that slow justice down and increase the efficiency of courts. In many cases, they ease administrative aspects of justice delivery.
- **Lowers Pendency:** Tools derived from AI could help expedite the case-flow management which in turn helps in lowering delays and pendency in courts
- **Strengthens Right of access to Justice:** AI will present a more streamlined, cost-effective, and time-bound means to the fundamental right of access to justice.

Concerns and Challenges

- **Big Carbon Footprint:** AI requires massive computational capacity, which means more power-hungry data centres — and a big carbon footprint.
- **Loss of low-income jobs:** Robotics and AI companies are building intelligent machines that perform tasks typically carried out by low-income workers: self-service kiosks to replace cashiers, fruit-picking robots to replace field workers, etc. Many desk jobs will also be edged out by AI, such as accountants, financial traders and middle managers. Artificial Intelligence, with its cognitive capabilities, has the potential to replace human jobs.
- **Widens Inequalities:** AI could compound digital exclusion. Without clear policies on reskilling workers, the promise of new opportunities will in fact create serious new inequalities.
- **Strengthen the Divide between North & South:** Investment is likely to shift to countries where AI-related work is already established, widening gaps among and within countries.
- **Cultural Sensitivity:** According to World Economic Forum research, the way workers and civilians respond to the inclusion of AI systems in their lives can depend on cultural context. The populations of China and England, for instance, are much more open to AI-enabled surveillance technologies than the populations of some underdeveloped countries.
- **Can reinforce existing prejudices:** The mathematical structures that AI-enabled systems depend upon can absorb and reproduce human prejudices. If machine learning systems are trained to regard different categories of people differently, they may become another engine of social inequality. e.g. Rich poor gap, Cast discrimination.
- **Privacy Concerns:** AI also presents serious data privacy concerns. Cambridge Analytica —algorithms and big data were used to alter voting decisions. There are problems emerging in **facial recognition technologies**, which are used to access our phones, bank accounts and apartments, and are increasingly employed by law-enforcement authorities, in identifying women and darker-skinned people.

Way Forward

- To ensure that the full potential of these technologies is reached, the right incentives for **ethical AI governance** need to be established in national and sub-national policy.
- **AI systems should not be used for social scoring or mass surveillance purposes**;
- **Particular attention must be paid to the psychological and cognitive impact** that these systems can have on children and young people;
- Member states **should invest in and promote not only digital**, **media and information literacy skills**, but also socio-emotional and AI ethics skills to strengthen critical thinking and competencies in the digital era.
- As more and more artificial intelligence is entering into the world, more and more emotional intelligence must enter into leadership.

Key Initiatives by the Indian Government

- **National Artificial Intelligence Portal**
  - It has been jointly developed by the Ministry of Electronics and Information Technology and National Association of Software and Services Companies (NASSCOM).
  - It will work as a one-stop digital platform for sharing of resources such as articles, startups, investment funds in AI etc.

- **Responsible Artificial Intelligence (AI) for Youth:**
  - By the Ministry of Electronics and IT
  - It is designed to reach out to students from **Government schools** pan India and provide them with an opportunity to become part of the **skilled workforce** in an **inclusive manner.**
  - It aims to help **reduce the skill gap**, while enabling youth to **create** meaningful **social impact solutions**.
  - It also intends to provide a **platform** for relevant **AI skill-sets** and **access** to required **AI tool-sets** to make youth digitally ready for the future.
  - It is open to students of class 8th to class 12th from Central and State government-run schools (including KVS, NVS, JNV) from across the country.
  - It will be implemented in a **phase-wise manner.**
  - In its first phase, each State will nominate 10 teachers as per the eligibility criteria.

India joins Global Partnership on Artificial Intelligence (GPAI)

- India joined the Global Partnership on Artificial Intelligence (GPAI or Gee-Pay) as a founding member to support the responsible and human-centric development and use of Artificial
- It is an international and multi-stakeholder initiative to guide the responsible development and use of AI taking into account human rights, inclusion, diversity, innovation, and economic growth.
- This is also a first initiative of its type which involves better understanding of the challenges and opportunities around AI using the experience and diversity of participating countries.
- It will be supported by a Secretariat.
- It will be hosted by the Organization for Economic Cooperation and Development (OECD) in Paris, as well as by two Centers of Expertise- one each in Montreal and Paris.

Chapter 3: NFT Explained

Non-fungible tokens (NFTs) have, thanks to their ability to assign value to everything from art to music to a simple selfie, taken the world by storm.

- The sales of NFTs surged $25 billion in 2021 as the crypto asset exploded in popularity, fuelled by the rising interest of celebrities and tech evangelists.
- Where Bitcoin was hailed as the digital answer to currency, NFTs are now being touted as the digital answer to collectibles, but plenty of skeptics fear they're a bubble waiting to burst.

What is a non-fungible token?

- In economics, a fungible asset is something with units that can be readily interchanged – like money.
  - With money, one can swap a £10 note for two £5 notes and it will have the same value.
- However, if something is non-fungible, this is impossible – it means it has unique properties so it can't be interchanged with something else.
- It could be a house, or a painting such as the Mona Lisa, which is one of a kind. One can take a photo of the painting or buy a print but there will only ever be one original painting.

What are NFTs?

- NFTs are "one-of-a-kind" assets in the digital world that can be bought and sold like any other piece of property, but which have no tangible form of their own.
- The digital tokens can be thought of as certificates of ownership for virtual or physical assets.
- Anything that can be converted into a digital form can be an NFT.
- Everything from your drawings, photos, videos, GIF, music, in-game items, selfies, and even a tweet can be turned into an NFT, which can then be traded online using cryptocurrency.
- But what makes NFTs unique from other digital forms is that it is backed by Blockchain technology.
  - Blockchain is a distributed ledger where all transactions are recorded. It is like your bank passbook, except all your transactions are transparent and can be seen by anyone and cannot be changed or modified once recorded.

How do NFTs work?

- Traditional works of art such as paintings are valuable precisely because they are one of a kind.
- But digital files can be easily and endlessly duplicated. With NFTs, artwork can be "tokenised" to create a digital certificate of ownership that can be bought and sold.
- NFT works on blockchain as it gives users complete ownership of a digital asset.
- As with crypto-currency, a record of who owns what is stored on a shared ledger known as the blockchain.
- The records cannot be forged because the ledger is maintained by thousands of computers around the world.
- For instance, if you're a sketch artist, and if you convert your digital asset to an NFT, what you get is proof of ownership, powered by Blockchain.
- NFTs can also contain smart contracts that may give the artist, for example, a cut of any future sale of the token.
- It is not just art that is tokenised and sold. Twitter's founder Jack Dorsey has promoted an NFT of the first-ever tweet, with bids hitting $2.5m.

So why are people willing to spend millions on something they could easily screenshot or download?

- In simple words, when you list your NFT on a marketplace, you pay something called a gas fee (transaction fee) for using the Blockchain, following which your digital art is then recorded on Blockchain, mentioning that you (your address) own the particular NFT. This gives you full ownership—which cannot be edited or modified by anyone, including the marketplace owner.
- An NFT is thus created or "minted", to get exclusive ownership rights. NFTs can have only one owner at a time.
- Apart from exclusive ownership, NFT owners can also digitally sign their artwork and store specific information in their NFTs metadata. This will be only viewable to the individual who bought the NFT.

How is an NFT different from cryptocurrency?

- NFTs and cryptocurrencies are very different from each other. While both are built on Blockchain, that is where the similarity ends.
- Cryptocurrency is a currency and is fungible, meaning that it is interchangeable.
- But NFTs are non-fungible, which means the value of one NFT is not equal to another. Every art is different from other, making it nonfungible, and unique.

Who can buy NFTs?

- Anyone who holds a cryptocurrency wallet can buy an NFT. That is the only prerequisite to purchase an NFT.
- One doesn't need any KYC documents to purchase an art. All one needs is a cryptocurrency wallet powered by Metamask, and an NFT marketplace where you can buy and sell NFTs.

What are the risks associated with buying NFTs?

- In the recent past, several incidents of NFT scams have been reported including: emergence of fake marketplaces, unverified sellers often impersonating real artists and selling copies of their artworks for half prices.
- Another risk associated with NFTs that cannot be swept under the rug is the unquestionably negative impact on the environment. In order to validate transactions, crypto mining is done, which requires high powered computers that run at a very high capacity, affecting the environment ultimately.

Chapter 4: Tech-Innovation in Banking

The banking sector is rapidly adopting new emerging technologies to draw the customers to park their wealth in attractive bank products and schemes. Latest technologies like artificial intelligence, big data, deep machine learning and Robotics are being used to understand the customers and their needs better. Established 252 years ago, the banking system in India has left its traditional way of functioning far behind and has emerged in a new avatar with the advent of new technologies.

Long queues at the bank are a thing of the past; people carry their banks in their pockets and can electronically transfer the money in minutes. Overall, technology in the banking sector has made citizens self-reliant. ICICI became the first bank to introduce internet banking in India and the public sector bank, The Central Bank of India, was the first to offer a credit card facility in India.

In recent years, several steps have been taken by the government of India to use banking technology to simplify the banking system. The government's ambitious Digital India Mission and Payment system laid the digital economy's foundation.

New age innovations

- **Robotic process automation:** Combining various technologies that enable cognitive and robotic processes, bankers can make a quick, large scale and quality decisions by predicting customers' actions. Smart virtual assistants are helping customers by handling banking transactions. Robotic process automation uses bots to do repeated tasks without human intervention in a more efficient manner.
- **Data Analytics:** Technology and digitisation have enabled the banking sector to make informed decisions with actionable insights in real-time, face market competition, understand future launchable products, and ensure customer satisfaction.
- **API Platform:** The API platform allows banks to adopt an entirely new business model and use new technologies such as blockchain at a lower cost, APIs also help banks to make their systems future-proof.
- **Cyber-security:** Banks are becoming more alert concerning cybersecurity. They are gradually implementing advanced, analytical, real-time monitoring and biometrics and behaviour analysis software to detect threats and prevent them from disrupting systems. They are also using anti-hacking tools that provide network-level security.
- **Cloud Computing:** By leveraging cloud-based services, banks, while ensuring the security of customer data, can reduce data storage costs by saving on capital and operating expenses. Cloud Computing also promotes secure online payments, digital money transfers, wallet payments, etc.
- **Biometrics:** Companies are investing in new payment systems due to a gradual decline in dependence on cash. Customers can pay within seconds by simply verifying their identity through their fingers or face.
- **Chatbots:** As voice-based interactions with customers continue to grow banks are rolling out new financial chatbots that save up to 4 minutes per transaction.
- **Wearable Smartwatch:** They give a unique digital payment experience.
- **Zero-Trust Security Model:** This is the way to deal with the growing cyber risk. It ensures strict adherence to the user and device authentication across the network without relying on implied trust.

Digital Banking Units (DBU)

- In the Budget for 2022-23, the Finance Minister had noted that in recent years, digital banking, digital payments, and fintech innovations have grown at a rapid pace in the country.
- As result, the government is continuously encouraging these sectors to ensure that the benefits of digital banking reach every nook and corner of the country in a consumer-friendly manner.
- Taking forward this agenda, and to mark 75 years of our independence, the government proposed to set up 75 Digital Banking Units (DBUs) in 75 districts of the country by Scheduled Commercial Banks.

What are DBUs?

- DBU is a specialised fixed point business unit housing a certain minimum digital infrastructure for delivering digital banking products and services.
- It will be a fixed business unit operating under the retail banking division of the bank and will deliver new digital products and services and service existing financial products digitally, in a cost-effective, efficient, paperless and secure manner with 24X7 availability in both self-service and assisted mode.

Who will set up these DBUs?

- Commercial banks (other than regional rural banks, payment banks and local area banks) with past digital banking experience are permitted to open DBUs in tier 1 to tier 6 centres, unless otherwise specifically restricted, without having the need to take permission from the RBI in each case.

What are the minimum Products and Services to be offered by DBUs?

- **Liability Products and services:** (i) Account Opening: Saving Bank account under various schemes, Current account, Fixed deposit, and Recurring deposit account; (ii) Digital Kit for customers: Mobile Banking, Internet Banking, Debit Card, Credit card and mass transit system cards; (iii) Digital Kit for Merchants: UPI QR code, BHIM Aadhaar, POS, etc.
- **Asset Products and services:** (i) Making applications for and onboarding of customers for identified retail, MSME or schematic loans. This may also include end-to-end digital processing of such loans, starting from online application to disbursal; (ii) Identified Government-sponsored schemes that are covered under the National Portal.
- **Digital Services:** (i) Cash withdrawal and Cash Deposit only through ATM and Cash Deposit Machines respectively; (ii) Passbook printing / Statement Generation; (iii) Internet Banking Kiosk which may also include facilities like Cheque Book request, receipt and online processing of various standing instructions of clients;(iv) transfer of funds (NEFT/IMPS support); (v)Digital onboarding of customers for schemes such as Atal Pension Yojana (APY); Insurance onboarding for Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) and Pradhan Mantri Suraksha Bima Yojana (PMSBY). etc.

What are the other key guidelines by RBI on DBUs?

- **Digital Banking Customer Education:** In addition to onboarding of customers in a fully digital environment, various tools and methods shall be used by DBUs to offer hands-on customer education on safe digital banking products and practices for inducing customers to self-service digital banking.
- **Customer Grievances:** There should be an adequate digital mechanism to offer real-time assistance and redress customer grievances arising from business and services offered by the DBUs directly or through Business Facilitators / Correspondents.
- **Reporting Requirements:** Performance updates with respect to DBU shall be furnished in an RBI pre-defined reporting format. Banks shall furnish information relating to opening, closure, merger or shifting of DBUs to RBI.
- **Cyber Security:** In addition to ensuring physical security of the infrastructure of the DBU, adequate safeguards for cyber security of the DBUs will have to be ensured by the banks

What are the benefits of DBUs?

- **Digital India:** It will prompt the banks, including the traditional ones to adopt a Digital Strategy and thereby moving a step closer in realising the objectives of Digital India mission.
- **Cost-Effectiveve Banking:** DBUs will help banks themselves which are now looking to reduce physical footprint with fewer brick & mortar branches, with a 'light' banking approach.
- **Increases Rural Penetration:** The move will open up rural market for service providers besides providing a boost to credit flow.
- **Personalised products for new-age customers:** The units can also be branded as new-age banks than can help provide personalised finance management tools to new customers.
- **Financial Literacy:** More such units will encourage more financial literacy and a favourable outlook towards digital banking – which is the need of the hour.
- **Fosters Innovation:** This will also prompt the launch of new products or services or transition of the existing ones to become holistically digitized, particularly for the Retail and SME segments, fostering innovation.
- **Better Consumer Experience:** Such units will be cheaper to establish than a new branch and can provide better customer experience aided by technology.

How will these DBUs compete with fintechs?

- Currently, fintechs operating as neobanks offer digital banking services but they do so in partnership with non-banking financial companies (NBFCs). Some of the neobanks offering services in India are Jupiter, Fi Money, Niyo, Razorpay X.
- Compared to conventional banks with online and mobile banking facilities, neobanks or digital banks excel at product innovation and offer far better digital solutions.
- However, given the arrangement they have currently with NBFCs or scheduled banks to conduct the actual banking part, some have pegged these digital banks as "glorified digital distribution companies".

Blockchain Technology can help check banking frauds:
- The adoption of blockchain by India's banks could help avert frauds such as the one at Punjab National Bank.
- The disaggregated and transparent nature of the technology, which updates information across all users simultaneously, would have ensured immediate verification of any transaction.
- Transaction reconciliation systems at present do not result in immediate notification.
- SBI had already implemented it in its reconciliation systems and in several cross-country payment gateways.

Blockchain is not a panacea for all issues facing the banking system today but is an ideal technology to ensure proof of integrity to the data and reduce incidents of fraud.

Chapter 5: Advancements in Medicine

'Medicine is not merely a science but an art too' is a famous adage we owe to Paracelsus, a 16-century Alchemist turned physician. Technology, the third dimension, has steadily been incorporated and has fortified medicine as it is practiced today. Health or Medical Technology is defined by the WHO as 'the application of organised knowledge and skills in the form of devices medicine vaccines procedures and Systems developed to solve health problems and improve the quality of lives.

7 promising new healthcare technologies
There are so many exciting new medical technologies being used in the healthcare industry, but these are some of the most prominent. Some of them have been around for a little while now, but they are becoming more technologically advanced as time goes on.

AI & robots
Artificial intelligence (AI) has so many exciting applications in healthcare.
- One of the most important applications is in diagnosis, as there have been several situations in which AI has been able to identify diseases like skin cancer and diabetic blindness better than experts in the field.
- Other than diagnosis, AI can be used to perform routine tasks, manage data, design treatments, manage medication, monitor health and more.
- AI can even be used on robots, and then these robots can act as medical assistants, take lab samples, assist in surgeries, and disinfect hospital rooms.

Nanotechnology for diagnosis
- Another innovative technology in the medical field is nanotechnology for diagnosis. You may not have heard of nanotechnology before, but it's concerned with objects that have at least one dimension under 100 nanometres (nm) in size. One nanometre is one-billionth of a metre.
- Essentially, nanotechnology can be used to recognise unique cells and identify genetic content that might signify disease. This then allows drugs to reach specific damaged cells whilst avoiding healthy ones.

eHealth apps
- eHealth refers to the use of technologies to improve healthcare, including health and wellbeing. Therefore, eHealth apps are mobile applications that tend to target a specific area of healthcare.
- Since almost everyone has a smartphone these days, eHealth apps make looking after your health and wellbeing feel more accessible and less daunting.

Internet of Things
- Experts define IoT as any "set of sensors and actuators embedded in physical objects that are linked through wired or wireless networks". In recent years, there have been plenty of innovations in the healthcare industry that fall under the Internet of Things, and they allow patients to take control of their own health.
- This is important because often, people experiencing health difficulties feel a total lack of control, and this can have negative consequences on mental health. Some examples of IoT applications in healthcare include wearable technologies like sleep monitors and glucose trackers.

Future of genomics

- Genetics is a fast-moving and innovative field in medicine, with so many possibilities. While it may be one of the more controversial medical fields, it has exciting applications, including early detection of diseases, synthetic DNA production, and faster, cheaper DNA testing.

Regenerative medicine

- Regenerative medicine is– medical treatment that seeks to replace damaged tissue or organs.
- Clearly, progress in this area is invaluable, and there's no knowing how far regenerative medicine will be able to go in the future.

Orthopaedic implants

- Orthopaedic implants, which are manufactured devices that replace damaged bones, joints or cartilage.
- The market for orthopedic implants is growing at a fast rate, with more products being released than ever before.
- Now, patient-specific, customisable orthopaedic implants made with revolutionary 3D technology are becoming more common.

Technology in India's health sector

- **Robots**: Hospitals can use robots to deliver medicines and food to COVID-19 patients. This helps to reduce the chances of hospital staff contracting the infection.
- **Blockchain technology**: The health blockchain would contain a complete indexed history of all medical data, including formal medical records and health data from mobile applications & wearable sensors. This can help in addressing the interoperability challenges that health information and technology systems face.
- **AI and the Internet of Medical Things**: IoMT is defined as a connected infrastructure of medical devices, software applications, and health systems and services. IoMT can be utilized to provide health-care applications that can help in quick diagnosis of illness.
- **Cloud computing** is another application that can facilitate collaboration and data exchanges between doctors, departments, and even institutions and medical providers to enable best treatment.

What are the possible challenges to above technologies?

The possible constraints in this effort are

- Standardisation of health data
- Developing a template for sharing data
- Reengineering many of the institutional and structural arrangements in the medical sector
- Organisational silos in bureaucracy
- Data security and Data privacy
- High investments

Way Ahead

- **Digital Strategy:** India needs to own its digital health strategy that works and leads towards universal health coverage and person-centred care. Such a strategy should emphasise the ethical appropriateness of digital technologies, cross the digital divide, and ensure inclusion across the economy.
- **Using Local Knowledge**: In addition to robust health systems, an effective national response must also draw upon local knowledge. Primary health centres in India could examine local/traditional knowledge and experience and then use it along with modern technology.

RURAL TOURISM

Chapter 6: Rural Tourism of India

Rural Tourism is any form of tourism that showcases the rural life, art, culture and heritage at rural locations, thereby benefiting the local community economically and socially as well as enabling interaction between the tourists and the locals for a more enriching tourism experience.

Rural Tourism exhorts tourists to spend quality time in a nuanced fashion by engaging them in different ethnic, indigenous and aesthetic practices in rural areas. The stresses generated by urban life and the detachment and distance from the natural environment occasionally provoke the urbanites to escape from their monoculture city life. In such cases, rural locations seem to be an ideal place to release stress and also provide an opportunity to be re-engaged in a simpler way of life that offers rest and absolute peace for a certain period of time. Not only that, such a form of tourism is widely acknowledged because it can shape rural society by bringing benefits both in monetary and social terms.

6.1: Culture & Heritage

Mahatma Gandhi once said that "India lives in its villages". The village life in India is where you meet the 'real India'. The villages are also repositories of the country's culture and tradition. The slow pace of life in the village, far away from the hustle and bustle of the big city, is an experience that can rejuvenate oneself. The villages and the rural economies also have practitioners of unique arts and crafts in their original forms that are hard to come by in the cities. However, one knows that rural areas are mostly farming communities and in many cases, the incomes are not as good as they are in cities.

Recognizing the potential of Rural Tourism in the country, Rural Circuit has been identified as one of the 13 thematic circuits to provide a unique experience to travelers visiting the country and, as the same time, develop lesser-known destinations located in remote areas of the country. The development of Bhitiharwa, Chandrahia & Turkaulia in Bihar, and Malanad Malabar cruise Tourism Project in Kerala has been undertaken under the Rural circuit theme. This would help in generating employment through active involvement of local communities and following community-based development and a pro-poor tourism approach.

Kerala has been at the forefront of developing the Rural Tourism model and evolving it under the greater ambit of Responsible Tourism. The award-winning Kerala Responsible Tourism projects in Kumarakom, Wyanad and other locations combine a unique model of involving the local community and getting the visitor to experience the village life with the local stakeholders as the storytellers. This instills great pride in the villagers who would otherwise have abandoned their traditional way of life for the city.

Another success story is in Sikkim which has empowered many village communities to develop tourism experiences including homestays thus spreading the tourism product evenly and away from the traditional destinations. This also helps in increasing the carrying capacity of the tourism product. Sikkim is also leveraging its rural tourism product with its distinction of being India's first organic state. Such a development model has the communities' involvement at the grassroots level and everyone gets a equal stake in the whole process.

A noteworthy mention is of the Govardhan Eco-Village in Maharashtra which won the UNWTO Ulysses Award for Innovation. The institution has developed the village into a community that has a symbiotic relationship with the visitors and has increased both community participation as well as helped in raising income levels and education in this once backward area.

India's rich cultural, historical, religious and natural heritage provides a huge potential for the development of tourism and job creation in the country and it would be fit to quote Mahatma Gandhi again, "India perishes if her villages perish". Therefore, it is imperative on our part to nurture the villages and preserve that simple way of life for our future generations. Rural Tourism therefore, goes a long way in keeping that tradition alive

6.2: Development of Rural Tourism

The OECD prescribes that rural tourism should be:

- Located in rural areas.
- Functionally rural, built upon the rural world's special features; small-scale enterprises, open space, contact with nature and the natural world, heritage, traditional societies, and traditional practices.
- Rural in scale – both in terms of building and settlements – and therefore, small scale.
- Traditional in character, growing slowly and organically and connected with local families.
- Sustainable – in the sense that its development should help sustain the special rural character of an area, and in the sense that its development should be sustainable in its use of resources.
- Of many different kinds, representing the complex pattern of the rural environment, economy, and history.

If rural India can be re-developed, rejuvenated, and promoted as tourist spots, these villagers will obviously get an adequate number of alternative job scopes that can possibly reduce the tendency of leaving native villages and in such a way the socio-economic condition of rural India can also be improved. In India, Rural Tourism is still an emerging concept and the sector is quite open and untouched by marketing. Now, the thrust will be to promote village tourism as the primary tourism product to gain maximum socio-economic benefits from it.

Seeing the stressful urban lifestyles leading towards "counter-urbanization" syndrome, growing curiosity of urban people regarding rural culture and heritages, the downfall of income level from agriculture and related works, lack of alternative way outs for earning sufficient money, look out for new business opportunities, changing attitude in Indian and global tourists' behavior in terms of nature awareness and increasing demand for niche tourism and green products – it is evident that the future of Rural Tourism in India is going to be a promising one.

6.3: Rural Tourism and Rural Women

Tourism is one of the most important activities in the world, employing large number of women in industrialized and developing countries. Rural Tourism presents both opportunities and challenges for women, which makes the gender equality perspective highly relevant. Work in the rural tourism sectors of destination areas is concentrated particularly in retailing accommodation & catering, selling entertainment & transportation provisions. Thus, Tourism is considered one of the largest economic activities today. In the tourism industry, the percentage of women who work in the industry is high but the function is dominated by unskilled, low-paid jobs. The tourism sector definitely provides various entry points for women's employment and opportunities in small & medium-sized income-generating activities for creating self-employment.

1. Rural Tourism can create long-term employment and provides skilled/ unskilled training and career development opportunities.
2. Rural Tourism will boost women's empowerment and provides young/ agriculturist livelihood diversification.
3. Rural Tourism has the potential of establishing medium and small enterprises started by women entrepreneurs.
4. Rural tourism will promote local production, education, art and architecture, community self-esteem and pride, heritage and nature conservation.
5. Rural Tourism will create new infrastructure/superstructure, helps to maintain local services and facilities and improves the quality of life for women.
6. Development of Rural Tourism is the passport of poverty alleviation and can double the women farmers' income without creating negative impacts on the environment and ecology.
7. Rural Tourism has the potential of developing new professional profiles in the form of local tour guides/escorts, Managers of Accommodation, Transportation, Shopping Centers, Travel Circuits, Production houses, Food Joints, Souvenir Shops, and Services. Women can be hired for such services.

6.4: Tourism for Atmanirbhar Bharat

The development of a strong platform around the concept of Rural Tourism is definitely useful for a country like India, where almost 74% of the population resides in its 7 million villages.

Potential in India:

- **Cultural wealth-** Numerous local traditions like plays, art forms, dances etc. enhance the cultural wealth of rural areas, making these attractive for the tourists.

- **Natural wealth-** Lush green forests in south Indian villages, sacred groves etc. make them an ideal site to promote tourism.
- **Peace and serenity** in the countryside can offer a relaxing experience.
- **The stresses of Urban lifestyles** have led to a "counter-urbanization" syndrome, which has led to growing interest in the rural areas.
- **Improved infrastructure and connectivity** of rural India can improve tourist footfall.
- **Growing trend** of short-break holidays, rural areas being near to cities can easily provide for great tourism destinations.

Measures to promote tourism:

- **Identification of strengths of villages** in different states and introduction customized trips like Cultural and Heritage walk in Rajasthan, Tribal tours in North-East India.
- **Promoting Farm homestaystays** to provide local and humane touch to tourists.
- **Development of infrastructure and convergence** among various government initiatives.
- **Train villagers** to address foreign tourists.
- **Exposing tourists to basic works in the village** like milking cows, making pottery and handicrafts etc.
- **Adoption of each potential site** by a Member of Parliament.
- **Involvement of NGOs** for promotion of culture.
- **Marketing** of clusters of villages.
- **FDI or Private investment** to introduce latest technology
- **Government initiatives** to support the young entrepreneurs by providing loans.

Benefits of Rural Tourism

Indian experience and several research studies across the world reveal that the benefits of rural tourism to the various sectors/segments of the society are manifold. It would be appropriate to examine these benefits sector-wise:

- **Benefits to the Local Community:** The primary occupation and source of income to households in any village in India is agriculture and allied activities. Further, rural incomes in India widely fluctuate depending on the vagaries of monsoons. Agriculture in most of the regions in India is rainfed. That apart, agricultural operations by and large are seasonal. As a result, most of the households in India are financially stressed. This is largely responsible for the exodus of people from rural areas to urban places in search of livelihoods. The promotion of rural tourism contributes for the resurgence of rural India in the following ways.
- **Provides alternate and novel employment opportunities** in the village they live. The possibility of continuing their occupations/ vocations gets enhanced. Rural tourism increases the faith in their traditions/occupations and motivates them to stay at villages instead of migrating to urban places in search of jobs/ alternative income-earning avenues.
- **Supplements household income in a big way**. Rural tourism will lead to the creation of several supporting services where enterprising villagers transform themselves into service providers. It is a sure option to engage the rural folks. This in a way reduces the pressure of depending on the tiny landholdings with meager incomes.
- **Throws up opportunities to showcase their cuisine, heritage and artifacts**. Rural tourism facilitates the expansion of complementary businesses like service stations, hospitality services, recreational activities, crafts/arts.
- **Facilitates and broadens their vision and outlook**, thanks to the interaction with the tourists from different places and backgrounds. In most of Indian villages, for a variety of reasons, the exposure and awareness levels of people are rather low. Interaction with tourists and close association with tour operators/planners connects them to the outside world and in the process, the rural-urban divide gets blurred for good.
- **Entrepreneurial instincts** which are hitherto innate get tickled by showcasing their wares to the tourists. Enterprising youth in the villages get new career opportunities suited to their energies and enthusiasm. Rural tourism provides a chance to sharpen their creative skills with respect to product design and improvement.
- **The feeling that they are less privileged** compared to the urban dwellers may be assuaged. They may be helped to draw pride in what they do and the way they live; It is natural for anyone to feel elated when someone from outside their system appreciates the aura and the dexterity with which they perform various tasks in their daily routine - be it collecting water from the wells, tending the livestock, milking the cattle, ploughing the fields, sowing, harvesting, weaving, craft making,

community participation/involvement in the celebration of festivals and type of competitions/events organized, etc., are only to be seen to appreciate and enjoy! Each of these tasks is a fine art.

- **The various local crafts and arts, the heritage and treasure trove of yesteryears**, are languishing for want of patronage could be revived and the past glory may be restored. For instance, handlooms, pottery, wood carvings, and several other region-specific crafts in the villages are on the way out in the modern market economy. The commitment and spirit in continuing them gets reinforced by acknowledgment. Rural tourism is the only way to sustain and preserve the folklore, music, dance and drama which form part of the rural cultural heritage and legacy.
- **Rural tourism is the easiest way to provide gainful employment to the women folk** in villages as Indian women are known for their hospitality. For instance, Homestays, the fast-growing segment of the tourism business today, largely owe their success to women in those villages.
- **With the revenue that villages will get** from the tourists through an entry fee, parking charges and the cess levied on local service providers. The revenue thus pooled up by the village administration comes in handy for improving the facilities like sanitation, drainage and internal roads. This is how rural tourism empowers the villages and the much avowed 'Gram Swaraj 'becomes a reality

Precautions:
- Safety of tourists, especially females should be ensured.
- Adequate finances must be devolved to the gram sabha for maintenance of basic infrastructure.
- Training of villagers to avoid any kind of hostility towards tourists.
- Adequate healthcare facilities must be provided.
- Environment impact of increased number of tourists must be assessed.

6.5: Draft National Strategy and Roadmap for Development of Rural Tourism in India

What is the focus of the strategy?
- Model policies and best practices for rural tourism
- Digital technologies and platforms for rural tourism
- Developing clusters for rural tourism
- Marketing support for rural tourism
- Capacity building of stakeholders
- Governance and Institutional Framework.

Key provisions
- State assessment and tracking on rural tourism.
- Digital Technologies and platforms for rural Tourism.
- Development of clusters and marketing support
- Capacity building of stakeholders

What is the Potential/Significance of Rural Tourism in India?
- The concept of Rural Tourism is useful for India since almost 74% of the population resides in its 7 million villages.
- Numerous local traditions like plays, art forms, dances etc. enhance the cultural wealth of rural areas, making these attractive for the tourists.
- Lush green forests in south Indian villages, sacred groves etc. make them an ideal site to promote tourism.
- It could provide jobs to many young men and women who otherwise are increasingly migrating to cities.
- Socially, it can open the rural mindset to new thoughts and ideas from the outside world. For the urban citizen, a few days spent amidst traditional rural lifestyle may prove to be a great stress reliever.

6.6: Agrotourism & Strategies to promote it:

1. Proper recognition of the Agri-tourism industry.
2. Government-supported policy structure. There is a need for the government to develop and implement policy measures in this regard.
3. Education of the farmer and the farm owner for the development of the entrepreneurial skill in their work operations.
4. Creation of a community-level cooperative for the implementation of Agri-tourism at the village level.

5. Interest-free loan to be given to such cooperatives for the development of Agri-tourism.
6. Product and service quality improvement training programs
7. Timely delivery of services
8. Proper development of the 4 Ps Marketing Strategy and
9. Setting up a proper public-private partnership development model

6.7: Ecotourism in India

Realizing the importance of ecotourism a great deal of work has been done in terms of developing eco destinations in various states keeping in mind the spirit of sustainable development through conservation of ethnicity and environment. The top eco-destination in the country in Kerala is the narrow piece of land tantalizingly wedged between the Arabian Sea and the Western Ghats. The very fact that the mighty Western Ghats runs across the length of Kerala is the reason for a large number of eco destinations dotting the state of Kerala.

Other major ecotourism destinations are found in the northeastern states chiefly in the states of Assam, Mehalaya, Sikkim, Himachal Pradesh and Uttarkhand. The concept of ecotourism is catching up in other states as well, some of which like Rajasthan, Uttar Pradesh to name a few. With a fascinating spread of wildlife amply protected by the national parks and wildlife sanctuaries, India is one of the few countries in the world that can boast of such a varied biodiversity.

- **Leh Nutrition project:** Ladakh (Leh) is a much sought-after destination where ecotourism is a source of livelihood to local community. The Leh Nutrition Project, an NGO initiative joined hands with Ladakh Ecological Group to promote sustainable livelihood to the local community. They have been addressing issues related to child care, development, education, livelihood and watershed development in this difficult terrain. Ecotourism concepts have been imbibed into the livelihood activities of this community which has resulted in improving living standards.

- **Ecotourism in Uttarakhand:** Uttarakhand has established itself as a leading eco-tourism destination in the country over the last few years. With its abundance in terms of snowcapped mountains, rolling meadows, high-altitude lakes, dense forests and wetlands, Uttarakhand is a nature lover's paradise. Garhwal and Kumaon regions of Uttarakhand are home to exotic wildlife, birds and flora. Many circuits are being developed in these areas as ecotourism circuits. The forest rest houses of the British era add value to these circuits.

- **Thenmala Ecotourism:** This is India's first planned ecotourism destination. The major activities and zones in this scenic spot situated 72 kms away from Trivandrum are a) Adventure zone b) Boating c) Butterfly safari d) Children's park e) Deer Rehabilitation Centre f) Leisure zone g) Musical dancing fountain and the h) Nakshatravanam. The latest contribution by Thenmala Ecotourism Society (TEPS) is barrier-free access for hearing and visually challenged visiting this pioneer eco-tourism destination in the country launched in March 2019

"To another country, I may go as a tourist. But to India, I come as a pilgrim", the words of Martin Luther King Jr. have their resonance with the words of Mahatma Gandhi, "We are inheritors of rural civilization. The vastness of our country, the vastness of the population, the situation, and the climate of the country have, in my opinion, destined it for a rural civilization."

Rural India has a lot to offer to people. It would need concerted effort from both the Union Government and State Governments to identify these areas and explore tourism potential in this sector. That is of utmost importance to promote rural tourism in the country. Then only rural tourism can develop and flourish. Then only woman empowerment in the rural tourism sectors increase.

All the best
Team IASbaba ☺