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Digital India

Towards An Inclusive and Empowered Nation

Ravi Shankar Prasad

Regulating the Digital Revolution

RS Sharma

Secure Digital India

Rama Vedashree



FOCUS

Digital India—An Imperative for the Country

R Chandrashekhar

SPECIAL ARTICLE

Aadhaar: The Digital Highway to New India

Ajay Bhushan Pandey

PM launches “IT Apps



The Prime Minister, Shri Narendra Modi interacting with the IT electronic manufacturing Professionals on Self4Society, at the launch of the “Main Nahin Hum” Portal & App, in New Delhi on October 24, 2018.

A n App for IT professionals and electronic manufacturing professionals -“Main Nahin Hum” -portal and app was launched recently by the Prime Minister in New Delhi

The Main Nahin Hum portal, which works on the theme “Self4Society”, will enable IT professionals and organizations to bring together their efforts towards social causes, and service to society, on one platform. In doing so, the portal is expected to help catalyse greater collaboration towards the service of the weaker sections of society, especially by leveraging the benefits of technology. It is also expected to generate wider participation of interested people who are motivated to work for the benefit of society.



The Prime Minister, Shri Narendra Modi interacting with the IT electronic manufacturing Professionals on Self4Society, at the launch of the “Main Nahin Hum” Portal & App, in New Delhi on October 24, 2018.

Interacting with a wide cross-section of IT and electronic manufacturing professionals, captains of industry and technocrats on the occasion, the Prime Minister said that he was sure that people want to work for others, serve society and make a positive difference.

The Prime Minister noted that he observes India's youngsters leveraging the power of technology very well. He said that they are using technology not only for themselves but also for the welfare of others. IT professionals explained their efforts towards social volunteering, especially in skilling and cleanliness. In response to an observation, the Prime Minister asserted that the symbol of the Swachh Bharat Mission is the spectacles of Bapu, the inspiration is Bapu and we are fulfilling Bapu's vision.

Responding to a team that is working to create rural digital entrepreneurs, the Prime Minister said that it is important to create an India where everyone has equal opportunities.

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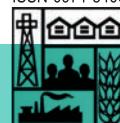
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*Let noble thoughts come to us from all sides
Rig Veda*

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Reshaping Development

History has been witness to many social and economic revolutions. Beginning with agricultural, going on to industrial and then the technological, these revolutions have changed the face of humanity. And now, the digital revolution is redefining the pace of progress opening countless avenues to transform society, culture and lifestyles.

Digitisation as a phenomenon made its onset long ago. But the pace was so gradual and the changes involved so subtle, that it went almost unnoticed. Early digital initiatives were mainly to preserve records, create in-house office management systems, processing of data, etc. It is over the last few years that the digital revolution has opened a whole new vista of opportunities reshaping the scope of development. From the Internet to artificial intelligence and robotics, emerging technologies have presented unprecedented opportunities for social and economic renovation. India, the fastest growing economy in the world, has undergone complete transformation with the rapid uptake of digital technologies. Smart and connected technology has become an integral part of businesses, governments and communities. It has had profound impact on the way people interact with each other, express their feelings, share ideas, manage their health and finances.

The IT revolution has given a big leap forward to Indian economy and proved to be a boon for the Indian youth as a generator of employment and revenue. Traversing through phases of Indian youth migrating abroad for work followed by global IT giants investing in India and jobs returning to India, the economy is now in the phase of start-ups and innovations.

The digital revolution has now touched many areas of relevance to the common man. The best example is the mobile revolution, with almost every Indian, industrialist or a rickshaw-puller, a student or a housewife, owning a mobile phone. Many services are now available through digital platforms where earlier one had to go physically or stand in queues. Passport and visa services, railway bookings, withdrawal of cash – have all been digitised. The government has, on its part, initiated many programmes to further this revolution. Aadhar was the first major initiative of the government to streamline government services through Direct Benefit Transfer and the JAM trinity. Digital payments are now possible through apps like BHIM and Rupay debit cards, e-Sign has been introduced to facilitate digital signature on documents; Jeevan pramaan has made life easier for the old who can now get verification of life through digital life certificates to draw their pensions. Common Service Centres, digital classrooms and e-hospitals have enabled access to services in rural and remote areas.

This continuing wave of digital transformation has permeated every facet of business and life but like any other technology, this also has come with considerable challenges in the form of fake content, online frauds and cyber-bullying. The government has taken several cyber security measures to ensure robust data delivery systems in various sectors like banking, insurance etc.

The journey to digitisation has been one of inclusive growth, transforming India into a global economy. It is a revolution that has touched the lives of the common man in almost all aspects and holds the potential to completely redefine the human experience, vastly simplifying, enhancing and enriching lives. Responsible behavior clubbed with digital intelligence on part of the organizations and citizens is what is required to ensure that the benefits of digital technologies outweigh the costs.



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Towards An Inclusive and Empowered Nation

Ravi Shankar Prasad



India's digital story is one of digital empowerment and digital inclusion for digital transformation based on technology that is affordable, inclusive and equitable. The Digital India Programme is generating pathways to a future powered by technology and achieving a high growth of our Digital Economy to reach a level of trillion dollars by 2025

Digital India is a visionary initiative of the Prime Minister to transform India by leveraging the power of information technology. It is aimed to empower the poor and the underprivileged by using technology that is affordable, developmental and inclusive. Inclusive growth and empowerment of ordinary Indians is at the core of Digital India.

Today, India is recognised in the world for its thriving IT industry that is present in more than 200 cities of 80 countries. Growth of IT industry in India 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. It is a matter of great assurance that India has the biggest user base for many of the IT and Internet companies today.

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.

- **Phase-III:** This is the current phase where India is witnessing great growth in innovation and entrepreneurship led by Startups which are mostly founded by young Indians. The efforts of our government to encourage Startups has paid rich dividends and today India has emerged as the third largest Startup ecosystem in the world.

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.

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.

Digital Identity

Digital Identity is the key to unlock access and potential of

National Scholarship Portal

Scholarships worth **Rs. 5295 Crore** disbursed in last 3 years



the Digital India Programme. To provide a unique digital identity, **Aadhaar** has covered around 122 crore residents 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. Today, financial entitlements under 434 Government services are being delivered using Aadhaar based Direct Benefit Transfer, which has been discussed in detail in the subsequent paragraphs. 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.

Digital Infrastructure: Building robust digital infrastructure is essential for the success of Digital India.

Bharat Net

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. About 2,91,689 kilometers of optical fibre have been laid, connecting 1,19,947 Gram Panchayats by 3rd November 2018.

district centers have also been commissioned under NKN.

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. More than 890 applications are running on 15300 virtual servers.

eSign

eSign Electronic Signature Service is an innovative initiative for allowing easy, efficient, and secure signing of electronic documents by authenticating signer 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. 5 e-Sign providers have been on-boarded and more than 5.89 crore e-Signs have been issued.

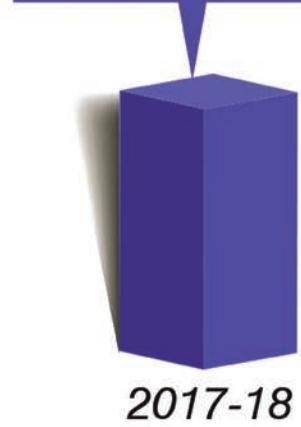
Digital India for Better Governance

- (i) **JAM (Jan Dhan-Aadhaar-Mobile) Trinity for Direct Benefit Transfers (DBT)-** The combination of 32.94 crore Jandhan bank accounts, 121 crore mobile phones and digital identity through 122 crore Aadhaar is helping the poor receive the benefits directly into their bank accounts. Financial entitlements under 434 Government schemes are being delivered through Direct Benefit Transfers. In the last five years a total of Rs. 5.09 lakh crore have been transferred directly into the bank accounts of beneficiaries leading to a saving of Rs. 90,000 crore. This has not only enhanced

Digital Payment Transactions



2071 Crore



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. Over the past four years digital payment transactions have grown multifold from 316 crore transactions in 2014-15 to 2071 crore transactions in 2017-18. Today, BHIM-UPI (Unified Payment Interface) platform and RuPay debit cards have become very popular digital payment instruments for sending, collecting the money and for payments at merchant outlets. In Sept, 2018, more than 48 crore transactions of value Rs 74,978 crore were made using BHIM-UPI platform. BHIM-UPI is a

unique mobile based payment innovation of India that is being appreciated world over.

(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. More than 8.4 million

It is now possible to eliminate the need to carry any paper to avail a government service. With more than 1.57 crore registered users, 68 issuers and 27 requesters, DigiLocker provides access to over 336 crore certificates in digital format on a single platform.

users have downloaded this app since its launch in November 2017. Now, instead of surfing various websites for availing government services, citizens can just use one mobile app and also access it in 13 different languages.

(iv) **Digital Delivery of Services** has spread and is now easily available to common people either through a dedicated portal or on UMANG mobile app. Some of these popular digital services are:

- **National Scholarship Portal** has become a one stop shop for all the scholarship needs of students. It has 1.08 crore students registered with scholarships worth Rs 5295 crore disbursed in the last 3 years.
- **Jeevan Pramaan** for ease of verification of pensioners using Aadhaar digital identity. 1.73 crore Digital Life Certificates have been submitted since 2014.
- **eHospital and Online registration services** aim to ensure that patients can get easy access to doctors. Implemented in 318 hospitals. 5.6 crore eHospital



transactions have taken place in all States since Sept 2015.

- **Soil Health Card:** National Soil Health Card scheme was launched in 2015 to provide information on soil health digitally. So far, 13 crore cards have been issued.
- **eNAM:** Electronic National Agriculture Market (eNAM) is a pan-India electronic trading portal which networks the existing Agricultural Produce Marketing Committee (APMC) Mandis to create a unified national market for agricultural commodities. Over 585 markets in 16 States have already been integrated. It has around 93 lakh farmers and 84,000 traders registered.
- **DigiLocker:** It is now possible to eliminate the need to carry any paper to avail a government service. With more than 1.57 crore registered users, 68 issuers and 27 requesters, DigiLocker provides access to over 336 crore certificates in digital format on a single platform. Various important documents like PAN card, driving license, Aadhaar etc. can be stored in digital form on DigiLocker.
- **eVisa:** Services of e-Visa 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. Since the launch of the scheme (November 2014) more than 41 lakh eVisas have been issued.

- **eCourts:** With eCourts mobile app and portal it has become easy to keep a track of case status of cases going on in different courts across India. Lawyers and litigants can also avail notification services about their cases.
- **National Judicial Data Grid:** This is a comprehensive data base of 9.16 crore court cases and 5.63 crore court judgments that has been integrated with the eCourts. It provides information on cases pending, cases disposed and cases filed in both High Court and District Court complexes in the areas of civil and criminal cases.
- **GeM:** Government eMarketplace (GeM) is a transparent online market place for government procurements. Over 29,812 Buyer Organisations, 1,55,821 Sellers and Service Providers

and 6,01,749 products have been registered on this platform. 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 departments and PSUs.

Digital India for Employment, Entrepreneurship & Empowerment

(i) Digital Service delivery near door-step (Common Services Centres)

A vast network of more than 3.06 lakh of digital services delivery centres, spread across 2.10 lakh Gram Panchayats of the country 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 for 12 lakh people and by promoting rural entrepreneurs, out of which 61,055 are women. CSCs have also undertaken the Stree Swabhiman initiative to create awareness about menstrual health and hygiene among rural women. Under this initiative, more than 300 micro sanitary pad manufacturing units have been opened



Ministry of Electronics &
Information Technology
Government of India

Common Services Centres

Driving Digital Inclusion in Small Towns and Villages





- More than 3 lakh CSCs setup
- 300+ services being delivered
- 1.45 crore persons trained under PMGDISHA
- 59,180 Active Women Village Level Entrepreneurs (VLEs)



- Stree Swabhiman
- Unique initiative to create awareness about menstrual health
- 117 sanitary pad units set up
- Low cost sanitary pads being given to rural women
- Creation of jobs for women



- Rural BPO
- Micro BPO units are being set up in CSCs
- Each BPO creates jobs for five to ten youth
- A new wave of IT led jobs spreading in rural India



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in rural areas. These units have not only provided livelihood opportunity to rural women but have also made low cost sanitary pads locally available.

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, wherein a total of 53.7 lakhs person were trained and certified in Digital Literacy in the country. In line with the earlier schemes, Government has approved a new scheme “Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA)” to usher in digital literacy in rural India to cover 6 crore rural households. So far, a total of 1.47 crore candidates have been enrolled under the PMGDISHA Scheme, out of which 1.43 crore candidates have been trained and 74.5 lakh candidates have been certified. This is the largest digital literacy mission of the world.

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. Today, more than 230 BPO units have come up in about 100 small towns of India across 20 States and 2 Union Territories, including in places like Visakhapatnam, Bhimavaram, Jammu, Sopore, Shimla, Patna, Muzaffarpur, Sagar, Nashik, Nagpur, Sangli, Aurangabad, Jaipur, Amritsar, Gwalior, Coimbatore, Madurai, Auroville, Bareilly, Lucknow, Kanpur, Guwahati, Kohima etc.

Digital India for Make In India

Promotion of Electronics Manufacturing

Government of India has undertaken various initiatives to promote electronics manufacturing in India, with the target to reduce imports. 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. From 2 units in 2014, we now have 127 units manufacturing mobile handsets and components. 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. The Ministry of Electronics and IT has received 245 applications for investing over \$8 billion under the government's Modified Specific Incentive Package Scheme, of which it has approved 142 applications representing investments. Out of these, 74 companies have started commercial production. This has created more than 4.5 lakh job opportunities (direct and indirect). There are about 35 manufacturing units of LCD/ LED TVs and 128 units of LED products in the country. Under Electronics Manufacturing Cluster (EMC) Scheme, MeitY has accorded approval to 23 projects in 15 states across the country.

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), Tactile Graphics for Visually Impaired, Agriculture and Environment, ESDM, Fintech, Language Technology, Automotive Electronics, Virtual Augmented Reality, Medical Tech and Health Informatics, Block Chain, Gaming and Animation, and Biometrics.



Ministry of Electronics &
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Electronics Made in India

From 2 to 127 Mobile Manufacturing Units in 4 years



Creation of 6 lakh Direct & Indirect Jobs

Mobile Phone Manufacturing

- 127 mobile handset & component manufacturing factories set up
- In 2014, there were only **2 units**

6 crore 2014-15 **22.5 crore** 2017-18

Mobile Phones manufactured in India

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Cyber Security

To create an inclusive, safe and secure cyber space for sustainable development, the Cyber Swachhta 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

In the 21st Century, Digital Economy has emerged as a key driver for global economic growth and will also effectively address common

global challenges including energy, environment and inequality. Digital technologies offer new opportunities for businesses, workers and citizens to engage in economic activity and to enhance efficiency.

India is today among the top three global economies of digital consumers. Conceted efforts to facilitate and promote process of digitalization including upgrading digital infrastructure, augmenting capacity to develop 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, permeate the economy has the potential to create a trillion-dollar digital economy by 2025.

India's digital story is one of digital empowerment and digital inclusion for digital transformation based on technology that is affordable, inclusive and equitable. The Digital India Programme is generating pathways to a future powered by technology and achieving a high growth of our Digital Economy to reach a level of trillion Dollars by 2025. □

(E-mail: mljoffice@.gov.in)

PM Launches historic Support and Outreach Initiative for MSME Sector

The Prime Minister launched a historic support and outreach programme for the Micro, Small and Medium Enterprises (MSME) sector. As part of this programme, the Prime Minister unveiled 12 key initiatives which will help the growth, expansion and facilitation of MSMEs across the country.

Access to Credit

- Launch of the 59 minute loan portal to enable easy access to credit for MSMEs. Link to this portal will be made available through the GST portal. • 2 percent interest subvention for all GST registered MSMEs, on fresh or incremental loans.
- All companies with a turnover of more than Rs. 500 crore, must now compulsorily be brought on the Trade Receivables e-Discounting System (TReDS). Joining this portal will enable entrepreneurs to access credit from banks, based on their upcoming receivables resolving problems of cash cycle.

Access to Markets

- Public sector companies asked to compulsorily procure 25 percent, instead of 20 percent of their total purchases, from MSMEs. • Out of the 25 percent procurement mandated from MSMEs, 3 percent must now be reserved for women entrepreneurs. • All public sector undertakings of the Union Government must now compulsorily be a part of GeM.

Technology Upgradation

- 20 hubs will be formed across the country, and 100 spokes in the form of tool rooms to be established.

Ease of Doing Business

- Clusters to be formed of pharma MSMEs. - 70 percent cost of establishing these clusters will be borne by the Union Government. • The return under 8 labour laws and 10 Union regulations must now be filed only once a year.
- Establishments to be visited by an Inspector will be decided through a computerised random allotment. • Under air pollution and water pollution laws, now both these have been merged as a single consent. - the return will be accepted through self-certification. • Ordinance has been brought, under which, for minor violations under the Companies Act, the entrepreneur will no longer have to approach the Courts, but can correct them through simple procedures.

Social Security for MSME Sector Employees

- A mission to be launched to ensure that they have Jan Dhan Accounts, provident fund and insurance. The Prime Minister said that these decisions would go a long way in strengthening the MSME sector in India and implementation of this outreach programme will be intensively monitored over the next 100 days.



The new era requires speed: in thought, in action, in governance and regulatory changes. These are not easy. But we are fortunate to have a Government that has recognized the imperatives and has prioritized Digital India

Towards a Digital Future

R Chandrashekhar

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. It is equally clear that the challenges that must be overcome while traversing this path are not trivial either. Today, we stand at a confluence of several synergistic progressions both in India and globally, that have collectively created an incredible springboard for highly accelerated economic development as well as far more equitable growth. This

endeavor is and will remain, a key determinant of India's future growth path.

Early efforts at digitization in government were largely government focused: how to improve efficiency, record keeping and data storage and processing especially in number crunching departments like finance (treasuries), taxation (Commercial taxes, Income Tax, Excise), Statistics, etc. Substantial efforts and progress were seen in departments that dealt with large numbers 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, barring a couple

The author is former President NASSCOM. Earlier he has served as the Chairman of Telecom Commission, Secretary in the Department of Telecommunications and Secretary in the Department of Information Technology.



The last 5 years have seen one other major development, namely the rapid growth of the third largest start up eco-system in the world with around 7,500 tech start ups....the start up eco-system is increasingly creating innovative products and services focused on solving Indian problems in healthcare, agriculture, fintech, cyber security, energy to name a few.

of states like AP where NIC efforts were augmented by state technology organizations like APTS.

It was in 1997 that the first steps towards a citizen focused e-governance program were taken, initially in the state of Andhra Pradesh. Later, thanks to a 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, transportation, land registration, urban local bodies, PDS, etc. at the state level and Income Tax, Excise and MCA at the national level. Towards the end of this period, State Wide Area Networks were created under a scheme funded by the Central Government. Some of these projects were implemented in a PPP mode, thereby drawing the country's technology industry into the nation-wide effort and opening new approaches to rapid deployment of comprehensive e-governance solutions. These sporadic, but highly visible initiatives were widely appreciated and hailed as truly path breaking changes in systems

of governance in the country. 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. Thereafter, steady progress was made across the country: faster in some states and much more slowly in others. During this period (2004-2013), some of the more ambitious projects like UID (later renamed as Aadhaar), Passport seva, MCA21, etc. were initiated.

Parallel developments in the telecom sector unfolded at a staggering, globally unprecedented pace. 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. Smart phone coverage grew rapidly as did social media usage, especially by the young population.

Potential of Digital Economy

The advent of the present Government in 2014 was marked by a clear recognition of the huge potential of the digital economy. The Government took the digital push in the country to unprecedented levels with many spectacular initiatives that attracted global attention and drew praise. The Aadhaar project was taken to its logical conclusion by a vigorous drive, the JAM program (Jan dhan, Aadhaar and Mobile) program saw over 200 million people benefitting from financial inclusion through bank accounts and direct benefits transfer (DBT). Linkage of mobile telephones and bank accounts with Aadhaar (recently barred by the Supreme Court) gave Government and businesses the ability to deal with a vast population individually and without leakage caused by non-value adding intermediaries. The CSC program has expanded to 2,50,000 panchayats and now provides employment to nearly a million people in the rural heartland. Technology can indeed be used to distribute economic opportunity and job creation more equitably.

Meanwhile, global developments in technology led to the emergence and use at scale of enormously powerful, highly affordable, almost infinitely scalable disruptive technologies like Social Media, Mobile, (Data) Analytics, Cloud, Artificial Intelligence, IoT, 3-D printing, etc.

The Indian IT industry had also grown from strength to strength and had become a 150+ billion dollar behemoth that was globally respected and often, envied.



Global products like IBM Watson already provide a range of medical services across countries including treatment recommendations based on patients' records. But within India, well known products in healthcare such as Practo, Portea, Lybrate, etc. are connecting doctors and medical professionals to patients in ways that make it easy to reach the right person from the comfort of your home.

Meanwhile, global developments in technology led to the emergence and use at scale of enormously powerful, highly affordable, almost infinitely scalable disruptive technologies like Social Media, Mobile, (Data) Analytics, Cloud, Artificial Intelligence, IoT, 3-D printing, etc. The Indian IT industry had also grown from strength to strength and had become a 150+ billion dollar behemoth that was globally respected and often, envied. The last 5 years have seen one other major development, namely the rapid growth of the third largest start up eco-system in the world with around 7,500 tech start ups. After initially coming up with clones of western products in e-commerce, transportation, entertainment and hyper-local logistics and deliveries, the start up eco-system is increasingly creating innovative products and services focused on solving Indian problems in healthcare, agriculture, fintech, cyber security, energy to name a few. Of course, many of these have a global potential even though they started off with an India focus. India is well on its way to becoming a fountainhead of frugal innovation for the globe by creating services in various areas, but more importantly

in the social sector, by leveraging new, disruptive technologies.

Digital Services Delivery

E-commerce, transportation, payment wallets, hotel/accommodation/cinema booking, local food and provision delivery services enabled by mobile apps are now familiar to most urban citizens and increasingly smaller towns as well. Global products like IBM Watson already provide a range of medical services across countries including treatment recommendations based on patients' records. But within India, well known products in healthcare such as Practo, Portea, Lybrate, etc. are connecting doctors and medical professionals to patients in ways that make it easy to reach the right person from the comfort of your home. Apps like Byju's are making high quality educational content and services easily accessible at highly affordable costs. Similar established products albeit in smaller numbers exist in the agriculture sector too. But there are more new exciting efforts in the pipeline in social sectors like healthcare, agriculture, fintech/ financial inclusion that hold the promise of scripting India's future, riding on the back of and reinforcing the Digital India program.

Some examples would suffice to convey a sense of the range of innovation and extent of changes being ushered in by these young innovators and change leaders. Medicea Technology Solutions is building a tech driven pharmaceutical distribution business with next generation anti-counterfeit technology using private blockchain. Artoo has built an intelligent lending system specifically designed for Micro Enterprise lending. Dheeyantra has built a product that enables vernacular interactions and engagement with end customers using AI and NLP. Inform DS Technologies has built Doxper, an AI powered product that enables doctors to instantly digitize prescriptions and clinical notes using a digital pen and encoded paper. Krishi Hub is a free AI-powered mobile app that enables farmers to make data-driven decisions and supports 8 local languages and is currently being used across 17 states. DeepMind mines through medical records, analyzes digital scans of the eye to diagnose eye disease.

AI and Internet of Medical Things (IoMT) are transforming healthcare. Similar transformation in the agriculture sector through technology interventions that enable precision farming, early warning of pest attack in cotton farming for example, are available through AI-powered systems to lower risks and costs while increasing productivity. It is interventions like these and hundreds of other such innovations that are going to help deliver desired outcomes like doubling farmers incomes, health coverage for the poor through Ayushman Bharat and similar programs.

Challenges

It needs to be recognized that these exciting trends should not be taken to mean that progress is assured. McKinsey has estimated that India's Digital economy could grow to 1 Trillion US\$ by 2025 with focused efforts but could end up at about half that level with a business-

as-usual approach. Regulatory facilitation and debottlenecking by Government are critical across sectors for rapid progress necessary for full realization of the potential. Examples abound. Map Policy of the country was an impediment to growth of location-based services. Lack of a drone policy stymied use of drones and growth of a drone services ecosystem in the country. Some people have welcomed the recent drone policy, while others feel it is still sub-optimal. Even as we formulate laws and regulations on data privacy, we have to strike a careful balance to ensure that innovation is not stifled by unduly restrictive regulation. The recent Supreme Court judgement on Aadhaar appears to bar use of Aadhaar by the private sector even with the consent of a citizen, thereby constricting opportunities for innovative, convenient services in many areas. Regulatory facilitation of consensual use warrants fresh consideration by stakeholders. Conservative regulations in healthcare that disallow remote treatment by doctors are retarding the growth of commercial ecosystems in this field. There are many, many more examples of policy and regulation which needs to be tweaked to enable and not retard Digital India. But we are all learning, as is the rest of the world. The new era requires speed: in thought, in action, in governance and regulatory changes. These are not easy. But we are fortunate to have



AI and Internet of Medical Things (IoMT) are transforming healthcare. Similar transformation in the agriculture sector through technology interventions that enable precision farming, early warning of pest attack in cotton farming for example, are available through AI-powered systems to lower risks and costs while increasing productivity.

a Government that has recognized the imperatives and has prioritized Digital India.

While all of these developments are hugely encouraging and give rise to well-founded optimism about the future of India's digital economy (1T), the path is not easy. Availability, power and affordability of technology are no longer the limitation. It is our imagination and our ability to assimilate them into the ordinary tasks of everyday life, normal business and governance. Equally, it is well-recognized that the power of technologies has grown at a pace far exceeding our ability to leverage

them in key social sectors. This, even though we are beset by monumental problems that have defied solutions for decades since independence: poverty, employment, education and skilling, healthcare, increasing agricultural productivity and mitigating risk, financial inclusion including access to credit without collateral (eg. based on cash flows and financial history). There is an old saying: When an irresistible force (read technology) meets an immovable object (read our massive problems), something gotta give! I'm betting on technology winning this battle. What about you? □

(E-mail: rentala.chandrashekhar@gmail.com)

India Surges 23 Ranks in Ease of Doing Business with Port-led Development under Sagarmala

As per the World Bank report 2019 on Ease of Doing Business, India has taken a huge leap of 23 ranks from 100 in 2017-18 to 77 in 2018-19 indicating it is continuing its steady shift towards global standards. One of the key indices which has contributed immensely toward this growth is 'Trading across borders' which shows an impressive improvement from 146 rank last year to 80th rank this year.

The Ministry of Shipping has been taking initiatives to improve the parameter of 'Trading across border' as 92 per cent of India's Export- Import trade by volume is handled at ports.

The report mentions that this is mainly due to India's continued reform agenda, which has made it the top-ranked economy in the region. Upgradation of port infrastructure, improvement of processes, and digitization of document submission has substantially reduced Export/Import cargo handling time at ports which has significantly contributed towards improving the trading across border parameter and India's impressive growth in the World Bank's report. The World Bank has recognized India as one of the top improvers for the year.



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Regulating the Digital Revolution

R S Sharma

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. World over, the Digital Revolution is driving the socio-economic and technological growth of the human race. The revolution is driven by various factors like the availability of high-speed Internet, innovative products and services, the need for efficient management and distribution of resources both by the Government as well as private entities, the user's ubiquitous requirement of remaining connected at all times etc.

As stated in the TRAI's recommendation on "Privacy, Security and Ownership of the Data in the Telecom Sector"¹, "The eco-system used for delivery of digital services consists of multiple entities like Telecom Service Providers (TSPs),

Personal Devices (Mobile Handsets, Tablets, Personal Computers etc), M2M (Machine to Machine) Devices, Communication Networks (consisting of Base Trans Receiver Stations, Routers, Switches etc), Browsers, Operating Systems, Over The Top (OTT) service providers, Applications etc. It is estimated that the global volume of digital data created annually was 4.4 zettabytes in 2013 and this would reach 44 zettabytes by 2020². Further, it is expected that the number of devices connected to the IP Networks would be approximately three times the global population by 2021³". It would be pertinent to note that the mode of communication has transformed from purely Analog to Digital now and mobile communication has become an inseparable part of our lives.

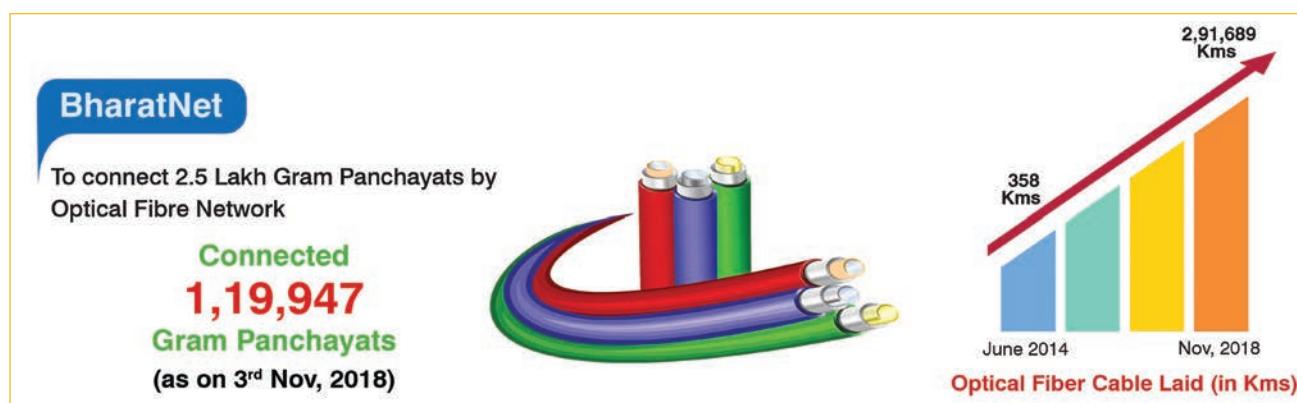
The entire gamut of Digital Transformation is to provide innovative products and services to

The entire gamut of Digital Transformation is to provide innovative products and services to improve productivity and efficiency. The connectivity to the digital devices would be predominantly provided by the telecom networks; hence the Telecom Sector would be the key growth engine driving the Digital Revolution.

improve productivity and efficiency. The connectivity to the digital devices would be predominantly provided by the telecom networks; hence the Telecom Sector would be the key growth engine driving the Digital Revolution.

Challenges

During the past two decades, the world has witnessed an



The author is Chairman, Telecom Regulatory Authority of India (TRAI). Earlier he has served as Secretary, Department of Electronics & Information Technology and Director General & Mission Director, UIDAI.



unprecedented growth in technology. The advancement in technology has, on the one hand, provided the consumers services and devices which were earlier perceived as fiction; and on the other posed new challenges in the regulatory environment. A major portion of the Applications and services that are being developed are based on the mobile connectivity, hence 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.

The world is witnessing emerging technologies like Artificial Intelligence, Internet of Things (IoT), Machine Learning (ML), Machine to Machine (M2M) Communications, Big Data Analytics, Distributed Ledger Technologies(Block Chain) etc. Emergence of these technologies has opened new avenues and methods for the consumers to interact with each other. New technologies have also paved the way for new

businesses and the manner in which these new businesses are executed.

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

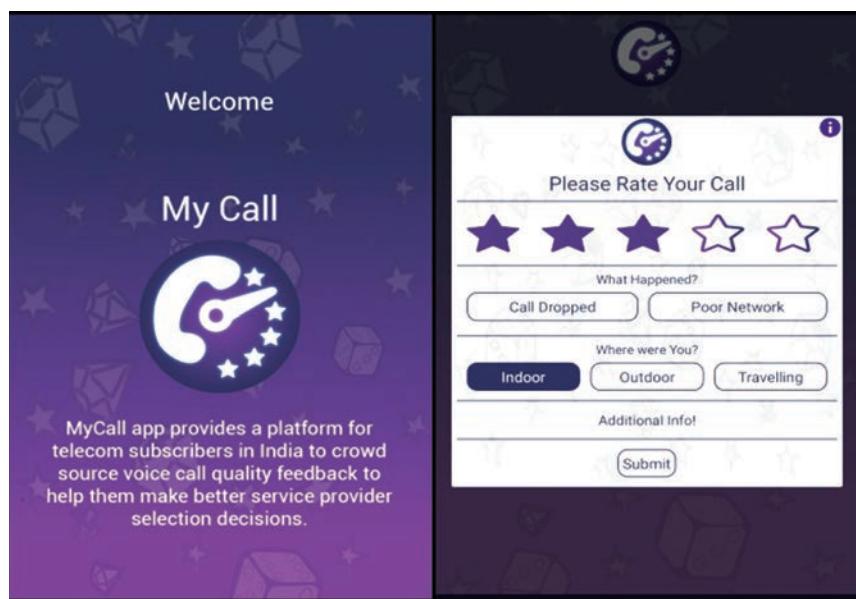
tradition regulation can be broadly classified into:

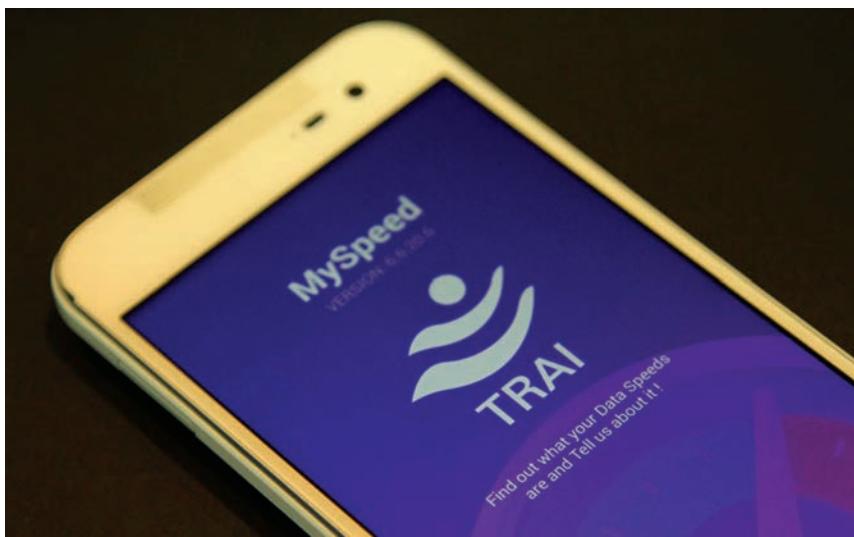
Business Challenges: These could be the Pacing problem i.e a slow pace of regulations may become irrelevant very soon while a regulation released early may discourage innovation. Another issue that is of importance is the disruptive business models wherein the new businesses may require intervention/regulation by multiple regulators.

Technological challenges: These are far too many and are dynamic in nature i.e 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.

India is the second largest market in the world. 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.





As new business models and services emerge, government agencies are expected to create or modify regulations, enforce them and communicate the same to the environment at faster pace. 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.

Based on the emerging technologies, a Regulator therefore may have to consider the following approaches while formulating the regulations today:

Regulations should be Adaptive: A rigid Regulatory framework may prove to be detrimental to innovation as well as the growth of industry. 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: As brought out earlier, services and products today may require regulation by multiple Regulatory bodies; hence a collaborative Regulatory approach would have to be adopted.

A Regulator, therefore, has to be aware of the current state of regulations world over, know the right time to regulate, know the right approach to regulate and have an adaptive approach towards emerging technologies.

Experiences at TRAI:

World over, ICT Regulators have been keeping pace with the emerging technologies. Similarly, for regulating the digital revolution in telecom sector in India, TRAI has taken considerable steps in the past five years. We have 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.

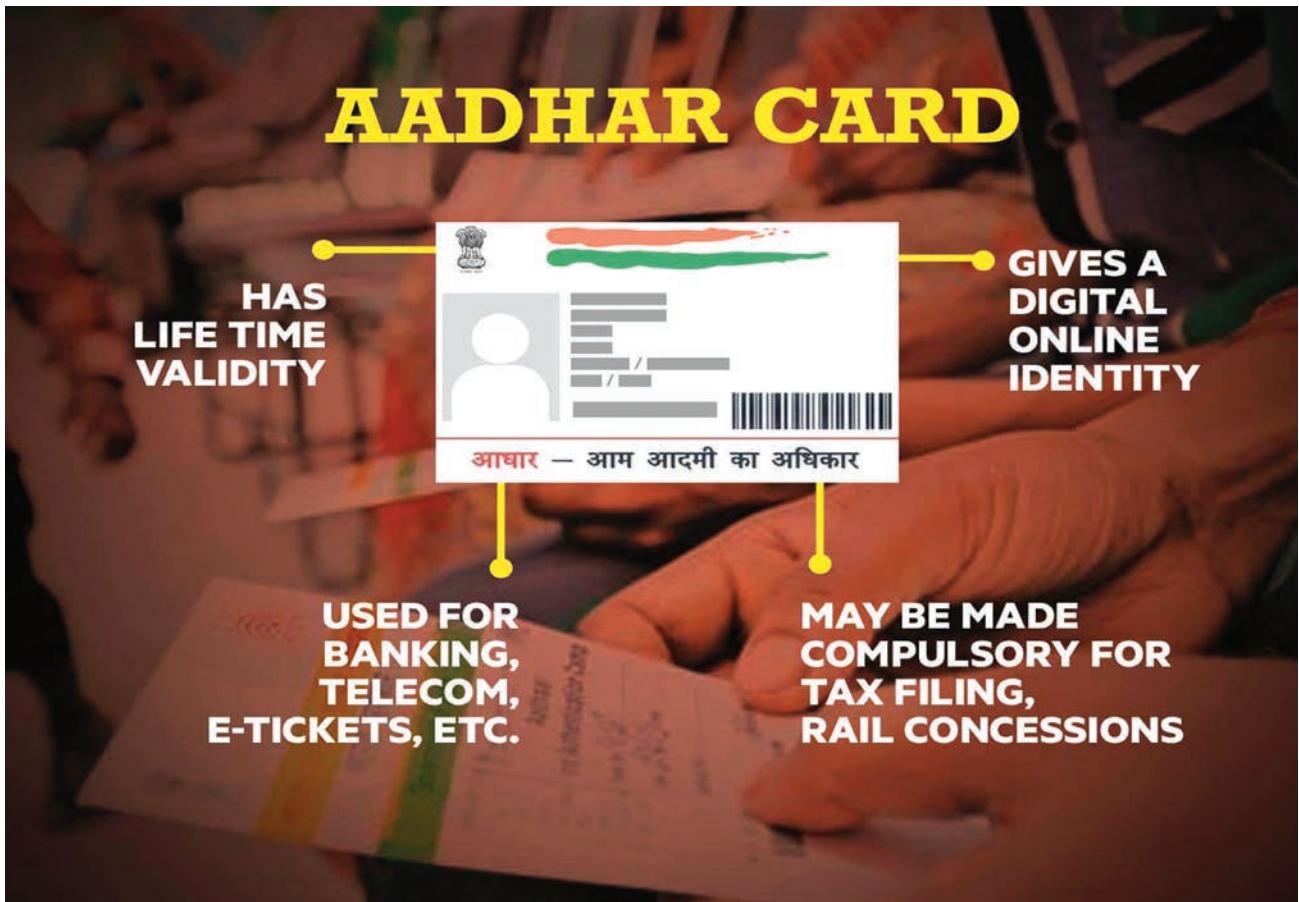
Conclusion:

The Telecom Sector is witnessing the biggest transformation in the past several decades, New technologies and services based on mobile connectivity, social media, data-analytics, cloud computing etc are being designed today. These technologies and services have blurred geographical boundaries, created exciting business models, created job opportunities, empowered the citizens and attracted world telecom leaders to India. TRAI has a very important role today in not only regulating the Digital revolution in the telecom sector but also be a front-runner in adaptively regulating emerging technologies.

Endnotes

1. <https://www.trai.gov.in/sites/default/files/Recommendation DataPrivacy16072018.pdf>
2. The Digital Universe of Opportunities: Rich Data and the Increasing Values of the Internet of Things', EMC Digital Universe with Research and Analysis by IDC (April 2014), available at:<https://www.emc.com/leadership/digital-universe/2014iview/executive-summary.html>
3. <https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.html> □

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Aadhaar: The Digital Highway to New India

Ajay Bhushan Pandey

Since independence, rarely any single initiative of the Government of India has ever been as intensely debated as Aadhaar during the last nine years of its existence. The debate which engulfed practically every section of society – governments, NGOs, civil society, legal fraternity, political

parties, academics, professionals, activists, techies, advocates, media, etc., was so widespread and passionate that no section of our society remained untouched. It was like the great mythological churning of the sea that has brought a number of gems like unique identity, privacy, data protection, digital security, etc. on the national agenda.

Critics alleged that Aadhaar was unconstitutional for it purportedly, as per their claim, 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

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Aadhaar as an instrument of state surveillance.

While yet another section of critics perceived Aadhaar as a tool of denial and exclusion, some of them raised questions on the efficacy 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 mechanisation was opposed due to fears of job loss.

It is useful to know how other developed democracies used unique identification numbers to cleanse their system. USA introduced Social Security Number (SSN) through an enactment in 1935 for a limited purpose of providing social security benefits during the Great Depression. However, in 1942, President Franklin Roosevelt expanded the scope through a historic executive order no. 9397 which mandated all Federal agencies to exclusively use SSN in their programs. In 1962, SSN was adopted as the official Tax Identification Number (TIN) for income tax purposes. 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.

The mandatory use of SSN by the State did not go unchallenged in US courts which eventually held mandatory use of SSN to be constitutional. In Doyle vs. Wilson, it was held that "*mandatory disclosure of one's social security number does not so threaten the sanctity of individual privacy as to require constitutional protection.*" In other cases, courts held that "*requiring an*



SSN on a driver's license application is not unconstitutional, nor is a requirement that welfare recipients furnish their SSNs" and "preventing fraud in federal welfare programs is an important goal, and the SSN requirement is a reasonable means of promoting that goal". In United Kingdom too, almost every important service requires a National Insurance Number (NIN). It is required from those who want to work, open bank accounts, pay taxes, want to receive child benefits, and even those who want to vote.

In India, too, Aadhaar had to undergo several legal challenges. After six years of prolonged litigation and 38 days of marathon hearing in Aadhaar case by the 5 judges Constitutional Bench of the Supreme Court of India where 36 petitions along with the lead writ petition (civil) no. 494 of 2012 of Justice (Retd.) K.S. Puttaswamy & Others vs. Union of India & Others challenging various aspects and issues of Aadhaar and Aadhaar Act were argued and debated; and the SC delivered its historic and landmark judgment which upheld Aadhaar as constitutional albeit with 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.

In fact, this judgement is a big win for the people of India, particularly for the marginalized and underprivileged section of the society who could now use Aadhaar to access any service anytime-anywhere. The Supreme Court decision in Aadhaar case would certainly take us together miles ahead on India's digital voyage with augmented safety that is supported by stronger data protection measures to enhance digital trust of the people with hassle-free empowerment with the use of Aadhaar. With 122 crore people with Aadhaar, India is now all set on its path to a digital revolution that she missed at the time of the industrial revolution as we were not independent then.

Upholding the constitutional validity of Aadhaar - the world's largest unique biometric identity project of India that caters to one-sixth of the population on this planet, 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

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

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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 and has spread a responsibility on the agencies involved in the implementation of schemes to ensure that no deserving beneficiary -whether senior citizens, people engaged in manual labour or belonging to underprivileged sections of society- is denied of any benefit or service for lack of Aadhaar or due to any technical glitches.

Aadhaar as empowerment enabler will be, as always, a game changer for the poor and for India. 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 like PDS, MGNREGS, PAHAL, Scholarships, etc., 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!

Aadhaar is the first and biggest public owned world's largest biometric technology platform which being constitutionally valid, would now not only empower 122 crore people with biometric based unique identity but 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 is also emerging as a great enabler of alternate digital payment system for those who cannot use debit, credit card, internet banking, etc. 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 doorsteps. Otherwise, these people earlier had to walk miles to withdraw their money from a brick and mortar bank branch. There are more than 7 crore people using AePS facility every month.

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 just by their Aadhaar and fingerprint through AePS enabled micro-ATMs.

Further, 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.

No one can deny the fact that Aadhaar has proven to be a powerful, safe and secure digital platform to establish unflinching identity of a person created on three basic doctrines of minimal information, optimal ignorance and federated database and is free from the traits of caste, colour, creed, race, profiling, etc.

It is a matter of pride for every Indian that we have been able to create such a mammoth and technologically sophisticated and safe identity platform in-house on our own strength. 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. □

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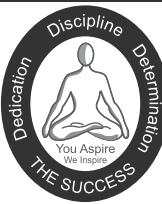
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Secure Digital India



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

As India heads towards becoming a trillion dollar digital economy, it becomes imperative to take a look at the different dimensions which have been spawned by digitization, their implications for the country and its citizens, the associated concerns that emanate from this phenomenon and most importantly, the efforts that are essential to making the ecosystem safe and secure. The transformation from the physical to digital is conspicuous in several realms. Be it the way we interface with each other or the way public services get administered or how financial transactions get effected, digital seems to be the way to go for government, businesses and the general public. India and its citizens are now truly plugged into the global 'Digital Village', and actually shaping the contours of democratization of

technology, and harnessing digital for Inclusion.

Some of the key indicators of digitalization - internet penetration, availability of smart phones, government services online, and a relatively new addition to this list- 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 footprint. We also boast of a robust Central Identity System that is facilitating inclusion, targeted public services delivery and platform that is supporting both G2C and B2C services. Let's not forget the endeavour to transform our urban centres by lending them smart infrastructure, smart systems and Pan-city ICT systems. Smart cities, once created successfully, will be digitization in true sense as they will not only optimize utilization of



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resources but also step up the standard of living of its citizens.

Digitization has also to do with paving the way for automation and creation of next generation factories, industries, supply chains, products and services. A three-pronged approach of, opportunities, capabilities and risks, might help put things in perspective. 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. Through its use of smart, autonomous technologies, Industry 4.0 strives to converge the digital world with physical to drive smart factories and enable advanced manufacturing. Organizations are also proactively leveraging Artificial Intelligence, Machine Learning & Deep Learning (under the bigger umbrella of Cognitive Computing) to disrupt the way the businesses are run and solutions are developed to meet the expectations of consumers. The limitless potential of algorithms is being realized by the mega corporates and also by the vibrant start-up ecosystem.

Concerns of Digital Space

The path to digitization is resulting in massive volumes of data getting digitized and infrastructure and applications becoming exposed to internet and inter-connected to each other, which, apart from opening new and better avenues, also engenders

the cyber security risk. 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. And let us be absolutely unequivocal about the fact that it is not just the BFSI (Banking & Financial Services industry) and the CII (Critical Information Infrastructure) sectors that are bearing the brunt. Across the board industry sectors are encountering these vicious cyber-attacks. 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.

With the recent cyber breaches across the world, there cannot be a clearer message for us to beef up our cyber security preparedness by a more orchestrated and well-coordinated action plan by Government, Industry and end users. Government-Industry Partnership within India, and collaboration with Global Stakeholders is an imminent priority to address the Cyber Challenge.

Changing Paradigm of Cyber Security

The demands from the digitization ecosystem are ever increasing. With it, the strategy to secure cyber space continues to evolve rapidly and propelling innovation in the realm of cyber security capability development. 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 (VII) Converging Security Disciplines. These elements and many



more are expected to be the driving force of the cyber security landscape in the era of ‘Digital India’.

In the age of digitization, organizations are focussing on building resilient systems which can with-stand attacks and replace disaster recovery as a concept. Organizations are building skills and capabilities in the age of digitization for threat hunting operations. National Security Agencies are building deep capabilities towards a more holistic threat intelligence, mitigation, and deterrence.

Addressing Cyber Security Concerns

The Cyber Security challenge we face needs serious attention of all stakeholders, especially Industry and Government. The two, along with other key entities including Sectoral Regulators and National Cyber Security machinery need to partner and devise institutional arrangements to respond to challenges and enable better preparedness to withstand/ counter attacks. Some of the measures are discussed below:

Policy and regulatory response to drive sectors and entities to Cyber Security Preparedness. The Cyber Security Frameworks by RBI, IRDAI for Banking and Insurance Sectors, Cyber Security Framework for Smart Cities by MoHUA are steps in this direction. But we need strong enforcement of these frameworks and similar focus in other sectors of Critical Infrastructure including Healthcare.

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. Beefing up capability of Law enforcement, Judiciary to bring cyber criminals to justice, and forge necessary government to government and bilateral, mulit-lateral collaborations for speedy investigations and concerted international effort.

Cyber Security Preparedness in India including large enterprises, SMBs and PSUs needs to be stepped up. Micro and small enterprises are rapidly going online, and face a severe cyber risk. In Digital India, citizen is the centre of this digital momentum. Digital Literacy and Cyber Security Awareness and adopting safe and secure practices online, and in their digital payment transactions is a key priority for India. As India is going on the fast lane of harnessing emerging digital technologies to accelerate its economy, attention to and angle investments in cyber security, both from a Technology and Institutional, manpower capabilities is now a national priority, probably as paramount as Military and para-Military forces.

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

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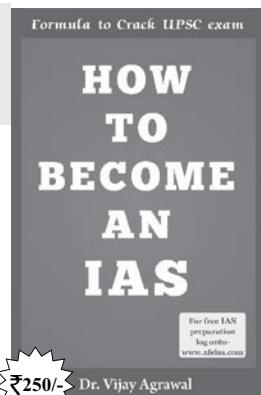
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Transformative Impact of Digital India

Simmi Chaudhary



India is at a tipping point where robust foundation of Digital India and increased access to information and services are enabling India to optimally harness digital technologies in the core economic and social sectors, leading to \$ 1 trillion Digital Economy while sustaining 55-60 million jobs by 2025

The story of India's Digital journey has been one of transformation and inclusion. The 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. Technology has been intrinsic in this transformative evolution by enhancing transparency, inclusion, productivity and efficiency.

The initiatives under Digital India, coupled with evolving technology, have led India to become a land of vast possibilities, where hope and talent meet opportunities digitally. India is among the top countries of the world that have effectively utilised technology and innovation to transform the governance outlook from government-centric to citizen-centric, where e-services are targeted towards creation of an environment of empowering citizens through participative governance, and engaging them in decision-making and formulation of government policies, programmes, regulations, etc. The remarkable increase in digital adoption 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 utilising 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 is in a sharply accelerating "lift-off" phase of its digital journey. Having built a strong foundation of digital infrastructure and expanded digital access, India is now poised for the next phase of growth—the creation of tremendous economic value and the empowerment of millions of Indians as new digital applications permeate sector after sector.

The citizens of the country have been given a Digital Identity through Aadhaar and more than 122 crore residents have already been covered. They have been given a government issued ID card which can be authenticated anytime anywhere. This has been a source of relief to the economically poor segment of the society while accessing services across national geography. Aadhaar has been seeded with several databases like Liquid Petroleum Gas (LPG), Public Distribution System (PDS), National Social Assistance Programme (NSAP) etc. to enable correct identification of the beneficiary and ensure that the benefits reach the beneficiary promptly

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Direct Benefit Transfer- A game changer

and directly. Thereby, Aadhaar has direct value in creation of digital infrastructure through which social and financial inclusion is ensured.

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 transactions 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. Now, DBT is using the digital payment technology to transfer the benefits/subsidies directly to the accounts of people. The transfer is instantaneous and the correct amount

reaches the beneficiaries. So far, Rs. 5.06 lakh crore direct benefit transfers have taken place and this has led to the savings of around Rs. 90,000 crore. Around 434 schemes are covered under DBT.

Digital Developing Service

Digital India has changed the landscape of delivery of service and governance. The Common Services Centres (CSCs) are ICT enabled rural enterprises in the country and provide plethora of services at the doorsteps of the citizens. Over 300 services, ranging from Education, Health, Agriculture, Certificate related are being provided in around 3.07 lakh CSCs. They have also become a major employer of rural youth through village level entrepreneurship leading

towards an empowered and a digitally inclusive society, thus, bridging the digital divide.

Digital transformation is an ongoing process to engage, enable, empower and sustain people on their digital journeys. Towards this, DigiLocker has enabled people to store, share and verify their documents and certificates through cloud. Since the documents are electronically signed and shared from issuing authority, no attested or original copies are required to be produced. Now, a user can share her educational certificate with a potential employer at the click of the button. With more than 1.59 crore registered users and 2.14 crore uploaded documents, this has offered an unlimited digital space free of cost to the citizens.

National Scholarship Portal has become a source of facilitating education. It is a one-stop solution that ensures students to access various services starting from student application, application receipt, processing, sanction and disbursal of various scholarships with ease. It has comprehensive coverage of schemes and departments. Since its launch in 2015, more than Rs. 5,257 crore have been disbursed to 1.8 crore students/beneficiaries.

Online Registration System (ORS) and e-Hospital have facilitated Aadhaar based online registration and appointment for patients, reduced tiring queues in hospitals





for appointments and enabled health information management system. 318 hospitals across India have been enabled with eHospital facility and 5.6 crore hospital transactions have been done.

Jeevan Pramaan, provides the ease to pensioners to generate their Digital Life Certificate at home, bank, CSC centre, government office etc, using Aadhaar biometric authentication. Now, the physical presence of the pensioner at the government office is not needed for generation of her life certificate and availing the entitled services. So far, around 1.75 crore Digital life Certificates have been generated.

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 finger tips of the citizens of India. It is a single mobile app that offers more than 307 government services,

with the target being to provide more than 1200 digital services on a single mobile app. It has reduced the drudgery of searching for relevant Government app for availing the services. More than 8.4 million users have downloaded this app since its launch in November 2017.

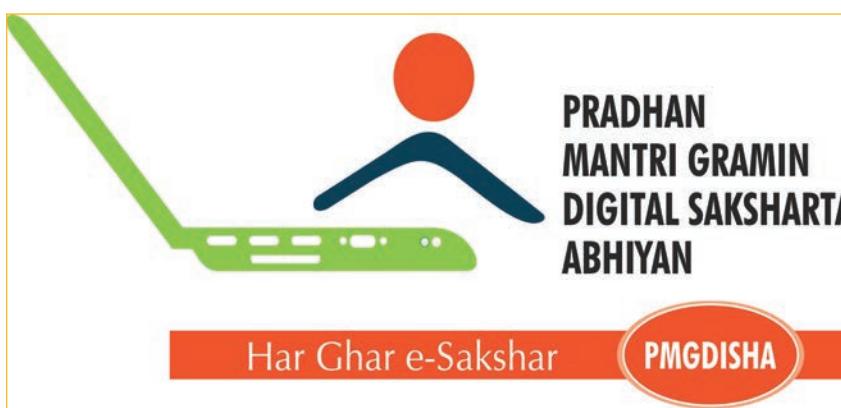
Government e-Marketplace (GeM)

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 decentralised nature. To address the challenges in public procurements, Government e-Marketplace (GeM) was launched. GeM provides an online marketplace for public procurement for both

goods and services. It has made lives of sellers to Government extremely simple by eliminating physical meeting of Government Buyers and brought transparency. There are 1.55 lakh sellers and service providers, 29,729 buyers organizations and 5.97 lakh products on the platform. The growth of buyers and sellers on GeM is indicative of its use and ease of selling on the portal.

Job Creation

In order to sustain a decent standard of living, employment is fundamental. In this direction, the Government of India has taken significant initiatives in the area of Electronics Manufacturing, BPO Promotion, IT-ITeS etc. Indian startups are already developing to take advantage of the humungous potential created through this transformation – more than 1,200 startups came up in 2018, including eight unicorns, taking the total number to 7,200 startups. Mobile manufacturing has increased multi-fold, from 2 units in 2014 to 127 units manufacturing mobile handset and components. This has generated 4.5 lakh direct and indirect jobs. Greenfield Electronic Manufacturing Clusters (EMC), approved for 20 locations and 23 Common Facility Centres (CFC), are poised to create approx 6.5 lakh jobs. The BPOs have reached the small towns of the country covering around 100 cities across 20 States and 2 UTs. These are creating jobs



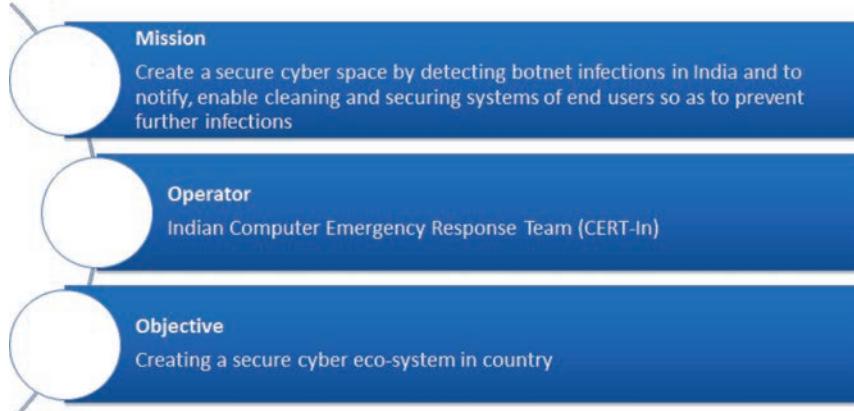
in these small cities and bringing the benefits of IT industry to youth of small towns and cities.

To keep up the accelerated pace of the digital disruption and the ever changing digital economy, the skill set of the people also have to be continuously improved and enhanced for adaptation. Hence the quest to promote digital literacy and future skilling is of utmost importance. Pradhan Mantri Gramin Saksharta Abhiyan (PMGDISHA) aims to make 6 crore people digitally literate. Over, 1.23 crore people have been imparted training.

The sustainability of the digital economy rests upon its resilience and security. The Cyber Swachhta 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 real-time. This aims to create an inclusive, safe and secure cyber space for people.

Information Technology (IT) is not just a vertical anymore and is now part of every domain. The new and emerging technologies are significantly disrupting and changing the processes

Cyber Swachhta Kendra



in critical sectors like agriculture, education, health etc. Deployment of these technologies has a potential to create immense value and change the dynamics and delivery models for these sectors. With the proliferation of emerging technologies in mind, 20 Centres of Excellence (CoEs) are being planned in the areas of Fintech, IoT in Agriculture, Virtual reality, Blockchain, Medical Technology, Electronics Products, Nanoelectronics etc. This will provide an apt platform for research and innovation boosting the growth of startups.

India is at a tipping point where robust foundation of Digital India

and increased access to information and services are enabling India to optimally harness digital technologies in the core economic and social sectors, leading to \$ 1 trillion Digital Economy while sustaining 55-60 million jobs by 2025. About \$390-500 billion of this \$1 trillion economic value would come from digital applications in sectors like agriculture, health, education. All these would together lead to the New India not just for economic transformation but for social transformation as well, by focusing on inclusion, empowerment and bridging of digital divide. □

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'Global IT Challenge for Youth with Disabilities 2018'

A three day event-the "Global IT Challenge for Youth with Disabilities, 2018" was organised 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.

This year 96 youth with disabilities (visual disability, hearing disability, locomotor disability and intellectual disability/developmental disorder) from 18 countries namely, India, Indonesia, China, Vietnam, Malaysia, Thailand, Sri Lanka, Bangladesh, Nepal, Mongolia, Cambodia, Laos, Philippines, Korea, Kazakhstan, Kyrgyzstan, UK and UAE participated in the Challenge. The event comprised of 55 awards in various categories including awards for best volunteer and three awards namely, "Best, Excellent and Good" in individual and group events in each category i.e. visual, hearing, physical and developmental/intellectual disability.

Thailand won maximum i.e. six awards followed by Philippines with five awards. India bagged three awards including Super Challenger awards. Shri Manjot Singh from India won two awards in e-tool challenge and e-life map challenge under visual disability category where as Shri Saurav Kumar Sinha from India won the Super Challenger award. Ms. Fayza Putri, Adila from Indonesia won the 'Global IT Leader Award'.

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. India had nominated twelve youth with disabilities to participate in the event. These youth with disabilities had been selected on the basis of the National IT Challenge conducted by the Ministry through NIT, Kurukshetra in June, 2018. India has been participating in the event since 2013 and has been winning awards ever since. Last year the event was held in Vietnam.

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<ul style="list-style-type: none">* Earth Motions* Origin of Earth, Solar System* Crustal Deformation,* Plate Boundaries* Atmosphere and Temperature,* Atmosphere Circulation& Moisture,* World Climate,* Ocean, Coastal Landforms* Mountains, Plateaus* Erosion Processes* Upper air winds* Salinity* Tides , Ocean Currents* World Regional Geo.* Indian Physical Geo.* Indian Climate	<ul style="list-style-type: none">* Fundamental of Environment* Fundamentals of Ecology* Terrestrial Biomes* World vegetation and Soil types* Aquatic Biomes* Indian Biomes* Indian Soil and Vegetation* Bio-geographical provinces of India* Global concerns/Convention on Biodiversity* Indian protected area network* Conditions of Indian Environment* Causes of climate change* Global and Indian strategies to combat climate change + REDD* World Biodiversity Congress	<ul style="list-style-type: none">* Fundamental of Human geography* Demographic aspects of World* Demographic aspects of India* Ethnic characteristics World & India* Agriculture development* Mineral resources distribution* Mineral Policy /Power Sectors* Major transport network* Communication technology* Human Development* World Development report* Economic Survey - 2017-18* Indian Budget (General Outlook)* Social Sectors Programme* Hunger Index* Central Public Sector Enterprises

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Digital India - At the Heart of Poorna Swaraj

Lalitesh Katragadda

The promise of freedom and true empowerment at national, organisational and individual level was the intent behind the freedom movement championed by founding fathers like Bhagat Singh and Gandhi. The absence of which was abject poverty, oppression at every level and exploitation of the average Indian in British hands. Gandhi, in his wisdom understood that perfection of freedom is paramount and transcends the need for perfection of governance.

"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 though it may be full of defects. **Good government is no substitute for self-government.**", M K Gandhi, Sep, 1920.

Fortunately, India has understood this spanning parties and administrations. Over the decades, fundamental rights have been established. Systems are in place to empower every individual -to ensure equality and fairness in nutrition, health, education, law and order and right to livelihood via farms, business or MNREGA. But unfortunately, though we have been successful at a massive scale, hundreds of millions still suffer under the yoke of poverty and exploitation.

Digital India providing information equality to everyone is the final realisation of poorna swaraj for every individual. Digital India spans three fundamental blocks - universal broadband, 100 per cent digital services and Open APIs.

Gandhi also observed that poverty is the worst form of violence. In my own

journey of trying to understand India and role of technology in development, I have understood one truth - poverty is very rarely caused by lack of resource or ability. Poverty indeed is oppression deliberately or otherwise caused by asymmetry in information, arbitrage and knowledge. The singular truth is that poverty is, in fact, an information problem.

This information problem, this information asymmetry due to a few malicious actors in spite of the sweat of the toiling masses, good intentions of many of our elected officials and best efforts of our most of our administrative officers - is why we, as a nation, have been unable to overcome. Macro economically, the facts are devastating. According to India's CEC in 2015, it was observed that the PDS was most effective at reaching the poorest and the masses.

In a world where governance (digital India), marketing (online ads), supply chains (digital logistics) and distribution (eCommerce) are all digital, there will no friction in the way of India. This is what modern India will look like when developed

The author is the founder of Indihood, which is a platform engineering information systems. He is also Chief Product Adviser for Avanti Finance, which is a technology-enabled financial inclusion platform, focused on delivering affordable and timely credit to the underserved and unserved segments of India.

Even in the PDS, grains do not reach 25-50 per cent of the poor. Other programs like fertiliser subsidy, electricity and water are far worse.

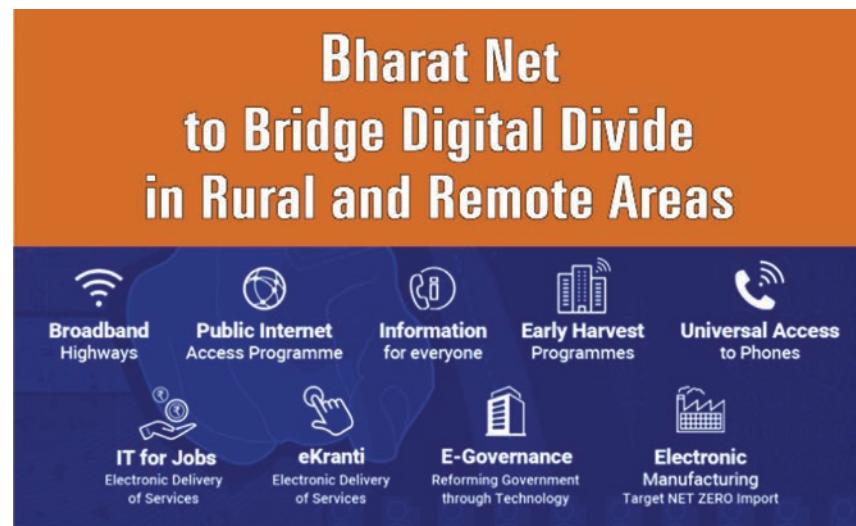
The cause is quite obvious-a country as vast as India requires systems and layers of processes and people responsible for implementation. Typically these chains of responsible actors, both public and private, are 10 to 15 long. Even one bad, malicious actor in this chain disrupts, destroying the good intentions and work of the entire chain. At scale, the entire system is tainted - where, we as a nation, along with our policy makers have lost faith. This is even more damaging as such loss of faith gives rise to stringent controls - bringing to a grinding halt our social programs, infrastructure projects and our businesses to the point where we have lost global competitiveness.

Since Independence, India's share of global trade has barely budged - we account for 2 per cent of global exports, while India's share of global GDP has declined to around 3.1 per cent from the 4 per cent it used to be at independence.

Three Blocks of Digital India

Reversing this trend, 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. The caution is digital India cannot be done piecemeal. 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 ensures that each of our 1.3 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. Aadhar, GSTN, eSign, UPI are all vibrant examples of this approach. Digital India's Open APIs are solely responsible for India's leadership position in the global FinTech revolution underway.

When every citizen, every entrepreneur including farmers and every organisation can access governance directly, digitally and instantly in this manner, India will leap forward from the current 77th in ease of doing business to top 20, where India needs to be to achieve its promise of a top ten economy, not in aggregate but per capita.

Era of Infinite Productivity

India's potential, once we peer beyond our current systemic problems is vast. We are heading into an era of infinite productivity fueled by AI and robotics. Economies will shift from resources, capital and labor constraints to resources, capital and invention constraints. All successful large enterprises will be resource rich, invention rich or both. All others will diminish.

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. I use formal to mean measurable formal jobs with payroll. 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 (or any nation). 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. These enterprises will be staffed by the best and brightest in the world, which Indian higher education produces in numbers. Such enterprises will no longer be \$1 billion unicorns, they will be \$100 billion singularities which even at that size will grow 20-30 per cent CAGR. Singularity enterprise is a winner takes all game, the bigger ones accelerating even faster. India does not have a single such singularity enterprise today and will not have in the current environment. As AI and robotics accelerate, India risks losing its economic strength and its digital sovereignty at an accelerating pace to global singularities. Already, India's



digital deficit spanning electronics and software product revenue is around \$70+ Billion and growing at 25+per cent CAGR. Ring fencing India from global singularities, to make Indian enterprises (both existing and startups) globally competitive is a must. The good news is that Indians are very much capable. Indians already run global singularities. We just need to create a bit of space for them at home.

Singularity Enterprises

However, the number of jobs created by these singularity enterprises will be minuscule-less than 5 per cent of the country will be employed this way at best. I am often asked what the rest of the 95 per cent will then do. I struggled with this for a while and in my humility realised that Gandhi gave us the answer decades back - humble, local, sustainable work. India is not just a country of 1.3 billion. India is also a country of about 160 million small and micro enterprises of which 80 million are known. And for every known micro-enterprise, there is a locally visible but macro-economically invisible home business usually run by a woman. Universal broadband married with ease of access via digital services and Open APIs will unleash India's true power. India will never be a center for factory labor, nor will we ever be a nation of white collar workers. When I first moved back to

India in 2004, I happened to visit a large retailer to find that the checkout clerk could barely operate the machine, was slow in handling customers, looked disinterested and dull - dramatic departure from counterparts in other countries. The same week, happened to visit a local medical store and asked for a silver cream. The fourteen year old who was the owner's son with a bright smile immediately recognised it was for a burn, found the medicine within 15 seconds and suggested what else could help minor burns. He intimately knew each and every one of the hundreds of products I saw in the store. When I inquired how he gets so many products, I realised that unlike the west, the supply chain comes to him. This ran counter to every dogma of

efficiency at scale. I was flabbergasted and realised it's simply not in our culture to follow the herd as evidenced in everything from local politics to our work culture. India is a proud nation of diverse thinkers who thrive when each individual owns their own destiny and acts locally.

These 160 million small and micro-enterprises, if truly empowered, will not just create self-sufficiency for themselves. At scale they will solve two nation scale problems. They will solve the problem of agricultural income by collaborating with farmers to augment farm produce with derivative products, where at least a third of the net value of farm output will vest with the farmer. An illustration with potatoes is important to understand in the digital context. As I write this article, potato is retailing at Rs 27/kg in Delhi. Today, farmers would be happy to get just Rs 6/kg, a margin of ~Rs 1. This will increase by Rs 3/kg or more if supply chains get digitised, quadrupling their income. Even then, they may not move firmly out of poverty into the middle class. What if the farmer and their local neighborhood small business could turn a fraction of these potatoes into derivatives - like hot chips (Rs 100/kg yield in bulk) - and sell via emerging digital commerce platforms - whose logistic networks are just starting to touch rural India but will soon be firmly enmeshed. Both these possibilities - higher fraction of final sale value of



commodities via digital commerce and moving up the value chain of farmers led by local enterprise - will dramatically transform farm income and livelihood, perhaps reversing the trend of systematic abandonment of farms.

In parallel, as 160 million micro businesses start thriving, they will solve the employment problem at a massive, hyperlocal scale. An anecdote is relevant. Years ago, when I was studying value of information to the disaffected as Head of Products of Google India, we ran across this sunar (goldsmith) in Calcutta who had almost run out of business as he was unable to compete with modern jewellery stores and the fad of fake jewellery. For a change of scenery he happened to visit his relative in Delhi and saw this carpenter using the internet to find cool furniture designs. He learnt how to use image search, went back to Calcutta and started offering new found designs to his customers. He was very sharp - had the talent to pick up skills, a good eye for design and able to visualise what his customers needed. In a few months he was selling quite well, including to customers abroad who loved not just his new fusion of classical and modern designs but also his ability to craft bespoke jewellery based on their desires and his ideas. He was soon employing tens of people including other sunars, earning export revenue.

In a single example, I saw India's future. In a world where governance (digital India), marketing (online ads), supply chains (digital logistics) and distribution (eCommerce) are all digital, there will no friction in the way of India. This is what modern India will look like when developed.

A hundred and sixty million entrepreneurs coming on to the internet will be a planetary event. It will impact the planet at a magnitude that the American industrial revolution did. We will leap from 2 per cent of global exports to 20 per cent in a span of two-three decades. All we need to do is ring fence our enterprises, while ensuring broadband and every government service is delivered digitally via Open APIs reaching each Indian. The elite in India do not need to solve poverty. The average Indian as always and in everything, will do even this for themselves, if we just open the gate for them a little. It is possible.

Saare Jehan Se Accha - Ek Peedhi Mein

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(E-mail:lalitesh@gmail.com)

Cooperation on Digital Communications and Economy discussed between India and European Commission.

The Minister of State for Communications (Independent Charge) Government of India and the H.E. Mr Andrus Ansip, European Commissioner for Digital Single Market and Vice President of the European Commission met in New Delhi to discuss cooperation on Digital communications, Digital economy and society. Both sides noted the importance of supporting global standards and welcomed the close technical cooperation between the Indian and European Telecom Standardization Development Organizations - TSDSI (India) and ETSI (European Union).

India and the EU will work together to develop joint plans of action in the agreed areas of cooperation such as-future networks and emerging technologies, including 5G,IoT/M2Metc.,promotingR&D and innovation, network security, spectrum management, enhanced capacity development as well as policy and regulatory requirements among others.

EU expressed interest in strengthening cooperation in the area of testing and certification by supporting the visit of Indian Government experts to the European testing and certification laboratories for telecom equipment, with a view to exploring the possibility of India recognizing EU certifications. EU side also discussed about basic custom duties on some ICT products.

The India-EU co-operation dialogue on Digital Communications will take place annually through appropriate mechanism within the existing framework of the India-EU Joint Working Group on ICTs which was set up in 2011.Both sides agreed to hold the next India-EU dialogue on cooperation in the field of Digital Communications in the first half of 2019.

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YE-802/2018

Electronic Manufacturing: Scope and Future in India

Pankaj Mohindroo



It is imperative that promotion of electronics manufacturing eco-system must be given the highest thrust area and the Government must undertake all possible measures to help establish this sector on a prioritized manner

Electronics Industry is one of the largest and fastest growing industries in the world. It is finding increasing applications in almost all sectors of the economy. The demand for electronics hardware products has been growing at a rapid pace in India which is driven majorly due to increase in demand for mobile handsets and smart phones amongst other consumer electronics, IT hardware products etc. 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. Needless to mention, the Government of India attaches high priority to promote electronics manufacturing in the country under the “Make in India” and “Digital India” flagship programs.

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. Mobile handset and its components manufacturing eco-system is undoubtedly considered to be the Champion product category under the “Make in India” flagship program of the Government.

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. This is considered to be a major achievement for the industry and the Government despite the fact that during 2014-15 handset production dwindled to 58 million units valued at Rs. 18900 crs. after closure of the Nokia plant.

Production of handsets has since been growing at a rapid pace year-on-year and there has been a corresponding reduction of imported handsets which has reached 60 mn units (215 mn – 2014) and Rs. 30000 crs. (Rs. 58550 crs.) during 2017-18

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. Mobile handset and its components manufacturing eco-system is undoubtedly considered to be the Champion product category under the “Make in India” flagship program of the Government.

The author is Chairman, India Cellular & Electronics Association, New Delhi.

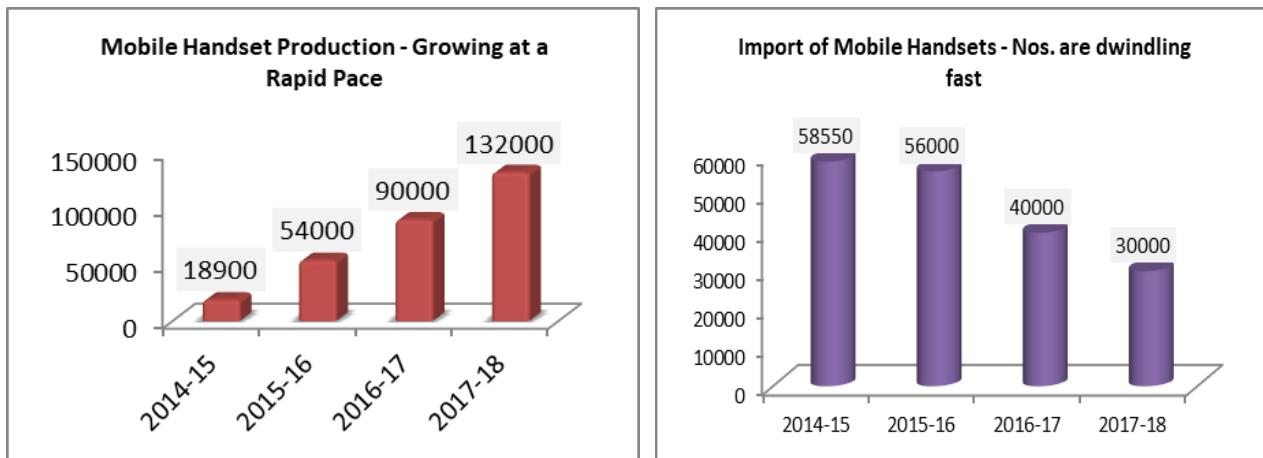


Figure 1-Mobile Handset Production and Import Data (Figures in Rs. Crs.)

by volume and value respectively. This is a shining success story scripted under the “Make in India” flagship program of the Government.

Apart from the resurgent growth witnessed in mobile handset manufacturing, 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

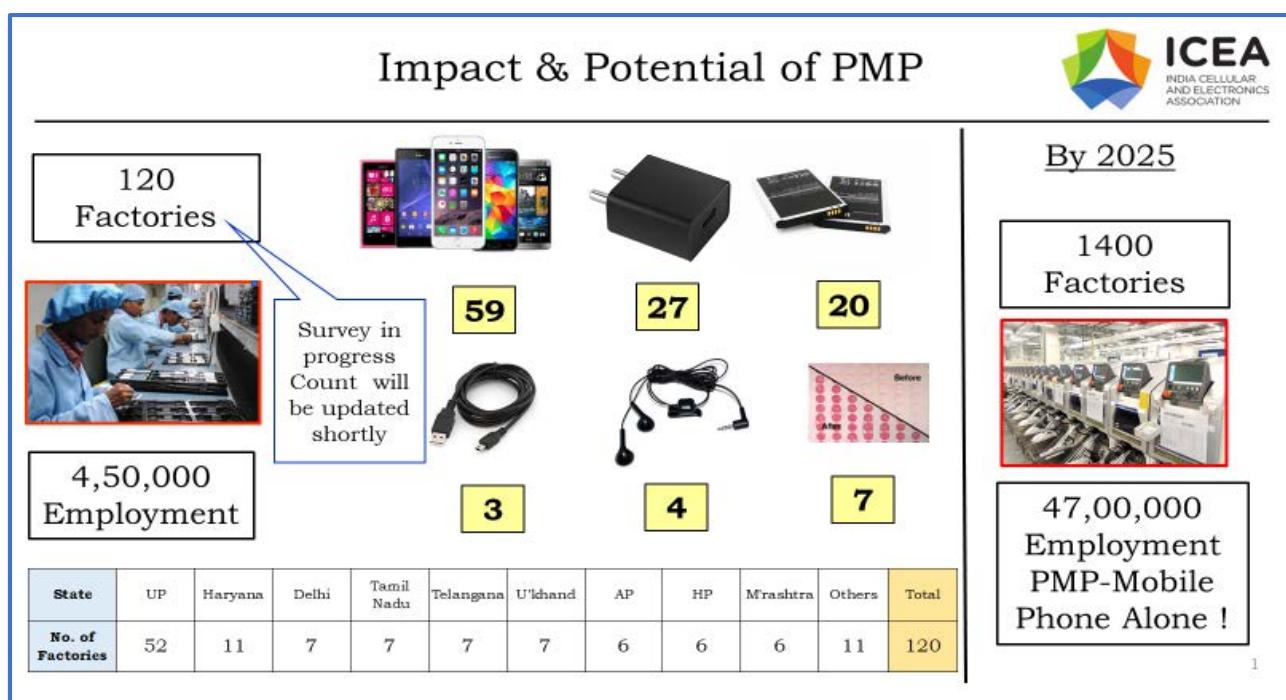
the components manufacturing eco-system in the country with a major focus to enhance value addition and generate significant employment.

Fig-1. represents the no. of new factories which have been established in various states component wise during the past 3-4 years. As per ICEA estimates, PMP alone does have the potential to create 47 lakh jobs through establishment of 1400 factories in the mobile components space alone.

Some of the stalwart policy

interventions undertaken by the Government of India during the past 3-4 years under the “Make in India” initiative to encourage and promote electronics manufacturing eco-system in India with a major focus on mobile handsets and its components eco-system are as per the following –

- Robust differential duty structure which was made applicable on mobile handsets vide Budget 2015 encouraging domestic manufacture of handsets vis-à-vis imports of handsets.



India – The Global Manufacturing HUB By 2027	
Mobile Handsets' Eco-system - 2027	Electronics Manufacturing-2027
• Handsets production-1.2 billion units	• Achieve 40 % global market share = US\$ 1.1 Trillion
• US \$ 230 billion (2017-18 - US\$ 21 billion)	• 40% value addition worth US \$400 Bil
• Components manufacturing-PMP2-\$210Billion	
• Export – 800 million handsets US \$150 billion	
• Total Employment –	
• 5.60 million-Direct	
• 10.0 million-Indirect	

The duty benefit available to domestic manufacturers was also maintained during switch over to GST through suitable BCD imposition route

- Notifying and subsequent phased implementation of the Phased Manufacturing
- Program (PMP) to encourage indigenisation of components of handsets.
- Extension of the last date for applicability of investments under M-SIPS extending up to 31st December 2018
- Draft National Policy on Electronics 2018 currently under consultation process
- Effective outreach initiatives jointly undertaken by Government of India (MeitY, DIPP etc.) 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 (FTTF) by the

Ministry of Electronics and IT (MeitY) to “re-establish and catalyse significant growth in mobile handset and components manufacturing eco-system in India”

As per the vision propounded by the India Cellular & Electronics Association (ICEA) (the apex industry body representing the entire electronics sector), which is further elucidated in the just published report “Making India the global manufacturing Powerhouse for mobile handsets and components” jointly undertaken by ICEA and McKinsey, clearly highlights about a Mega opportunity/ potential which India can galvanize to become a global manufacturing powerhouse for mobile handset eco-system and electronics overall during the next decade.

It is imperative that promotion of electronics manufacturing eco-system must be given the highest thrust area and the Government must undertake all possible measures to help establish this sector on a prioritized manner. Considering the tremendous potential that this sector holds in terms of significant employment generation, ability to transform

socio-economic identity of citizens, contributions in the upliftment of the economy, value addition, forex savings etc., all regulatory framework/ incentivization policies to be adopted and implemented for future must be suitably calibrated to be export focussed.

It has clearly been an established fact that no giant manufacturing eco-system has ever been able to be established unless focus of the manufacturing intent is displaced from being completely domestic market focussed to export oriented outlook. Undoubtedly, perceived opportunities from the global market is far bigger and greater than the captive domestic market requirements.

Riding on successes already achieved in the mobile handset manufacturing eco-system, the Government of India is very keen to replicate similar success stories in the entire electronics vertical with a special focus on developing manufacturing eco-system in medical electronics, automotive electronics, defence electronics, consumer electronics, emerging technologies such as IoT, sensors, agricultural electronics etc. □

(E-mail:bijesh@icea.org.in)

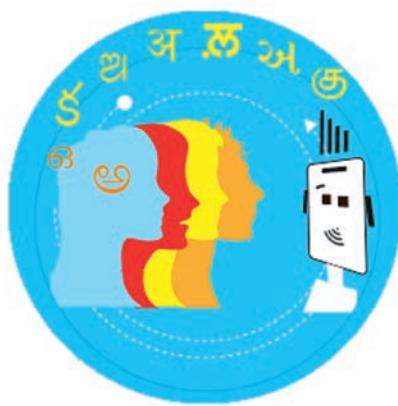


YOJANA

Forthcoming Issue

INNOVATION

Technology Areas for Indian Languages



The conditions are most conducive for the use and proliferation of language technology for Indian languages. There are a large number of users with digital devices (smart phones etc.), who wish to get information in their own languages as they do not know English. There is a large amount of content in English but not in Indian languages. Hence, there is a large unserved need!

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 where it can make a mass impact on various aspects of language use. Indian language 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 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.

Technology Areas

Here are the Indian language technology areas and example tasks in each of them.

1. Localization
 - Availability of Indian language support on all electronic devices
 - Use of standards

2. Creating e-content in Indian languages
 - Creating by original writing
 - Creating through translation
3. Automatic machine translation
 - English to/from Indian languages (ILs)
 - Among Indian languages
4. Cross language access to content
 - Cross lingual search (information retrieval) across Indian languages as well as English
5. Speech processing
 - Text-to-speech (TTS) for ILs (e.g., machine reading out text in a language)
 - Speech-to-text (ASR) for ILs (e.g., interacting with computers through telephone)
6. Optical character recognition
 - Optical character recognition (OCR) for ILs (e.g., converting scanned images of pages to text)
 - Online handwriting recognition (OHWR) for ILs (e.g., stylus based input to mobile devices)

Status and Prospects of Technology Areas

Each of the above technology

There is an acute need to create e-content in Indian languages. While e-content is not a replacement for books, the young generation has started placing increasing reliance on the content available over the internet.

- areas are described below with respect to the following aspects:
- What the technology area is about (e.g., applications of the technology, what it can do, etc.)
 - Current status of technology for Indian languages
 - What can be achieved in the foreseeable future for Indian languages

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. Moreover, the customer should be able to add any other Indian language later on demand, without having to change the handset.

Use of standards is most important. This ensures that the data created on one device is usable (displayable, editable, processable, etc.) on any other electronic device.

For example, if one sends a message created on one device to a user on another device, it should be displayable on it. This would happen only if the standards are used. Prime among them is the use of Unicode, for representation across devices, and the standard input (e.g., keyboard) so that the user does not have to learn a new method (e.g., keyboard layout) every time he uses a different electronic device.

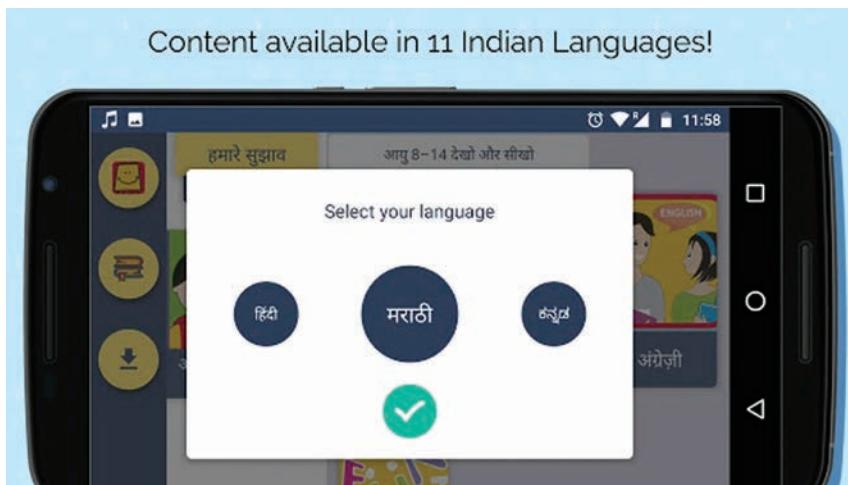


content in German on the internet. Through a national effort, a large amount of German content was put on the internet, and the young generation switched back to German content. In India, where a large number of people know an Indian language but not English, it is even more important to create large amount of e-content in all Indian languages.

e-Content in ILs can be created rapidly, in the short term, through translation of English content; but in the long term, it should be created originally in the Indian languages.

Impact of Audio Digital Library

- Availability of information in spoken language form for illiterate and others
- Promotes research in speech technology for Indian languages
- Enable to develop speech technology products useful for common man
- Examples:
 - Speech-speech translation systems
 - For information exchange
 - Screen readers,
 - For illiterate and physically challenged
 - Naturally speaking dialog systems
 - For information access over voice mode



Translation among Indian languages can be used to generate content in all the Indian languages. Translations across ILs can be effective in conveying the original meaning and would also be suitable to the Indian context.

Automatic Machine Translation (MT)

Automatic machine translation (MT) 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.

Translation from English to/from Indian languages has lower quality, as expected, because English is linguistically distant from Indian languages. Machine translation among Indian languages, on the other hand, has much better quality.

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. Good quality translation can be produced by human post-editing of the output (or pre-editing of the input) text.

MT systems for Indian languages are available and produce good quality

translation. They compare favourably with similar systems across European languages, for example. However, effort needs to be put in deploying them and making them available to users, both general users as well as publication houses. Deployment of systems for the language pairs which are ready, can take place within a year.

MT systems are available for about a dozen Indian languages, and need to be developed for all 22 scheduled Indian languages. Technology framework is

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. Here, it would be that the content is getting created for Indian languages, because large amount of content might not be available in all Indian languages initially.

fully developed and a new language pair can be added easily and rapidly, in a matter of 2 years. The task of addition of new pairs can, of course, be done in parallel.

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. Here, it would be that the content is getting created for Indian languages, because large amount of content might not be available in all Indian languages initially.

Technology is available for this task across half a dozen ILs. However, indexing of content in the languages (crawling) needs to be done. More languages also need to be added.

Speech Processing

There are two parts to this technology:

- Text-to-speech (TTS), and
- Speech-to-text (ASR) systems

The former technology allows a computer to "read out" a given text file in an IL. The latter allows the computer to "listen" to the spoken language and convert it into a text file.

TTS can be used to allow a text file to be accessed by a blind person or an illiterate person. It can also allow interaction over the telephone, where the text cannot be seen by the user. TTS is a mature technology and is available for more than a dozen ILs.

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. For example, the user might want to know some information over the telephone, and the computer would have to understand the spoken command, and provide the requisite information.

ASR systems are available in half a dozen ILs in the laboratory, but are not yet mature. Research needs to be undertaken to advance the accuracy and performance, particularly for restricted task domains.

Optical Character Recognition (OCR)

There are two technology areas under this head:

- Optical character recognition (OCR), and
- Online hand writing recognition (OHWR)

OCR 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.

This technology for Indian languages for about a dozen ILs is available as a field prototype. It needs to be converted into a product and provided to digital libraries which hold scanned collection of IL books, such as, Digital Library of India of Ministry of Information Technology.

OHWR is important for stylus based input for mobile devices. As mobile devices proliferate, stylus based input rather than keyboard is likely to become more important.

However, it needs to be converted into products. OCR should be taken up first, in view of the immediate need.

Conclusion

The conditions are most conducive for the use and proliferation of language technology for Indian languages. There are a large number of users with digital devices (smart phones etc.), who wish to get information in their own languages as they do not know English. There is a large amount of content in English but not in Indian languages. Hence, there is a large unserved need!

Several things need to be done. For example, the Indian language technology should immediately be deployed to translate all central government web sites into 22 Indian languages. This will generate a demand (and will not just remain the unserved need of a non-paying population), 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 the 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. □

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DO YOU KNOW?

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' which is aimed at transforming India into a digitally empowered society and knowledge economy. 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.

As we know, many applications or forms submitted by a citizen require physical signature of the citizen. A digital signature takes the concept of traditional paper-based signing and turns it into an 'electronic fingerprint'. This 'fingerprint' or coded message, is unique to both the document and the signer and binds them together. Some of the salient features of digital signature are non-repudiation, integrity and authenticity. The Information Technology Act 2000 provides the required legal sanctity to digital signatures. As per Section 18 of the Act, the digital signatures are accepted at par with handwritten signatures and the electronic documents that have been digitally signed are treated at par with paper documents. In short, a digital signature has the same function as that of a handwritten signature.

Earlier, methods of obtaining Digital Signature Certificates and e-signing document were cumbersome. To make it easy and user friendly, in January 2015, the government announced a method that facilitates Certifying Authority to offer e-Sign service to citizens who have Aadhaar ID.

Now, an eSign can be integrated with service delivery applications via an open API (Application Programme Interface). This facilitates an Aadhaar number card holder to digitally sign a document. Citizens with Aadhaar ID will be able to upload their documents to eSign service to obtain them digitally signed. The user is provided with the digitally signed document and the Digital Signature Certificate. In this process two major challenges were, authentication of the user and trusted method of signing. Aadhaar based authentication is carried out to address the first challenge and Public Key Infrastructure (PKI) is used to securely sign the user document and establish the trust.

Benefits of e-Sign Service

1. Secure online service

eSign services are offered by trusted third party service provider, like Certifying Authorities (CA) licensed as per the IT Act under the Controller of Certifying Authorities (CCA). C-DAC plays the role of CA and has placed necessary security measures to ensure security of the whole signing process.

2. No Physical verification required

Unlike the case of traditional CA that requires verification process by a personal visit which cause inconvenience, eSign provides ease of service on-line based on Aadhaar based e-Authentication.

3. No need of Hardware tokens

eSign is an online service and with this, traditional hardware-tokens are not required anymore.

4. Multiple ways to authenticate

eSign service provides authentication based on multiple ways such as One-Time-Password (OTP, received through registered mobile in Aadhaar database) or Biometric (fingerprint or iris-scan). Presently enabled for OTP based authentication.

5. Privacy is preserved

eSign service ensures the privacy of the signer by just requiring the hash of the document instead of the complete document.

The IT Act also provides for the Controller of Certifying Authorities (CCA) to license and regulate the working of Certifying Authorities. The Certifying Authorities (CAs) issue digital signature certificates for electronic authentication of users.





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REPORT ON THE VISION DOCUMENT FOR DIGITAL NORTH EAST 2022

The Government of India accords the highest priority towards the sustainable development of the country's North Eastern Region that stands apart with its rich and distinct cultural heritage and strategic position. **Digital North East** is envisioned as an integral part of the Digital India programme, which would help in leveraging the power of Information Technology to leapfrog the overall development of the region and realize its full potential. Taking this forward, the '**Vision Document for 'Digital North East 2022'**' was released by, Hon'ble Minister of Electronics and Information Technology, Government of India on 11th August, 2018 at Guwahati, Assam.

The Vision Statement for Digital North East India 2022 is, "*Leverage digital technologies to transform lives of people of the North East India, enhance ease of living and ensure inclusive and sustainable growth*". The Mission Statement focuses on fast track implementation of Digital India Initiatives in the North Eastern Region through optimum utilisation of ICT, bountiful natural resources and vibrant human resource.

The Vision Document provides a roadmap for bringing about a Digital transformation of the North Eastern Region through an accelerated implementation of the various initiatives under the Digital India programme of the Government. The Document identifies eight digital thrust areas namely; Digital infrastructure, Digital services, Digital empowerment, Promotion of Electronic manufacturing, Promotion of IT and ITeS including BPOs, Digital payments, Innovation and Startups and Cyber security for realisation of Digital North East 2022.

The major objectives of the Vision Document for Digital North East 2022 include high speed broadband connectivity to all Gram Panchayats, mobile connectivity to uncovered villages of NER, creation of Cloud Hub with Disaster Recovery Centre, expansion of Common Services Centres, provide better access to quality health, education and agricultural services through digital technology, promote local tourism, art and culture, handicrafts, handloom, establish Start-up Hub in NER, promote entrepreneurship and employment opportunities in Electronics manufacturing, BPO, IT-ITeS industry etc.

Specific strategies and initiatives required to be undertaken in each thrust area have also been identified, so as to extend the benefits of the digital transformation to the people of the region in an inclusive and affordable manner. State-wise roadmaps for implementing digital initiatives in the North East States have been prepared.

The Vision Document has been formulated with the collaboration of various Central Ministries specially, Ministry for Development of North Eastern Region (DoNER) and Department of Telecommunication (DoT). Wide consultations were also done with State Governments of North Eastern Region to identify the strengths and opportunities in North East.

The Vision Document for Digital North East 2022 will not only enhance the growth and development of the North eastern Region but will also fulfill the goals of Digital India and will accelerate progress towards a Trillion Dollar Digital Economy.



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Digital Library in India - A Paradigm Shift

Ajit Mondal

Digital libraries provide an effective means to distribute learning resources to students and other users. Rapid advances in information technologies have revolutionized the role of libraries. Libraries are redesigning services and information products to add value to their services and to satisfy the changing information needs of the user community

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. Ultimately, Digital technology, Internet connectivity and physical content can be dovetailed resulting in Digital Library. In India, a number of digital library initiatives and digitization programmes have

been initiated across the country. Most of the digital library initiatives are government funded.

Concept of Digital Library

A number of initiatives are being taken-up in India towards digitization. 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. Though a few libraries have made attempts earlier in this direction, the digital library initiative in India is still at a budding stage.

Digital Libraries have the ability to enhance access to information and knowledge. They also bridge barriers

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of time and space. Digital library is a library in which collections are stored in digital format (as opposed to print, microform, or other media) and accessible by computers. The content may be stored locally, or accessed remotely.

Digitization of Libraries – Few Initiatives

Digital Library of India (DLI) is a digital collection of freely accessible rare books collected from various

libraries in India. DLI project started in early 2000 with the vision to archive all the significant literary, artistic and scientific works of mankind and to preserve digitally and make them available freely for every one over Internet for education, study, appreciation and for future generations. As a first step in realizing this vision, it was proposed to create the Digital Library with a free-to-read, searchable collection of one million books, predominantly in Indian languages. 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. Digital Library of India has currently 550,603 books with 191,677,823 pages (191.657 Million approx.) in Portable Document Format (PDF). This project is funded by the Department of Electronics and Information Technology (DEITY), Ministry of Communication and Information

The screenshot shows the homepage of the National Digital Library of India (NDLI). At the top, there are navigation links for 'Browse' and 'Search'. A search bar contains the placeholder 'Enter your search key...' with a dropdown menu set to 'English'. To the right of the search bar are buttons for 'Language' and 'Log In'. Below the header, the NDLI logo is displayed, followed by the text 'National Digital Library of India'. A central banner features a green geometric pattern and a cartoon illustration of a student in graduation attire. The text on the banner reads: 'Educational materials are available for users ranging from primary to post-graduate levels'. On the left side, there is a sidebar with icons and links: 'About National Digital Library of India', 'Learning Resource Type', 'Subject Domain', 'Featured Sources', and 'News and Events'. On the right side, there is a 'Member Log-In' section with fields for 'E-mail address', 'Enter your password', and a CAPTCHA field showing '536848'. It also includes 'Remember me', 'Log In', 'Account Recovery', and 'Register' buttons.

Technology (MCIT), Govt. of India. DLI is being hosted by Indian Institute of Science, Bangalore.

Information and Library Network (INFLIBNET)

Information and Library Network (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. Initially started as a project under the IUCAA, it became an independent Inter-University Centre in June 1996.

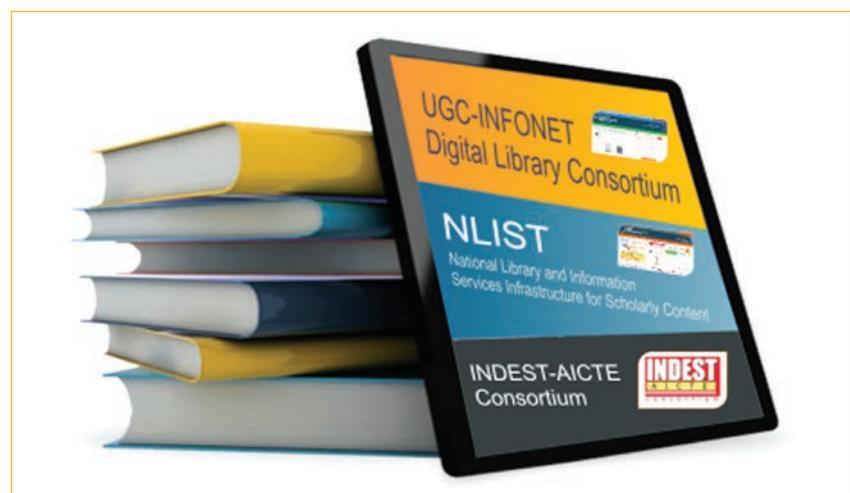
INFLIBNET is involved in modernizing university libraries in India and connecting them as well as information centres in the country through a nation-wide high speed data network using the state-of-art technologies for the optimum utilisation of information. INFLIBNET is set out to be a major player in promoting scholarly communication among academicians and researchers in India.

Shodhganga: A Reservoir of Indian Theses

The UGC Notification (Minimum Standards & Procedure for Award of M.Phil. / Ph.D Degree, Regulation, 2009) dated 1st June 2009 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.

Shodh Gangotri: Indian Research in Progress

Shodhgangotri is a new initiative that complements “ShodhGanga”. While “ShodhGanga” is a repository



of full-text theses 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. Under the initiative called **ShodhGangotri**, research scholars/research supervisors in universities are requested to deposit electronic version of approved synopsis submitted by research scholars to the universities for registering themselves for the Ph.D programme. The repository on one hand, would reveal the trends and directions of research being conducted in Indian universities, on the other hand it would avoid duplication of research. Synopsis in ShodhGangotri would later be mapped to full-text theses in “ShodhGanga”. As such, once the full-text thesis is submitted for a synopsis, a link to the full-text theses would be provided from ShodhGangotri to “ShodhGanga”

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

The Project entitled “National Library and Information Services Infrastructure for Scholarly Content (N-LIST)”, being jointly executed by the UGC-INFONET Digital Library Consortium, INFLIBNET Centre and the INDEST-AICTE Consortium, IIT Delhi provides for

- i) cross-subscription to e-resources subscribed by the two Consortia, i.e. subscription to INDEST-AICTE resources for universities and UGCINFONET resources for technical institutions; and
- ii) access to selected e-resources to colleges. The N-LIST project provides access to e-resources to students, researchers and faculty from colleges and other beneficiary institutions through server(s) installed at the INFLIBNET Centre. The authorized users from colleges can now access e-resources and download articles required by them directly from the publisher’s website once they are duly authenticated as authorized users through servers deployed at the INFLIBNET Centre.

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. The e-ShodhSindhu will continue to provide current as well as archival access to more than 15,000 core and peer-reviewed journals and a number of bibliographic, citation and factual databases in different disciplines from a large number of publishers and aggregators to its member institutions

including centrally-funded technical institutions, universities and colleges that are covered under 12(B) and 2(f) Sections of the UGC Act. The UGC-INFONET Digital Library Consortium is now merged into e-Shodh Sindhu Consortium.

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 and digital contents available with different 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 education. NDL will harvest metadata and contents from all the Institutional Digital Repositories (IDR) and other digital library initiatives and NMEICT projects in the National Digital Library Server so that the e-contents can be searched and accessed in the full text by the users through a single window.

The project's main aim was to create a knowledge base for students of all ages, especially for those interested in research. Every university has its own digital archive of its intellectual output and syllabus, known as the Institutional Digital Repository (IDR), whose access is limited to the university's own staff and students. The NDL is modelled on the IDR, but will consist of IDRs of several universities and any student will be free to access it.

Concluding Remarks

Digital libraries provide an effective means to distribute learning resources to students and other users. Rapid advances in information technologies have revolutionized the role of libraries. Libraries are redesigning services and information products to add value to their services and to satisfy the changing information needs of the user community. Digital libraries will start gaining ground in India in the present century. We are heading towards an environment in which digital information may substitute for much print-based information. There are 1, 24,500 secondary schools and over 11 lakh elementary schools in India. Indian higher education system is the largest in the world enrolling over 70 million students. Presently, there are 659 Universities, 33,023 colleges and 11356 in India. Under this setting, India truly needs digitization of traditional libraries more and more for the growth and development in education and research. □

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PM Dedicates “Statue of Unity” to the Nation



The Prime Minister, Shri Narendra Modi at the dedication ceremony of the 'Statue of Unity' to the Nation, on the occasion of the Rashtriya Ekta Diwas, at Kevadiya, in Narmada District of Gujarat on October 31, 2018

The Prime Minister dedicated the world's tallest statue, the 'Statue of Unity', to the nation on 31st October 2018. The 182 metre statue of Sardar Vallabhbhai Patel, was dedicated to the nation on his birth anniversary, at Kevadiya in Narmada District of Gujarat. The PM also inaugurated the Wall of Unity. 31st October is observed as Rashtriya Ekta Divas.

Greeting the people of India on this occasion, the Prime Minister said that with the Statue of Unity, India has given itself a towering inspiration for the future and will continue to remind future generations of the courage, capability and resolve of Sardar Patel. He said that the integration of India by Sardar Patel, has resulted today in India's march towards becoming a big economic and strategic power.

The Prime Minister also recalled Sardar Patel's vision of the administrative services as a steel frame and described the Statue of Unity as a symbol of the self-respect of the farmers who gave soil from their land, and iron from their farming implements for the Statue. He said the aspirations of the youth of India can be achieved only through the mantra of "Ek Bharat, Shrestha Bharat."



The Prime Minister, Shri Narendra Modi at the dedication ceremony of the 'Statue of Unity' to the Nation, on the occasion of the Rashtriya Ekta Diwas, at Kevadiya, in Narmada District of Gujarat on October 31, 2018.



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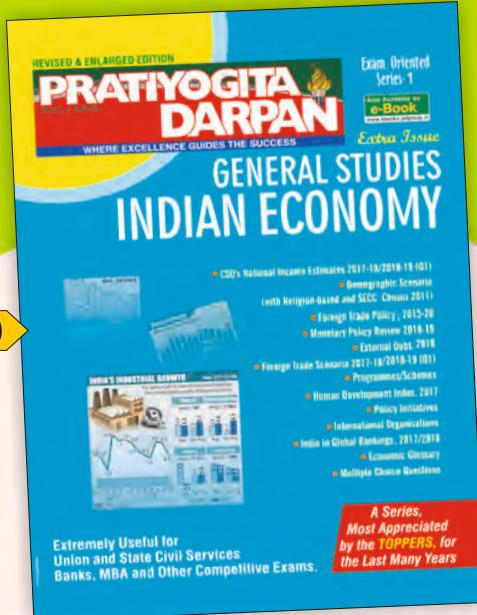
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