

Towards An Inclusive and Empowered Nation

Growth of Indian IT Industry:

- Today, India is recognised in the world for its thriving IT industry whose growth can be divided into three phases -
 - **Phase-I:** During this phase, the Indian IT professionals and IT companies travelled to different parts of the world and established their presence.
 - **Phase-II:** During this phase, the global IT giants started investing in India and tapped its vast domestic market.
 - **Phase-III:** This is the current phase where India is witnessing great growth in innovation and entrepreneurship led by Startups.
- India's vibrant IT industry has been growing very fast. In the year 2017-18 the total revenues of India's IT industry was \$167 billion and the exports made were to the tune of \$125 billion.

Digital India:

- Digital India is aimed to **empower the poor and the underprivileged** by using technology that is affordable, developmental and inclusive.
- Under Digital India Programme, various initiatives have been undertaken towards providing digital identities, creating digital infrastructure, enabling digital delivery of services and promoting employment and entrepreneurial opportunities that has transformed India into a digitally empowered society while bringing significant change in the lives of citizens.

A. Digital Identity

- To provide a unique digital identity, **Aadhaar** has covered around 122 crore residence of the country. It has provided a digital identity to supplement the physical identity of individuals for delivery of various social welfare programmes and enabled portability. It has curbed leakages and corrupt practices from the public welfare delivery mechanism.
- The Supreme Court, in its historic judgment on Aadhaar, has not only upheld the Constitutional validity of Aadhaar but also described it as a tool for empowerment of poor people.

B. Digital Infrastructure: Building robust digital infrastructure is essential for the success of Digital India. Following steps have been taken to improve the digital infrastructure:

I. BharatNet

- Bharat Net aims to provide high speed internet in rural areas of India by building optical fibre network connecting all the 2.50 lakh Gram Panchayats of India.

II. National Knowledge Network (NKN)

- NKN is a state-of-the-art network to promote collaboration and exchange of knowledge among educational and research institutions.
- Some of the NKN enabled applications are: virtual Class Rooms, Collaborative research groups over NKN (closed user groups), various Grids (like Cancer Grid, Brain Grid, Climate Change Grid) etc.

III. GI Cloud (Meghraj)

- In order to utilize and harness the benefits of Cloud Computing, this initiative aims to accelerate delivery of e-services in the country while optimizing ICT spending of the Government.
- This has ensured optimum utilization of the infrastructure and speed up the development and deployment of eGov applications.

IV. eSign

- eSign Electronic Signature Service is an innovative initiative for allowing easy, efficient, and secure signing of electronic documents by authenticating singer using e-KYC services.
- Some applications enhancing services delivery are Digital Locker, e-filing Financial Sector, account opening in banks and post office, driving licence renewal, vehicle registration, certificates for birth, caste, marriage, income certificate etc.

C. Digital India for Better Governance

- (i) **JAM (Jan Dhan-Aadhaar-Mobile) Trinity for Direct Benefit Transfers (DBT)**- It is helping the poor receive the benefits directly into their bank accounts. This has not only enhanced efficiency of service delivery mechanism but also eliminated leakages and curbed corruption.
- (ii) **Digital Payments**- The growth of digital payments ecosystem is set to transform the economy.
- (iii) **UMANG** has put the power of governance in the hands of common people. It is a single mobile app that offers more than 307 government services. The target is to provide more than 1200 digital services on a single mobile app.
- (iv) **Digital Delivery of Services**- Some of these popular digital services are:
 - **National Scholarship Portal** for all the scholarship needs of students.
 - **Jeevan Pramaan** for ease of verification of pensioners using Aadhaar digital identity.
 - **eHospital and Online registration services** aims to ensure that patients can get easy access to doctors.
 - **Soil Health Card**: to provide information on soil health digitally.
 - **eNAM**: to create a unified national market for agricultural commodities.
 - **DigiLocker**: It is now possible to eliminate the need to carry any paper to avail a government service. DigiLocker provides access to over 336 crore certificates in digital format on a single platform.
 - **eVisa**: involves complete online application for which no facilitation is required by any intermediary/agents etc. E-Tourist Visa has been introduced for tourists coming from 163 countries at 24 airports and at 5 Sea Ports.
 - **eCourts**: to keep a track of case status of case going on in different courts across India, Lawyers and litigants can also avail notification services about their cases.
 - **National Judicial Data Grid**: It provides information on cases pending, cases disposed and cases field in both High Court and District Court complexes in the areas of civil and criminal cases.
 - **GeM**: Government eMarketplace (GeM) is a transport online market place for government procurements. This has not only brought transparency in Government procurements but has also created opportunities for micro, small and medium enterprises to sell their products to Government department and PSUs.

D. Digital India for Employment Entrepreneurship & Empowerment

(I) Digital Service delivery near door-step (Common Services Centre)

- A vast network of digital services delivery centres, has been created to provide access to digital services especially in rural areas at an affordable cost.
- These centres have also led to empowerment of marginalized sections of the society by creating jobs and by promoting rural entrepreneurs. CSCs have also undertaken the **Stree Swabhiman initiative** to create awareness about menstrual health and hygiene among rural women.

(II) Digital Literacy for the Masses

- In line with the objective to make one person e-literate in every household in the country, two schemes were launched viz. **NDLM and DISHA**.

- Government has approved a new scheme “**Pradhan Mantri Gramin Digital Saksharata Abhiyan** (PMGDISHA)” to usher in digital literacy in rural India. This is the largest digital literacy mission of the world.

(III) BPO Promotion in Small Towns

- To create employment opportunities for local youth and secure balanced regional growth of Information Technology and IT Enabled Services (IT/ITES) Sector in each State, **India BPO Promotion Scheme and North East BPO Promotion Scheme** have been launched under Digital India Programme.

E. Digital India for Make In India

I. Promotion of Electronics Manufacturing

- The **Phased Manufacturing Programme** for mobile phones was launched with the goal of widening and deepening the mobile handsets and components manufacturing ecosystem in India.
- The duty on import of mobile components fell from over 29 percent to 12.5 percent in 2016-17 and domestic mobile handset manufacturing output increased from 60 million units in 2014-15 to 225 million in 2017-18.
- Under Electronics Manufacturing Cluster (EMC) Scheme, MeitY has accorded approval to 23 projects in 15 states across the country.

F. Initiatives in Emerging Technologies

- Centres of Excellence (CoE) are being set up in the areas of Internet of Things (IoT), Internal Security, Large Area Flexible Electronics, Intellectual Property Rights (IPR) etc.

G. Cyber Security

- The **Cyber Swachhata Kendra** (Botnet Clearing and malware analysis centre) has been set up to provide alerts to users for preventing losses of financial and other data. The centre is providing facility to clean botnets in realtime. **National Cyber Coordination Centre** has been made operational in 2017.

Way Forward

- India is today among the top three global economies of digital consumers. Concerted efforts to facilitate and promote process of digitalization including upgrading digital infrastructure, augmenting capacity to developed standards and testing for conformity assessment, promoting electronics manufacturing with appropriate incentives, developing capacity to harness emerging technologies and strengthening cyber security as more services, including digital payments has the potential to create a trillion-dollar digital economy by 2025.

Towards a Digital Future

- India’s move towards its digital future began several decades ago. However, unprecedented acceleration in recent times has brought sharply into view both the enormity of the benefits that have already accrued and the immense opportunities that beckon.

Early Efforts of Digitization:

- Early efforts at digitization in government were **largely government focused**; how to improve efficiency, record keeping and data storage etc.

- Substantial efforts and progress were seen in departments that dealt with large number of beneficiaries like rural development, PDS, etc. These efforts were largely spread over a couple of decades during 1976-1996 and almost entirely based on NIC support.
- It was in 1997 that the **first steps towards a citizen focused e-governance program** were taken, initially in the state of Andhra Pradesh.
- Strong push by the Central Government and the birth of the **annual National e-Governance Conference series**, the movement rapidly spread to several other states.
- The next decade saw the emergence of several e-governance initiatives in diverse areas like land records, transpiration, land registration, urban local bodies, PDS, etc.
- Towards the end of this period, **State Wide Area Networks** were created under a scheme funded by the Central Government.
- The foundation for a **comprehensive National e-Governance plan** had been laid through these efforts.
- Approval of the **SWAN project** and early discussions at the highest levels of Government on the contours of a **National e-Governance Plan** took place in 2003. These efforts culminated in the approval of the National e-Governance Plan and the game-changing **Common Services Centres** project in 2006 by the Union Cabinet.
- During this period (2004-2013), some of the more ambitious projects like UID (later renamed as Aadhar), Passport seva, MCA21, etc. were initiated.
- The country went from 100 to 1,000 million telecom subscribers in a little over a decade, broadband coverage was expanding and the **National Optical Fibre Network** (NOFN – later renamed as Bharat Broadband) was launched.

Regulating the Digital Revolution

- The Digital Revolution is often called as the **Fourth industrial Revolution** the first three being the Steam Engine, followed by the age of Science and Mass production, and computers.

Enormity of Digital Revolution:

- *It is estimated that the global volume of digital data created annually was 4.4 zettabytes in 2013 and this would be reach 44 zettabytes by 2020. Further, it is expected that the number of devices connected to the IP Networks would be approximately three times the global population by 2021.*
- The entire gamut of Digital Transformation is to provide innovative products and services to improve productivity and efficiency.

Challenges

- Unprecedented growth in technology has posed new challenges in the regulatory environment.
- The role of Telecom Service providers as well as the Regulator becomes more and more challenging. The regulators have the onerous responsibility of **maintaining a balance between encouraging innovation, protecting consumers, creating an environment for orderly growth of industry as well as address unintended consequences of disruptions.**
- Emerging technologies, along with the fast pace of commercialization of these technologies, has broken the popular myth that the regulations can be made deliberately at a slower pace and would be in place unchanged for a long time. The Regulator today **can no longer afford to be lagging in the technology development curve.** The challenges faced by the tradition regulation can be broadly classified into:
 - **Business Challenges:** a slow pace of regulations may become irrelevant very soon while a regulation released early may discourage innovation. Another issue that is of importance is the disruptive business models wherein the new businesses may require intervention/regulation by multiple regulators.

- **Technological challenges:** issues related to Data, Digital Privacy and Security, Data Ownership, AI-based challenges etc.
- One of the major challenges in the telecom sector today is to **simultaneously regulate the legacy as well as the new digital networks**. This requires framing of new set of regulations and frameworks that facilitate seamless co-existence as well as smooth migration.
- The Regulator is not only entrusted with the responsibility to ensure the compatibility of the new technology with the legacy frameworks but also foster innovation on the other.
- Though a large number of initiatives have been undertaken both by the Government as well as the private sector but still a large population remains devoid of connectivity to the internet. Spreading awareness as well as connecting every individual are keys to the socio-economic metamorphosis of our country.

Experiences at TRAI

- TRAI has taken considerable steps in the past five years. It has issued recommendations to the Government on cloud computing, M2M communications, Net Neutrality, internet telephony, National Wi-Fi Grid using WANI architecture, and Privacy, Security, and Ownership of Data in Telecom Sector.
- In order to protect the consumers' interests TRAI has launched various apps like **MySpeed app** for data speed measurement, **Mycall app** to report voice call quality, and **Do Not Disturb App** for Crowd-sourcing of data about offending messages and calls.
- Recently, TRAI has launched an online portal for presenting and comparing the tariffs offered by various service providers for telecommunication services.
- In the field of broadcasting and cable service also, TRAI has completely revamped the regulatory framework. The new framework would ensure effective choice to the consumers at affordable prices.

Way Forward:

- An adaptive regulatory regime would foster innovation, provide a platform for the industry to grow, enhance user satisfaction, provide consumer protection and help the government to regulate.
- Use of Regulatory Sand-boxes: Impact assessment of regulation on the technologies may be studied before issuing the Regulations.
- Collaborative Regulations: Services and products today may require regulation by multiple Regulatory bodies; hence a collaborative Regulatory approach would have to be adopted.

Aadhaar: The Digital Highway to New India

Allegations on the validity of Aadhaar:

- Critics alleged that Aadhaar was **unconstitutional** for it purportedly, *infringed on individual liberty, privacy, personal autonomy, freedom of choice, etc.*
- They perceived government's enhanced ability to directly connect, reach, and serve people in a cost-effective, efficient and transparent manner, as an increase in the state's power and, hence, criticized Aadhaar as an instrument of state surveillance.
- Aadhaar was also perceived denial and exclusion, some of them raised questions on the efficiency of Aadhaar technology and security of a central database.
- The debate often reminded us of the **Luddite movement** in Europe in the 19th century when mechanization was opposed due to fears of job loss.

Experiences from other Countries:

- USA introduced **Social Security Number (SSN)** through an enactment in 1935 for a limited purpose of providing social security benefits during the Great Depression.
- In 1976, the **Social Security Act** was further amended to say that any State may utilize, in the administration of any tax, general public assistance, driver's license or motor vehicle registration law, the social security account numbers for the purpose of establishing the identification of individuals and may require any individual to furnish SSN.
- In United Kingdom too, almost every important service requires a **National Insurance Number (NIN)**.

Legal Position of Aadhaar in India:

- In the case **Justice (Retd.) K.S Puttaswamy & Others vs. Union of India & Other** challenging various aspects and issues of Aadhaar and Aadhaar Act, the SC upheld Aadhaar as constitutional.
- However, it provided some stronger safeguards that would go a long way in accelerating India's digital journey and strengthening India's digital narrative to create greater digital trust, parity and confidence among people.
- **Upholding the constitutional validity of Aadhaar** – The Supreme Court has held that the architecture of Aadhaar **neither creates a surveillance state nor infringes the fundamental right to privacy**.
- The Court said that Aadhaar identification is unparalleled and **ensures empowerment and dignity of marginalized sections** of the society.
- The court also upheld that the Aadhaar Act meets the concept of the **limited government, good governance and constitutional trust** and *its passing as a Money Bill is justified and legitimate*.
- The apex Court has **upheld that the mandatory use of Aadhaar in welfare schemes** or subsidy or benefits delivery where fund flows from the Consolidated Fund of India is well-founded.
- It has **spread a responsibility on the agencies** involved in the implementation of schemes to ensure **that no deserving beneficiary is denied** of any benefit or services for lack of Aadhaar or due to any technical glitches.

Benefits of Aadhaar:

- Aadhaar ensures that the benefits reach **directly to the deserving beneficiaries** in a hassle-free manner. Aadhaar is helping **eliminate middlemen, ghosts, fakes, and duplicates** in schemes which has already led to savings of over Rs. 90,000 crore during the last three years.
- According to an estimate of the World Bank, if Aadhaar is used across all welfare schemes, it will help save Government about US \$11 billion every year.
- It would also **provide a nationwide infrastructure** to establish voluntarily their identity online anywhere, anytime and enable them to receive their entitlements and exercise their rights.
- Aadhaar makes it possible for the government to **design special welfare programs and target them to deserving sections of the society**. For example, use of Aadhaar in Ayushman Bharat ensures that benefits would not be siphoned away by non-deserving beneficiaries and thereby will help keep the insurance premium and expenses within the affordable limits.
- **Aadhaar enabled Payment System (AePS)** deployed on a handheld device makes it possible for people to use their Aadhaar and fingerprint to withdraw or transfer money at their doorstep.
- Also, Aadhaar has helped flood victims of Tamil Nadu who were stranded in relief camps to withdraw money from their bank accounts without any documents or withdrawal slips being filled.
- The government is using Aadhaar to create a **tax compliant society** by weeding out fake and duplicate PAN cards, shell companies, and curb tax evasion, money laundering, fraudulent, corrupt and dubious activities.

Conclusion:

- Aadhaar not only sets the direction of digital destiny of India but also helps leapfrog a country of 132 crore people on the path of digital leadership of the world. Aadhaar is just beginning to unfold new paradigms of development besides laying firm foundation and opening of innovative horizons for New India.

Secure Digital India

- As India heads towards becoming a trillion dollar digital economy, it is essential to make the ecosystem safe and secure.
- Some of the key indicators of digitalization – internet penetration, availability of smartphones, government services online, and number of devices that are getting connected with the internet, all these are on the upward curve and clearly demonstrate and reinforce India's growing Digital foot print.
- Industry 4.0, which essentially means cyber physical transformation of manufacturing, ushers in a new age of connected things, smart manufacturing, and tailored products and services.
- Organizations are also pro actively leveraging Artificial Intelligence, Machine Learning & Deep Learning to disrupt the way the business are run and solutions are developed to meet the expectations of consumers.

Concerns of Digital Space

- Never before encountered and unanticipated threat scenarios are emerging and confronting the Industry today and taking a toll in the form of business risks, reputational damage, disruption of services and potentially public safety hazards.
- Cyber space is now the **fifth domain of warfare**. The World Economic Forum 2018 Risk report called out Cyber Risk as one of **the top three risks along with environment disasters**.
- Unique characteristics of the cyber space, namely *offence dominance, difficulty in attribution of attacks, development of cyber weapons by states and the use of non-state actors to camouflage their actions* are making cyberspace more and more vulnerable.
- Tracking cyber criminals and bringing them to justice is increasingly difficult owing to challenges in collection of evidence, applicability of laws, jurisdiction issues, and ineffective international frameworks to address cyber-crimes.

Changing Paradigm of Cyber Security

- The indicative list of next generation cyber security strategy elements are as follows, but not limited to , (I) *Security of Recognition Technologies* (II) *Extended Perimeter Security with a focus on supply chain* (III) *Context Aware Security* (IV) *The Shift from Detection to Response* (V) *Protecting Machines* (VI) *Providing Resiliency to e-infra* (VI) *Converging Security Disciplines*.

Addressing Cyber Security Concerns

- Some of the measures are discussed below:
 - **Policy and regulatory response to drive sectors and entities to Cyber Preparedness.**
 - **Coordination and collaboration for collective defence and quick response:** Need for Sectoral CERTS and State Level CERTs to bolster the efforts of a national CERT.
 - **Cyber Security Preparedness in India including large enterprises, SMBs and PSUs needs to be stepped up.**

Conclusion:

- Security by design and not treating security as a bolt on feature and as a cost centre is a paradigm shift that we need to drive.
- This mind set change is needed in the entire ecosystems for developers, solution architects, businesses-large, medium and small start-ups, academia and government.

Transformative Impact of Digital India

- Digital India Programme was launched by the Government in 2015 with the aim to develop India into a **knowledge economy and a digitally empowered society**.
- India is among the top countries of the world that have effectively utilized technology and innovation to transform the governance outlook from government-centric to citizen-centric.
- The remarkable increase in digital adaptation is evident in the improvement in India's position in **United Nation's E-Government Index 2018** that highlights that India's relative capabilities of utilizing ICT for governance have improved **relatively faster than the entire Asia region**.
- There have been significant improvements in **UN-Online Service Index**, where India has scored 0.95 in 2018.
- There has been a **consistent growth in e-participation index** too, that has grown to 0.96 in 2018. The robust citizen engagement platform, 'MyGov', in true spirit of participative democracy, has been developed and implemented.
- India has moved up the ladder of **digital adoption with the multi-fold growth in digital payment transaction**. It has risen from 335 crore transactions in 2014-15 to 2070.98 crore transaction in 2017-18 and is growing day by day.
- The advantage of Digital Payments is being well exploited through Direct Benefit Transfer (DBT) which has reassured the commitment of the Government towards the welfare of the people.

Digital Developing Service

- The **Common Services Centres (CSCs)** are ICT enabled rural enterprises in the country and provide plethora of services at the doorsteps of the citizens.
- **DigiLocker** has enabled people to store, share and verify their documents and certificates through cloud.
- **National Scholarship Portal** has become a source of facilitating education.
- **Online Registration System (ORS) and e-Hospital** have facilitated Aadhaar based online registration and appointment for patients.
- **Jeevan Praman**, provides the ease to pensioners to generate their Digital Life Certificate at home, bank, CSC centre, government office etc, using Aadhaar biometric authentication.
- To sustain the people throughout their digital journey, a **Unified Mobile Application for New Age Governance (UMANG)** has been launched. It has brought government services to the fingertips of the citizens of India.

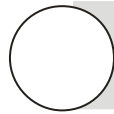
Government e-Marketplace (GeM)

- India spends a considerable, percentage of its GDP on public procurement with the challenges of decentralized procurement of commonly used items, while these purchases in small quantities lose the benefits of economies of scale, and makes it more vulnerable to malpractices because voluminous small transactions of decentralized nature.
- To address the challenges in public procurements, **Government e-Marketplace (GeM)** was launched.

Job Creation

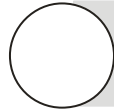
- Government of India has taken significant initiatives in the area of Electronic Manufacturing, BPO Promotion, IT-ITes etc. Indian start-ups are already developing to take advantage of the humungous potential created through this transformation.

Cyber Swachhta Kendra



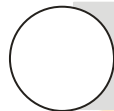
Mission

Create a secure cyber space by detecting botnet infections in India and to notify, enable cleaning and securing systems of end users so as to prevent further infections



Operator

Indian Computer Emergency Response Team (CERT-In)



Objective

Creating a secure cyber eco-system in country

Global IT Challenge for Youth with Disabilities 2018

- A three day event-the “Global IT Challenge for Youth Disabilities, 2018” was organized by the Department of Empowerment of persons with Disabilities (DEPwD), Ministry of Social Justice and Empowerment in association with Rehabilitation International Korea and their associated partner LG Electronics from 9th to 11th November, 2018.
- The objective of the Global ICT Challenge for Youth with Disabilities is to leverage IT skills among youth with disabilities and also to spread awareness about the application of Information and Computer Technology (ICT) in enhancing the quality of life of persons with disabilities especially in Asia-Pacific region.

Digital India- At the Heart of Poorna Swaraj

*“For me the only training in Swaraj we need is the ability to defend ourselves against the whole world and to live our natural life in perfect freedom, even through it may be full of defects, **Good government is no substitute for self-government.**”* M K Gandhi, Sep 1920.

- Gandhiji, in his wisdom understood that perfection of freedom is paramount and transcends the need for perfection of governance.
- Digital India providing information equality to everyone is the final realization of poorna swaraj for every for every individual. Digital India spans **three fundamental blocks – universal broadband, 100 per cent digital services and Open APIs.**

Three Blocks of Digital India

- Unleashing India’s vast potential requires a level of transparency, speed of operations and efficiency in implementation – including eliminating leakage – at a national scale.
- In parallel, we need to build so much confidence in our ability to trust the system that we give pure freedom to our professionals, innovators and enterprises to conduct business at a speed that makes them global leaders. All of this is very much possible only with three blocks that constitute Digital India.

- If we fail to serve everything digitally or fail to ensure it reaches everyone, we make the problem worse by deepening the asymmetry and creating chokepoints.
- Universal affordable broadband at speeds of 10 -50 Mbps for each person and home ensure that each of our 1.0 billion citizens is empowered.
- Delivering every service digitally dissolves friction while bringing transparency and trust at all levels.
- And every digital government service available as an Open API ensures uniformity of access, sparking a Cambrian explosion of services using governance services.

Era of Infinite Productivity

- We are heading into an era of **infinite productivity fueled by AI and robotics**. Economies will shift from *resources, capital and labor constrains to resources, capital and invention constrains*.
- Every global economy will go through social upheaval as jobs disappear and people are left to fend for themselves.
- India is already witnessing this trend – where we are growing as an economy but formal jobs are not growing at the same rate. The World Bank has assessed that *India will lose 69 per cent of its existing jobs*.
- This new infinity economy has two sources of growth for India. **Innovation enterprises owned by Indians situated in India** will be the primary source of Indian government revenue which fuels our social programs and defense.
- What is in the way is friction of doing business. This will disappear if we do implement all digital India fully in all three dimensions to create an environment of zero friction enterprise.
- As AI and robotics accelerate, India risks losing its economic strength and its digital sovereignty at an accelerating pace to global singularities.

Electronic Manufacturing: Scope and Future in India

- Electronics Industry is one of the largest and fastest growing industries in the world. The demand for electronics hardware products has been growing at a rapid pace in India.
- While majority of the domestic market requirements related to electronics products are met through imported goods majorly sourced from China, however, manufacturing activity related to mobile handsets and its components eco-system has been growing at a rapid pace during the past 3-4 years.
- The Government of India attaches high priority to promote electronics manufacturing in the country under the **“Make in India”** and **“Digital India”** flagship programs.

Progress of Electronic Manufacturing in India:

- Over 120 new manufacturing units have been established across the country during the past 3-4 years generating employment for 4.5 lakhs combining both direct and indirect employment.
- During 2017-18 India has overtaken Vietnam to become the 2nd largest mobile handset production geography after China with approx. 225 mn units of handsets being produced during this period.
- Indigenization of components related to mobile handsets has also gained momentum after the Government of India notified and started implementing the Phased Manufacturing Program (PMP) in various phases.
- The aims and objectives behind implementation of the PMP are to widen and deepen the components manufacturing ecosystem in the country with a major focus to enhance value addition and generate significant employment.

Polity initiatives:

- **Robust differential duty structure** was made applicable on mobile handsets encouraging domestic manufacture of handsets, vis-à-vis imports of handsets.
- Notifying and subsequent **phased implementation of the Phased Manufacturing**.
- Draft **National Policy on Electronics 2018** currently under consultation process.
- **Effective outreach initiatives** jointly undertaken by Government of India and major Industry Associations such as ICEA (India Cellular & Electronics Association) to important geographies such as China, Taiwan, Japan, USA, Korea, Germany etc.
- Investment friendly policy framework adopted by various state Governments such as AP, Telangana, UP, Haryana etc.
- Establishment of the Fast Track Task Force by the Ministry of Electronics and IT (MeitY) to “re-establish and catalyse significant growth in mobile handset and components manufacturing ecosystem in India”.

Technology Areas for Indian Languages

- Language technology has reached a level of maturity today where it is making mass impact on users of English and many other languages of the world. Indian language technology is also at an advanced level.
- This technology can enable people to access material in their own languages, for example, material in English and other Indian languages can be translated automatically.
- Similarly, computers can read out information to the illiterate or the blind through text-to-speech systems, remote data can become accessible through telephonic speech systems, remote data can become accessible through telephonic speech interfaces, sophisticated search can be provided to the internet, digitally scanned books and other material can be made more accessible by using optical character readers.

Different Technology Areas

A. Localization

- Localization in our context means that the electronic device is enabled with Indian languages using the standards.
- For example, when one buys a phone, it should already have the language of the region built into it along with Hindi and English, for displaying, key-boarding etc.

B. Creating e-Content in Indian Languages

- It was observed in Germany, (around the year 2000), that the German youth were accessing English language content much more than the German language content.
- It was realized that this situation had arisen because there was not sufficient content in German on the internet. Through a national effort, a large amount of German content was put on the internet, and the young generation switched back to German content.
- In India, where a large number of people know an Indian language but not English, it is even more important to create large amount of e-content in all Indian languages.
- Translation among Indian languages can be used to generate content in all the Indian languages.

C. Automatic Machine Translation (MT)

- Automatic machine translation translates a given text in one language to another, instantly. While the quality of translation produced varies depending on the distance between the language pairs, and the technology used, it provides instant access to text in another language to the user.
- It has been found that, although comprehensibility reached in automatic translation is reasonable, the fluency or readability leaves much to be desired. As a result, a combination of man and machine needs to be used.

- MT systems for Indian language are available and produce good quality translation. However, effort needs to be put in deploying them and making them available to users, both general users as well as publication houses.
- Also, there is need to develop MT system for all 22 scheduled Indian languages.

D. Cross Language Access to Content

- As the e-content in Indian languages increases, there would be an even greater need to search for and locate relevant content by the users on the internet.

E. Speech Processing - There are two parts to this technology:

- Text-to-speech (TTS) – It allows a computer to “read out” a given text file in all IL. It can be used to allow a text file to be accessed by a blind person or an illiterate person.
- Speech-to-text (ASR) systems - It allows the computer to “listen” to the spoken language and convert it into a text file. ASR (automatic speech recognition) is important where the computer has to understand a spoken command in a language, and the needful has to be done in response to the user request.

F. Optical Character Recognition (OCR)

- There are two technology areas under this head:
 - **Optical character recognition (OCR)** – It takes a printed book and converts it into text form. When scanning of a book in hardcopy is done, the output is in the form of scanned images which cannot be used for search, machine translation, speech processing etc. OCR takes a scanned image of a page, recognizes the characters, and converts it into text form.
 - **Online hand writing recognition (OHWR)** - It is important for stylus based for mobile devices. As mobile devices proliferate, stylus based input rather than keyboard is likely to become more important.

Way forward

- The Indian language technology should immediately be deployed to translate all central government web sites into 22 Indian languages. This will generate a demand, which will help growth of an eco-system of academic institutions as researchers and technology developers, start-ups as technology maintainers and others who service the demand using MT technology.
- There would also be need for human post-editors who would take the output of MT system, and make it more readable etc. Similarly, speech processing can be done, along with MT, to provide spoken language translation.
- The **National Digital Library of India** should use services of an OCR for indexing the scanned images in Indian languages, in making them searchable.

DIGITAL SIGNATURE

- Digital Signature or eSign is an online electronic signature service. It is a part of the Government of India's flagship programme- “Digital India”.
- The objective of eSign service is to offer on-line service to citizens for instant signing of their documents securely in a legally acceptable form. Some of the salient features of digital signature are non-repudiation, integrity and authenticity.

Benefits of e-Sign Service

1. **Secure online service**
2. **No Physical verification required**
3. **No need of Hardware tokens**
4. **Multiple ways to authenticate:** eSign service provides authentication based on multiple ways such as such as One-Time-Password (OTP) or Biometric.
5. **Privacy is preserved**

- Digital technology and internet connectivity lead the evolution of the traditional library to digital library. There are many factors to make the change.
- The **demands for information, limitations of resources available, searching difficulties in traditional libraries, low cost of using technology, the space needed to build a traditional library and needs of new generations** are the most important points among these factors.

Concept of Digital Library

- The concept of digital libraries in India began in the mid 1990s with the spread of information technology, the internet and the support of the central Government.
- Digital Libraries have the ability to enhance access to information and knowledge. They also bridge barriers of time and space.

Digitization of Libraries – Few Initiatives

A. Digital Library of India (DLI)

- DLI is a digital collection of freely accessible rare books collected from various libraries in India. DLI project started in early 2000.
- The project was initiated by the office of the Principal Scientific Advisor to the Government of India and subsequently taken over by the Department of Electronics and Information Technology (DEITY), Ministry of Communications and Information Technology (MCIT), Government of India of India.
- This project is funded by the Department of Electronics and Information Technology (DEITY).
- It is being hosted by Indian Institute of Science, Bangalore.

B. Information and Library Network (INFLIBNET)

- INFLIBNET Centre is an autonomous Inter-University Centre of the University Grants Commission (UGC) of India. It is a major National Programme initiated by the UGC in March 1991 with its Head Quarters at **Gujarat University Campus**, Ahmedabad.
- INFLIBNET is involved in modernizing university libraries in India and connecting them as well as information centres in the country through a nation-wide high speed data network using the state-of-art technologies for the optimum utilization of information.

C. Shodhganga: A Reservoir of Indian These

- The UGC notification mandates submission of electronic version of theses and dissertations by the researchers in universities with an aim to facilitate open access to Indian theses and dissertations to the academic community world-wide.
- “**Shodhganga**” is the name coined to denote digital repository of Indian Electronic Theses and Dissertations set-up by the INFLIBNET Centre.

D. Shodh Gangotri: Indian Research in Progress

- Shodhgangotri is a new initiative that compliments “ShodhGanga”. While “ShodhGanga” is a repository of full-text these submitted to universities in India, Shodhgangotri hosts synopsis of research topics submitted to the universities in India by research scholars for registering themselves for the Ph.D programme.

E. National Library and Information Services Infrastructure for Scholarly Content (N-LIST)

- N-LIST is being jointly executed by the UGC-INFONET Digital Library Consortium, INFLIBNET Centre and the Indest-AICTE Consortium. IIT Delhi.

F. e-ShodhSindhu

- Based on the recommendation of an Expert Committee, the MHRD has formed e-ShodhSindhu merging three consortia initiatives, namely UGC-INFONET Digital Library Consortium, NLIST and INDEST-AICTE Consortium.

G. National Digital Library (NDL)

- Ministry of Human Resource Development, under its **National Mission on Education** through Information and Communication Technology (NMEICT), has entrusted IIT Kharagpur to host, coordinate and set-up the National Digital Library (NDL) towards building a national asset.

- The objective of the project is to integrate all the existing digitized institutions. More specifically, it is to provide a single window access with e-learning facility to different groups of users ranging from primary to higher educations.
- The project's main aim was to create a knowledge base for students of all ages, especially for those interested in research.

Conclusion:

- Digital libraries provide an effective means to distribute learning resources to students and other uses.
- India truly needs digitization of traditional libraries more and more for the growth and development in education and research.

