August 2019

Digital Rajasthan: Embracing Change

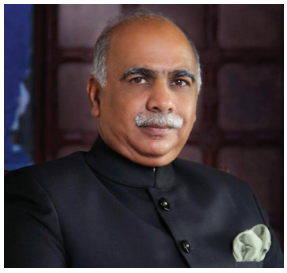
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Foreword



Randhir Vikram Singh
Co-Chairman
FICCI Rajasthan State Council

Under the Digital India Program, as the nation embarked on the audacious journey of a Digital India, a paradigm shift has been experienced in the way services are delivered to the country's citizens. With the advent of ever-emerging technology, the Government of India is actively exploring every nook and cranny to ensure digital transformation in the delivery of citizen-centric services.

Increasing digitisation of almost all government services and offerings through the extensive use of emerging technologies, shifting attention to mobility, ease of accessibility and deployment of many evolving technologies have been reshaping the government sector. Technology advancement in the space of the government and public sector ecosystem is changing our lives significantly.

This report, published under the 'Digital Rajasthan Conclave 2019', holistically focusses on various government initiatives and schemes from a technology perspective. The report highlights the current digital trends and applications of emerging technologies in various government initiatives at the national level along with a deep-dive for the state of Rajasthan. The report also draws attention to start-ups in India's economy.

I would like to acknowledge the efforts of all those who contributed to this report, provided valuable inputs and deep insights. I hope that the information presented in this report will serve as a valuable reference to all the stakeholders.

Preface



Pankaj Khurana
Partner, PwC

The world is witnessing a massive shift in the way services are delivered. In line with global trends, the citizens of India are experiencing the transformation brought about by digitisation. In the last few decades, there has been a huge transition from mechanical and analogue electronic technologies to digital technologies. The rapid adoption of emerging technologies such as Artificial Intelligence, Machine Learning, Blockchain in almost all sectors, along with massive social and economic changes, have ushered in a 'digital revolution'.

In 2014, the Government of India launched its ambitious Digital India Program with the vision of transforming the way services are delivered to citizens and 'reaching the unreached' and the 'poorest of the poor'. It is worthwhile to note that inclusion has been the key consideration of any initiative under the Digital India Program. In keeping with the digital agenda, any government initiative or scheme today is powered by the latest technology to ensure seamless execution – i.e. from concept to commission.

Ensuring that every citizen of the country benefits from the services offered by the government is a herculean task, especially in the case of a nation that is catering to the needs of 130 crore citizens and has immense diversity in terms of geography, culture, etc. Hence, it is imperative for the government and private sector to collaborate. This collaboration has helped us in working towards achieving the goal of becoming a developed nation.

Over the last five years, the IT ecosystem in the country has expanded manifold and we are now witnessing the widespread penetration of the ICT network from the centre to the state and district levels. This has made the last-mile delivery of government services a reality.

Recent trends indicate that access to high-speed internet and affordability of smartphones are going to bring about a paradigm shift in e-governance, and will transform the way government services are delivered to citizens. The government's flagship initiatives such as Aadhaar, Direct Benefit Transfer and Digital Payments will help in making citizen-centric services faceless, cashless and paperless.

Another key element that has been revolutionising our nation's growth is the start-up boom. Start-ups are the nerve centre of any country and India's start-up ecosystem has had an exciting 2018, with several new unicorns being added. It was a bumper year for funding, along with some large exits. NASSCOM's 10,000 Start-ups and NASSCOM Product Council have an array of programmes that are supporting the ecosystem in the country. In 2019, six Indian start-ups enter the unicorn club and this growth is expected to continue.

Given the above background, PwC and FICCI are pleased to present an in-depth study of the current digital transformation scenario in the country. This report highlights the digital trends in India and its benchmarking at the global level, with a special focus on the state of Rajasthan. It offers insights into emerging technologies and takes a close look at the start-up industry. In addition, it examines the current cyber security state of the nation and recent trends.

I hope that this report provides readers with a useful overview of India's evolving digital landscape and the road ahead.

Executive summary

Recent advancements in technology and innovation are continuously disrupting our world. The manner in which services are delivered to end users is undergoing a paradigm shift. Today, the focus of any service provider, be it the government or private industry, is on ease of accessibility. Ensuring user convenience has become vital. 'Inclusion' plays a crucial role in the government sector, where enabling every citizen to enjoy the benefits of various services and schemes, irrespective of his/her social status, is a key objective. The advent of digital technologies is making this possible and helping us reimagine our current ecosystem.

Emerging technologies such as Blockchain, Artificial intelligence (AI), Internet of things (IoT) and Cloud computing offer extensive possibilities for businesses, governments and citizens. Blockchain can be leveraged for economic growth and creating a safer and more secure internet.It has the potential to increase cost efficiency, improve processes and promote transparency in various industries, thereby enhancing the ways in which organisations offer services. It is also imperative to look beyond financial services, and consider the application of blockchain in other sectors such as healthcare, supply-chain management, energy, transportation, insurance and voting.

Similarly, Artificial Intelligence is revamping a diverse set of services and offerings. With the second-largest population in the world, India is one of the fastest-growing economies and plays a significant role in the AI revolution. The government has mandated NITI Aayog to institute the National AI Programme, with a focus on guiding full-fledged research and development on new and emerging technologies.

We are at an extremely pivotal point in time, with the world moving on to the Internet of things (IoT) and 5G technology. No previous generation of mobile technology has demonstrated the potential to drive economic growth to the same extent as 5G. It goes beyond connecting people to fully realising the Internet of Things (IoT) and the Fourth Industrial Revolution. A robust digital infrastructure set-up can make distance less relevant than it ever was. Smart cities, Industrial IoT, augmented reality, autonomous transport and digital health are just some of the exciting prospects that can be made real with the advancement in all the upcoming technologies.

With these advancements in technologies, we are also experiencing heightened risks related to cyber security. The sophistication of cyber threats is increasing with each passing day, and thus, organisations need to be cautious about maintaining a safe, secure and robust cyber security posture. Massive cyber security breaches are becoming increasingly common and are grabbing the attention of consumers and leaders. What's alarming is that despite the prevalence of such incidents, many organisations around the world are still struggling to manage emerging cyber risks, given the ever-increasing complexity of the digital ecosystem. As our dependency on data, interconnectivity and mobile usage has increased manifold, developing the flexibility to withstand cyberattacks has become extremely important.

Digital start-ups are supporting the global ICT industry. Both the government and private organisations are collaborating with start-ups at various levels that is not just driving innovation but also keeping the spirit of entrepreneurship alive. Home-grown brands, be it in the area of e-commerce, transportation or hospitality, are examples of how the citizens of this country have embraced the essence of entrepreneurship and shown an appetite to accept change and disruption in the existing models of services.

It is evident that the major industrialised nations are making significant progress in adopting the latest technologies, and reap the benefits of emerging technologies which contribute to their economic growth. However, understanding that technological advances are unambiguous, it is crucial that India maintains its pre-eminence in the adoption of technology. For India to stay abreast of the latest technologies, the government will need to partner with private organisations, with a focus on providing greater convenience to the citizens of India, and keeping the 'Nation First'.



1. Digital transformation: An evolutionary paradigm

Digital innovation has been disrupting nations and industries worldwide with proliferating automation, internet penetration and the booming telecom sector. A decade ago, 'digital' was just another word for information technology. Nowadays, it is strenuous to imagine any aspect of our life being untouched by technology. Digital is transforming the way we live and the way in which cities are run and governed. Technology has significantly improved the quality of life for citizens and the delivery of public services. Decades ago, who could have imagined getting real-time traffic and weather updates on mobile apps or booking flight or train tickets online.

In an age where innovation has become a rule, the value generated by digitalisation has redefined consumer expectations, transformed business operating models and unlocked broader societal benefits. The market for digital transformation professional services is expected to grow rapidly, with a CAGR of 12%, and is expected to reach over USD 175 billion[1] by 2023.



For digital transformation to be a success, the following key enablers need to be considered:

Key enablers of digital transformation

Customer's experience

- Understanding the customer's journey, behaviour & expectations

People

- Understanding the technology needs of your people and imbibing technology in workplace culture
- Creating meaningful experiences that reach the customers

Change

- Communicating expectations and developing the strategy for encouraging change
- Provisioning tools & environment to embrace change

Innovation

- Providing the space for open communication, collaboration and the freedom to create

Leadership

- Proactiveness in leading the transformation rather than just being involved

With focus, on these key enablers, various sectors such as health, agriculture transport etc. can unfold the potential of data being generated for improvement in citizen delivery and optimisation/automation of processes. However, there has been an essential shift in the way businesses are operated. Traditional models are becoming redundant as a new economy has taken over the regime. IT, which was considered a cost centre, is now being treated as the profit centre for the organisation because of the value propositions brought in by the digital disruptions such as AI, Machine Learning, Blockchain, Analytics and IoT.

Catalysing India's digital transformation journey

In the era, where economies worldwide are being complemented by these technologies, India's digital story has been no different. With the launch of the Digital India Initiative in 2015, the government has proposed the vision of transforming India into a digitally-empowered economy by focusing on the three vision areas of digital transformation.

1. Digital infrastructure as a utility for every citizen
2. Governance and services on demand
3. Digital empowerment of citizens

1. IDC, July 2019

Digital India pillars

Vision of Digital India

Digital Infrastructure as a utility to every citizen		Governance and services on demand		Digital Empowerment of citizens	
High-speed internet	Mobile phone and bank account	Integrated services	Availability of services on mobile platform	Digital Literacy & resources	Digital services in Indian languages
Access to CSC	Private space on cloud & secure cyberspace	Portable citizen entitlements on cloud	Geospatial info. systems as DSS	Collaborative Digital platform	No physical submission

Early harvest programmes	IT for jobs	Electronics Manufacturing	Information for all	e-Kranti (NeGP 2.0)	e-Governance Reforming	Public internet access programme	Universal access to mobile connectivity	Broadband highways



India's Trillion Dollar Opportunity Report, recently published by the Ministry of Electronics and Information Technology, also emphasises on Figure 3 needs to be placed along side this statement. The government aims to empower people with a pervasive and affordable digital access, thus reaching the unserved segments and facilitating them by creation of digital ecosystems that would solve economic and social issues. Doing so will facilitate the creation of a vibrant economy and help transform India into a digital factory.

Digital India Pillars, equally supported by the aspirations, have had a significant impact on our society. The proliferation of digital devices owing to the increased penetration of internet, mobile and social media has redefined the experience of citizens and the functioning of government departments. While internet users increased by 7%[2] in urban India, digital adoption is being spearhead by rural India, which has registered the growth of 35%[3] in internet users over the past year. Computerisation of land records, augmented by Blockchain technology, has led to a transparent and efficient way of buying, selling and financing property. The Government-e-Marketplace has brought in transparency across public procurement processes. e-NAM (National Agriculture Market), m-Kisan and Soil Health Cards have led in the enrichment of information dissemination to farmers.

Digital India aspirations

Digital foundation

- Digital Identity, authentication & consent framework
- Environment for cybersecurity & data protection
- Open API framework, supported by deep analytics and real-time visualisation
- Skilled persons in emerging technologies

Digital reach

- Affordable & high-speed internet for every household
- Digital literacy and strong local language content
- Digitisation of processes
- New digital platforms & delivery models in agriculcture, education, transportation etc.

Digital value

- Data-backed innovation for boosting productivity
- New digital start-ups
- Global data analytics hub



2. https://economictimes.indiatimes.com/tech/internet/internet-users-in-india-to-reach-627-million-in-2019-report/articleshow/68288868.cms?from=mdr

3. https://economictimes.indiatimes.com/tech/internet/internet-users-in-india-to-reach-627-million-in-2019-report/articleshow/68288868.cms?from=mdr

Impact of key government initiatives[4]

Key area	Initiative	Digital interventions	Impact
eGovernance	Common services centre	• **Single window** for provisioning of electronic services	• 290,000 functional CSCs, covering 72% GPs
	DigiLocker	• **Cloud-based platform** for sharing of identity documents	• 24.93 million registered users • 3.53 billion authentic documents
	Direct benefit transfer	• Aadhar-based authentication & de-duplication • Electronic payment framework	• >USD 1000 billion disbursed • 439 schemes across 55 ministries
	Government-e-marketplace	• E-bidding, reverse e-auction, dynamic pricing and demand aggregation	• 37,720 buyer organisations • 2,62,874 sellers
	Digital Land	• Blockchain-based registry • Computerisation of land records • Map digitisation • Modern record room	• 4,043 sub-registrar offices automated • 588,484 villages covered • 6,594,628 cadastral maps digitised
Agriculture	eNAM	• Electronic trading platform	• 585 markets, 16 states and 2 UTs covered
	Soil health card	• Integrated nutrient management • Soil testing laboratory	• 26,575,651 samples collected and tested in FY 2017-19 • 104,175,937 Soil Health Cards printed and dispatched
	m-Kisan	• SMS & IVRS services on farming advisories	• 24.62 billion SMSs dispatched • >50 million farmers on-boarded
Health	Aayushman Bharat	• Open API-based digital health blueprint • National Health Stack (Aadhaar-based India stack)	• 16,085 hospitals empanelled • 3,479,966 beneficiaries admitted • 91,216,945 e-Cards issued
	eHospitals	• Workflow-based hospital management system	• >322 hospitals • >114,063,673 transactions since Sept-15
Education	National knowledge network	• High speed internet backbone	• >1500 institutions connected
	SWAYAM	• Web portal for MOOCs	• >1600 MOOCs listed • >3.9 million students enrolled
	DIKSHA	• Multi-tenant Open API-based digital infrastructure for teacher trainings	• >1 million downloads on app stores

4. Impact Statistics taken from official websites

Propelling digital transformation using Emerging Technologies

Artificial Intelligence

Poised to disrupt the world, happening all over the globe, Artificial Intelligence presents opportunities for complementing and supplementing human intelligence. Research organisation IDC predicts that AI will be an integral component of 40%[5] of digital transformation initiatives by the end of 2019.

Launch of Imaging Biobank for Cancer

Using AI to improve decision support by correlating between radiographic imaging phenotypes and tumor stage, metabolism, hypoxia, angiogenesis and underlying gene or protein expression profiles

AI brings to us the potential to complement the way people live and work with intelligent machines that can empower high-level cognitive processes such as thinking, learning, problem solving, perceiving and decision-making.

The prospective of AI can be measured by the fact that its contribution is estimated to increase to USD 15.7 trillion[6] to global GDP by 2030 that is more than the combined output of China and India. Two prime factors that will be key in achieving this potential are:

1. Automation of labour – USD 9 trillion
2. Innovations in products & services - USD 6 trillion

As per PwC Analysis[6], all regions of the global economy will benefit from Artificial Intelligence, and the numbers speak for themselves:

PwC analysis on AI impact

Region	Objectives of the scheme	Impact
China	26.1	7.0
North America	14.5	3.7
Southern Europe	11.5	0.7
Developed Asia	10.4	0.9
Northern Europe	9.9	1.8
Africa, Oceania & other Asian markets	5.6	1.2
Latin America	5.4	0.5

As in other countries such as China and USA, India has been investing a lot in AI, with a focus on upskilling the workforce. According to LinkedIn.com, the networking site, the penetration of AI skills was highest in the US, followed by China, India, Israel and Germany as on Sept-18. Additionally, AI has the potential to add USD 957 billion[7] to India's economy by 2035. NASSCOM has envisioned that by 2022, a startling 46%[8] of the Indian workforce will be commissioned in entirely new jobs with radically new skill sets.

In the Union Budget 2019, the government has planned to launch a national programme on AI, for which it has decided to set up a national AI portal. In its Jun-18 discussion paper – National Strategy for Artificial Intelligence-Niti Aayog has acknowledged the importance and relevance of AI for Indian sectors.

5. The Four Elements Your AI Strategy Need to Succeed, IDC articleshow/68288868.cms?from=mdr

6. PwC Publication, Sizing the prize What's the real value of AI for your business and how can you capitalise?

7. https://economictimes.indiatimes.com/tech/internet/heres-why-indian-companies-are-betting-big-on-ai/articleshow/67919349.cms?from=mdr

8. https://www.livemint.com/Industry/MPEM6Jj7o0BIXwdNNg2qQK/37-of-the-Indian-workforce-will-be-in-new-job-roles-by-2022.html

Objectives of national strategy for AI

Empower with skills to find quality jobs

Invest in R&D to maximise social and economic impact

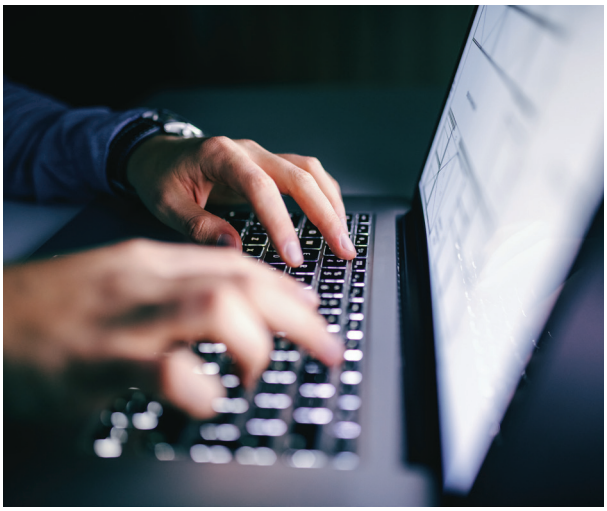
Scale India-made solutions to the rest of developing world

Key focus has been given to five sectors- healthcare, agriculture, education, smart cities & infrastructure and smart mobility & transportation. In order to build an AI ecosystem and support the environment, the paper also recommends:

1. Setting up of consortium of Ethics Council at Centre of Research Excellence in AI (COREs)
2. Development of sector-wise guidelines on security, ethics and privacy
3. Creation of a National AI Marketplace to increase market discovery

Elements for the AI strategy to succeed

In order to realise the value of AI, organisations need to have a structured AI strategy that will prioritise where and how to implement AI.



AI strategy elements

Alignment of AI with business objectives

- AI to identify routine tasks to automate if objective is to improve productivity

Usage of rich data sets for strategy execution

- Gauging high-risk drivers by combining data about auto insurers and vehicles with real-time GPS data

Contemplate which business processes need updation

- Process identification
- Change management
- Technology

Be ethical, remove biasness

- Eliminating AI bias
- Protect user data
- Control on complex systems

In addition to implementing AI strategy, organisations should consider business aspects rather than focusing only on the technical ones. Broadly, AI is affecting businesses in three ways:

Impact of AI on business

Process automation	• Automation of digital & physical tasks, typically back-end operations or financial activities using RPA technologies
Cognitive insight	• Using of algorithms for detecting patterns in large amount of data
Cognitive engagement	• Engaging customers and employees using Natural Language Processing chatbots, intelligent agents, machine and deep learning

According to the article – **Artificial Intelligence for the Real World** – published in the Harvard Business Review edition of Jan-Feb 2018, adoption of these technologies will bring with them various business benefits, as cited in the figure below:

Envisaged business benefits of AI

- Products' performance enhancement
- Better decision making
- Creation of new products
- Optimisation of internal business operations
- Automations of tasks, more focus on creativity
- Pursuing new markets
- Workforce management

Realisation of AI benefits in Indian sectors

The underlying thrust for the evolution of AI technology is to identify the applications that will have the maximum impact on society, and where the government can develop an implementation roadmap for AI by leveraging approaches that will lead to the democratisation of AI.





AI use cases

Sectors	AI Interventions
Smart Cities and infrastructure	1. Smart Parks and public facilities 2. Smart Homes 3. AI-driven service delivery 4. Crowd management 5. Intelligent safety systems
Healthcare	1. Early detection of diabetic retinopathy 2. Integration with retinal imaging for solving quality issues with image capturing and systems checks. 3. Using thermal images to anticipate haemo-dynamic shock or inadequate oxygen supply to organs 4. Early detection of Alzheimer's
Agriculture	1. Crop yield prediction model using AI for providing real-time advisory to farmers 2. Herbicide optimisation 3. Precision farming 4. ML process for crop classification and area estimation 5. Drone technology-based on ML technique 6. AI Sowing App, for sending sowing advisories like optimal sowing date, soil test based fertiliser application, farm yard manure application, seed treatment, optimum sowing depth to the farmers
Education	1. Adaptive learning tools for customised learning 2. Intelligent and interactive tutoring systems 3. Predictive tools to inform pre-emptive action for students predicted to drop out of school 4. Automated rationalisation of teachers 5. Customised professional development courses

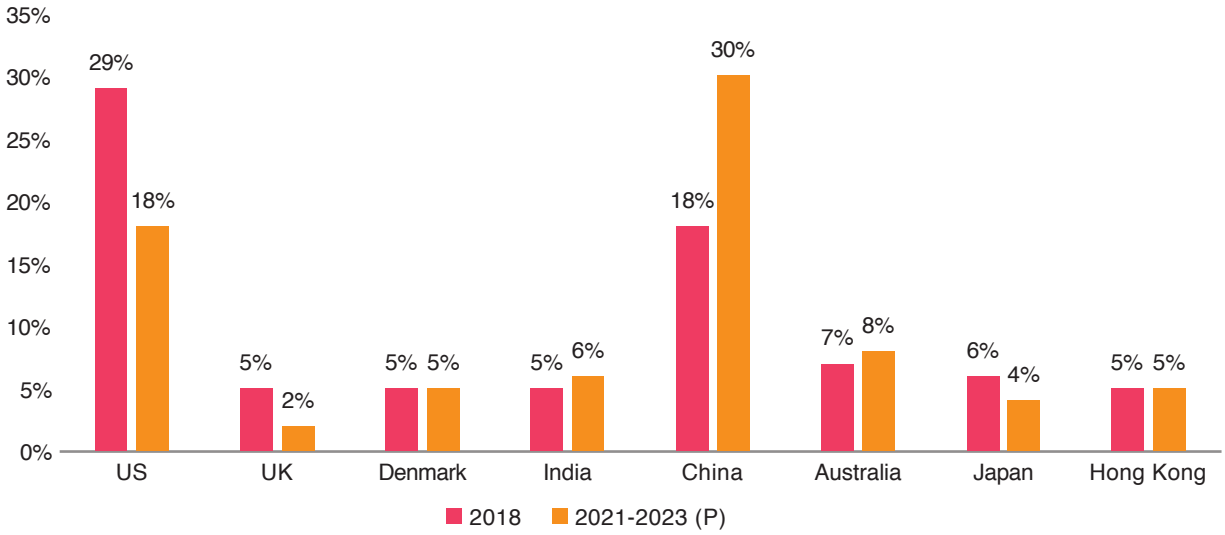
Blockchain

Blockchain has the power to foster trust and greater transparency for data-based transactions between individuals and organisations. As per PwC's 2018 survey[9] which involved 600 executives participating from 15 territories across the globe, 84% have stated that their organisations are involved with blockchain. These organisations have started building proof of concepts, since everyone wants to reap the benefits of technology. Blockchain, a distributed tamper-proof ledger, not only remove intermediaries, but also offers transparent and attributable systems. Research firm Gartner has predicted that blockchain has the potential to generate an annual revenue of over USD 3 trillion by the end of 2030.

According to the survey, respondents also believe that US will be the leader in the development of blockchain, closely followed by China.

PwC's global blockchain survey 2018

Which territories are seen as blockchain leaders?



India is also not far behind when it comes to blockchain adoption, with 60% in BFSI, 15% in the public sector, 12% in healthcare, 8% in logistics and 5% in other sectors.[10]

Top three use cases in India

- Land registry
- Farm insurance
- Digital certificates

Mumbai-based Auxesis group will implement a blockchain solution in electronic health records and land. The public sector in India is emerging as a large clientele of blockchain technology, in addition to being being a regulator. As per the NASSCOM Blockchain Report 2019[10], more than 40 blockchain initiatives are being implemented by the public sector in India, of which 92% are in the pilot phase and 8% are in production.

The Government of Rajasthan has collaborated with the Mumbai-based Auxesis group to design, develop and implement a blockchain solution in electronic health records and land registration.

9. https://www.pwc.com/gx/en/issues/blockchain/blockchain-in-business.html

10. Nassccom Blockchain Report 2019

Elements for Blockchain strategy to succeed

For a flawless and successful Blockchain execution, it is essential for organisations to devise a business model that will focus on routine standards and collaborative functioning. The answer lies in the building of trust and overcoming barriers of blockchain adoption.

Blockchain strategy elements

1 Evolution, not revolution while making a business case

- New ways of working without complete re-invention
- Framing problems and solutions
- Start small and then scale out

2 Build an ecosystem

- Start with smaller ecosystems with few stakeholders
- Establish industry groups or trade organisations
- Competitive analysis and identify opportunities for partnerships

3 Strategic design considerations (Permissionless vs permissioned)

- Early risk assessment
- Considerations of privacy implications (Ex. GDPR assessment)
- Streamline and invest in process and data flows

4 Regulatory considerations

- Engaging regulators and industry groups to shape emerging policies and practices
- Monitoring the evolution of regulatory practices

Realisation of Blockchain benefits in Indian sectors

Governments around the globe are betting huge on blockchain initiatives, enabling the administration to achieve their objectives. Enterprises, in collaboration with providers, are building various products and offerings to tap the potential of blockchain technology.

Blockchain use cases

Sectors	Blockchain interventions
Healthcare	1. Health records 2. Pharma track and trace 3. Drug provenance 4. Physician recertification
Banking	1. Inter-bank payments 2. KYC 3. Trade finance 4. Syndicated loans
Government	1. Food distribution 2. Digital land and vehicle registry 3. Digital identification 4. Asset registration and tracking
Insurance	1. Claims management 2. Customer data sharing 3. Insurance records 4. P2P insurance

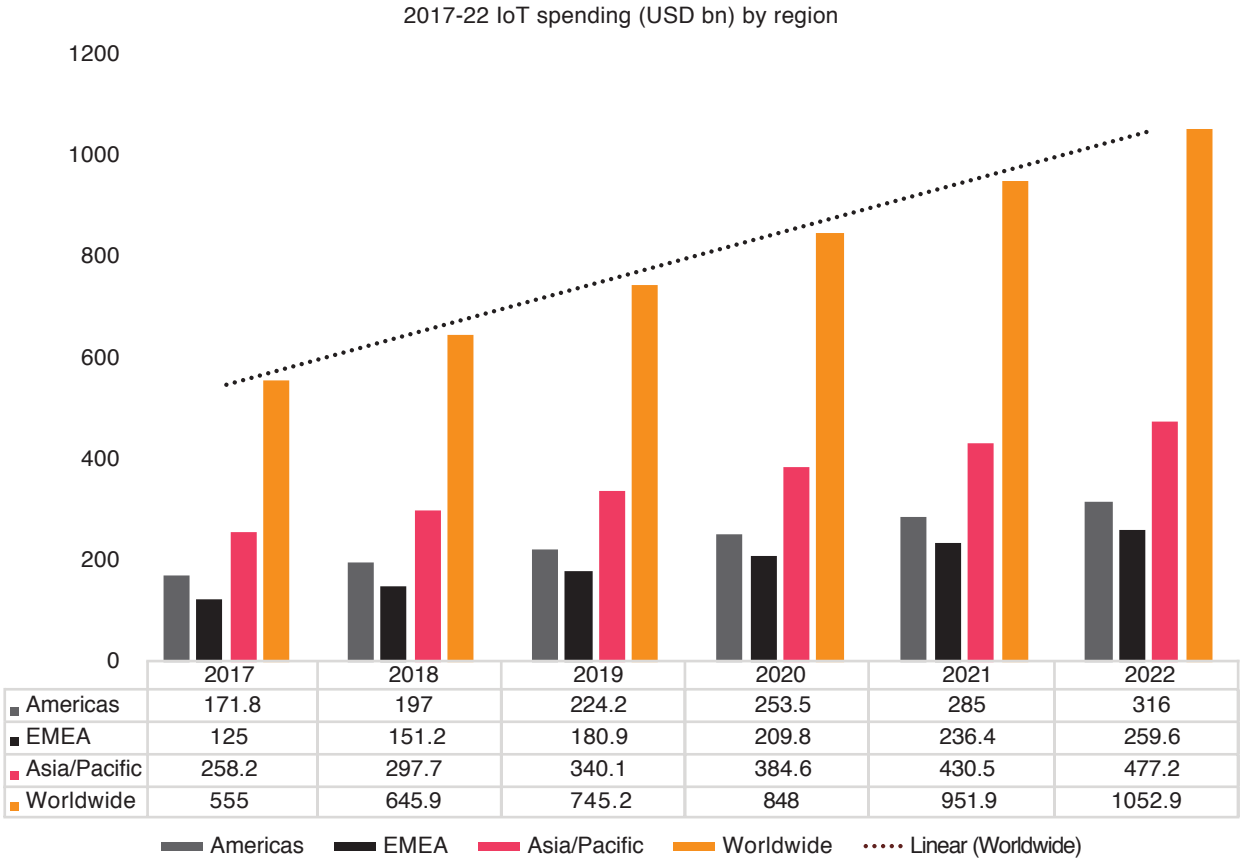
Internet of Things

At the cusp of digital transformation, implementation of Internet of Things (IoT)-based digital solutions, particularly in the manufacturing industry, has transformed the way machines interact with humans and with each other. IoT has streamlined decade-old processes, created new channels and developed new business models. IoT brings with it opportunities to reduce costs and increase revenue, which mandates an organisation to have it on the top of their digital agenda.

IDC predicts worldwide spending on IoT to reach USD 745 billion[11] in 2019, a rise of 15.4% in 2018. The global market revenue is expected to maintain double-digit growth and cross the mark of USD 1 trillion in 2022. From the regional perspective, the contribution is largest from the Asia-Pacific region, representing 45.3%[11] of total IoT spend by 2022.

11. https://www.idc.com/getdoc.jsp?containerId=US44755019&pageType=PRINTFRIENDLY

2017-22 IoT spending (USD bn) by region



	2017	2018	2019	2020	2021	2022
Americas	171.8	197	224.2	253.5	285	316
EMEA	125	151.2	180.9	209.8	236.4	259.6
Asia/Pacific	258.2	297.7	340.1	384.6	430.5	477.2
Worldwide	555	645.9	745.2	848	951.9	1052.9

13.7%
market CAGR

15.7%
EMEA CAGR

13.1%
APAC Pacific CAGR

13.4%
Americas CAGR

Nasscom is also positive on IoTs prospects in India, as the market is expected to reach USD 15 billion by 2020, with adoption happening across major sectors such as telecommunications, health, automobiles and agriculture. With the correct mix of regulations, industry collaborations and government incentives, India would be successful in tapping this potential and evolve to become a trillion-dollar digital economy by 2022. The Government of India has devised a significant strategy to promote IoT in various aspects of eGovernance.

National Policy on Software Products, 2019

Draft IoT Policy, MeitY

Elements for Internet of Things strategy to succeed

Given the vast potential, IoT is here to stay. Even if citizens are unsure of IoT, they are still reaping benefits from its applications. Smart Watch and Fitness Tracker are two best-use cases that are impacting our daily lives. Businesses are also implementing IoT more frequently. Factors like these necessitates the development of attainable IoT strategy.

IoT strategy elements

IoT ecosystem

- Well-defined scalable architecture and technology stack
- Quick innovation
- Government policy and start-up funding

Technology framework

- Unification of cyber and physical security
- Sensor technology and standards-driven augmented intelligence

Enterprise readiness

- Investments in IoT solutions across the technology stack
- Capacity building of employees

Proliferation of interconnected devices

- Monetising IoT data to develop new products and services

Realisation of IoT benefits in Indian sectors

We have been witnessing IoT adoption in various government sectors and our daily lives. Organisations have been utilising data generated by IoT devices to effectively run businesses by gaining insights into business processes for making real-time decisions.

IoT use cases

Sectors	IoT interventions
Manufacturing	1. Integration of RFID tags with Wi-Fi infrastructure for tracking real-time productivity 2. Remote monitoring of equipment to prevent downtime 3. Predictive maintenance using sensors
Agriculture	1. Monitoring insects and pests to schedule release of pesticides 2. Sensors for monitoring humidity, soil health etc. 3. Geo-fencing of livestock
Transport & logistics	1. Fleet management 2. Public transit management 3. Temperature sensors to check quality of food being delivered
Healthcare	4. Wearables to monitor pulse, heart rate etc. 5. Remote monitoring of patients 6. Enhanced drug management

2. Rajasthan goes digital

One of the progressive states and ranked nine[12] in the Ease of Doing Business, Rajasthan is witnessing strong growth in the last five years. Steered by the vision of "Minimum Government and Maximum Governance", Rajasthan has undertaken numerous path-breaking initiatives that have led to this growth and the fulfilment of key pillars of modern governance i.e. transparency, efficiency and ease of access. These e-initiatives have been equally supported by the penetration of the telecom sector in the state and the numbers, depicted in figures[13], speak for themselves.

Current Digital Penetration (Mar 2019)

64.2 mn. wireless subscribers	35.9 mn. internet subscribers
33 mn. rural	15.6 mn. rural
31.2 mn. urban	20.3 mn. urban



Start-up Policy 2015

With the tradition of entrepreneurial energy, presence of numerous education institutions and limited skilled jobs, there is a definite requirement to promote the start-up culture in Rajasthan. This would solve intractable issues of the state by creating more jobs for the youth. The Rajasthan government has also been endorsing a start-up ecosystem by various announcements of schemes and policies, of which the **Start-up Policy 2015** is significant:

With this policy, the government aims to achieve the objectives enlisted in the figure below.

Rajasthan Start-up Policy 2015

500 innovative start-ups

100,000 sq ft of incubation space

INR 500 crore angel and venture capital

Innovation and problem-solving culture

Key domains

- Social and cleantech
- Mobile and information technology
- IoT, electronics & software
- Disruptive idea/technologies

Creation of the Rajasthan Start-up Village and e-Platform fo running MOOCs

12. http://www.pib.nic.in/Pressreleaseshare.aspx?PRID=1557422
13. https://main.trai.gov.in/sites/default/files/PIR_10072019.pdf

Digital strategy framework

Technologies have been evolving at an exponential pace. While the Indian Government has been quick to adopt these, it is necessary to evaluate the possibilities of change brought in by these technologies. Digital government is not just about using technology as a tool, but also about empowering its stakeholders.

To lead digital transformation and simplify government services delivery, a Digital Strategy framework is needed to put in place the vision for a smart digital future, catering to the needs of many generations. The strategy aims to provide an integrated digital ecosystem, with certain design principles.

Digital strategy design principles

Adaptive	• Accomodate policy & technology changes
Open architecture	• Data-centric approach for effective decision making
Multi-stakeholder approach	• Holistic approach with a focus on each stakeholder's needs & aspirations
Integrated approach	• Integrated enterprise ecosystem
Outcome-based KPIs	

Keeping these design principles in mind, the report has segregated various flagship projects under the three pillars of digital strategy. It provides a roadmap for transforming a state or city into a digital economy, and comprises various digital interventions that will influence the citizens' lifecycle.

Digital strategy pillars

Digital enterprise

- Command & control centre
- Enterprise resource planning
- Knowledge management
- IT enterprise architecture

Digital infrastructure

- Wi-Fi
- Adaptive traffic
- City network
- IoT-based environment sensors
- Cloud infrastructure
- Emergency kiosks
- GIS

Digital services

- Website & mobile applications
- Citizens' relationships
- Digital learning
- State/city dashboards
- Digital payments

Digital strategy for Rajasthan

This section focuses on various digital initiatives (current and proposed) across strategy pillars and their interventions in the lifecycle of a citizen. For the purpose of a persona-based journey, the strategy will elaborate on the challenges faced by the protagonist named Rohit, and how digital products and solutions can help him in overcoming them.

Digital enterprise

Use Case#1:

Command & Control Centre: Rohit, a resident of a city in Rajasthan, is proud of his city having a command-and-control centre that ensures the safety of residents, organisations and institutions.

E-initiative:

ABHAY, a holistic & integrated surveillance system including Dial100, Intelligence Traffic Management System etc.

Use Case#2:

Enterprise Resource Planning: Using ERP, there is a seamless flow of information across departments. Rohit makes a call to enquire about a bill and a customer executive was able to answer him instantly owing to the connection between the front-end and back-end billing desk.

E-Initiative:

Raj ERP, an ERP package for PSUs of the government

Use Case#3:

Knowledge Management: Due to the presence of a knowledge management platform, all the departments, which used to work in silos, can now ensure knowledge sharing. Rohit will be able to avail the information on a single window.

E-Initiative:

An infrastructure (platform), headed by Chief Knowledge Officer, where all departments can share information in a unified format

Use case#4:

Enterprise architecture: Rohit can access the services via his mobile owing to the well-established enterprise architecture (EA) strategy of the department

E-Initiative:

Open platform architecture supported by the API and micro-services framework

Digital infrastructure

Use Case#1:

City Wi-Fi: Rohit has shifted to a new city and is in search of a food joint. He uses the Wi-Fi network for locating this.

E-Initiative:

Raj Wi-fi, a secured and free Wi-Fi Network for residents at Atal Seva Kendras in all 10,000 GPs and 5,000 municipal wards

Use Case#2:

Adaptive Traffic & Integration of Smart-City Operations Centre with Emergency Kiosks: Rohit is returning to his residence and witnesses an accident. He quickly approaches the emergency kiosk and presses the panic button. This communication reaches the concerned stakeholders for immediate assistance. In addition, due to an adaptive traffic system, congestion was avoided.

E-Initiative:

Installation of emergency kiosks and integration with ABHAY

Use Case#3:

City network: Rohit decides to work from home, since he is not feeling well. Due to strong network connectivity in the city, he was able to connect with his team remotely through video conferencing.

E-Initiative:

RajNet, an integrated network solution provisioned till the level of Gram Panchayats (GPs) through the Rajasthan State Wide Area Network (RajSWAN).

Use Case#4:

IoT-based environment sensors: Rohit takes preventive measures while going out, due to pre-emptive message received regarding air quality via emergency sensors.

E-Initiative:

Real time pollution management, e-waste management (Intelligent bins) etc.

Use Case#5:

GIS based decision support system: Rohit wants to visit a famous tourist spot of the city but is facing difficulty in reaching the location. Using GIS, he was able to reach the spot.

E-Initiative: Rajdhaara Citizen, a GIS based interface to enable citizens for locating near-by facilities. Over 38[14] GIS applications have been hosted. 3D GIS model for Jaipur has also been initiated.

Use Case#6:

Cloud Infrastructure: Rohit wants to share his identification documents with a government organization regarding issuance of license.

E-Initiative:

Raj-eVault, digital verification for official documents and certificates. Until now, over 25 Million[15] documents have been uploaded.

14. Economic Review 2018-19, Directorate of Economics & Statistics, Rajasthan

15. https://evault.rajasthan.gov.in/rajevault/

Digital services

Use Case#1:

Websites & Portal: Rohit recently got married and wants to apply for marriage registration. Due to the presence of centralized service delivery platform, the experience of marriage registration was seamless and transparent for him.

E-Initiative:

- **e-Mitra**, a multi-modal service delivery platform offering wide range of services
- **e-Mitra** plus, next generation self-service kiosk

Currently, more than 500 services are being provided through more than 50,000 kiosks[16]

Use Case#2:

Mobile App: Rohit's wife, Neera noticed many potholes near her home. She quickly lodged a grievance on city CM app and got an acknowledgment.

E-Initiative:

Raj App Centre, hosting Android, IOS & Windows based mobile apps developed for e-initiatives of the State such as CM App, eMitra etc.

Use Case#3:

Digital learning: Neera is delighted to know that her house cleaner's daughter is finding interest in studies because of online learning solutions in government school.

E-Initiative:

Raj-eGyan Portal, an education portal providing updated digital content to the students. Until now, more than 1000 videos[17] have been uploaded on different topics.

Use Case#4:

Citizen Relationship: For quite some time, there has been no maintenance on intelligent bins. Rohit lodges a complaint on centralized platform and is given a grievance tracking number.

E-Initiative:

Rajasthan Sampark 181, a citizen contact centre for grievance redressal. Until now, more than 8000 calls[18] are received per day

Use Case#5:

City Dashboard: Rohit is able to compare the performance of his locality on parameters such as lighting, water availability etc. due to availability of city performance dashboard.

E-Initiative:

Operational Dashboards, with measurable KPIs, integrated with IoT sensors, smart street lighting etc.

Use Case#6:

Digital Payments: Due to demonetization, Neera wants to increase usage of digital payment via secure payment gateway.

E-Initiative:

Raj-payment, unique, modern and secure payment gateway that can be used by any department for disbursing payment. Until now, more than USD 2 Billion[19] has been disbursed.

16. Economic Review 2018-19, Directorate of Economics & Statistics, Rajasthan
17. https://egov.eletsonline.com/2018/08/egov-august-2018-digital-rajasthan-reaching-the-last-mile/
18. Annual Progress Report 2018-19, DoIT&C
19. https://rpp.rajasthan.gov.in/

Proposed digital interventions for focused sectors

We are witnessing tremendous amount of growth in various technologies such as Advanced Analytics, Deep Learning, Blockchain etc. Nevertheless, it is pertinent to understand the priorities of the state government for focused investments in technologies. For the same, the report analysed the budgeted expenditure for 2019-20 across various sectors.

Based on the increased investments, it is observed that the Rajasthan Government will be focusing on these four key sectors and suggested that digital interventions shall complement the growth of these sectors.

Key sectors and suggested digital interventions

Prioritised sectors	Suggested digital investments
Social welfare and nutrition	• Robots for testing the ground and picking weeds that threaten the main crop • Effective production through water sensors, gene-editing • Linkages along the food value chain through blockchain-enabled traceability • Satellite imagery combined with AI to understand specific shocks on agriculture and predict crop yields • Data-driven solution for the monitoring of ground water • Electronic sensors, buried into soil, to transmit data to web-based platforms for the reduction of waste through the production chain
Energy	• Technology-enabled smart buildings and grids, micro-grids and renewables • Blockchain to record energy consumption, credit histories and provide energy trading between households
Education	• AI-driven assessment • Remote exam proctoring and classrooms • Augmented analytics • Experiential and personalised learning
Water supply, sanitation, housing & urban development	• Smart water network using IoT • Water quality simulation and data alerts • Advanced spatial analytics for planning infrastructure • Self-adaptive water filtration • Streamflow forecasting • Predictive maintenance of water plants • Drought prediction and impact assessment • Real-time monitoring and management of household water supply

3. Cyber security: Resilience in digital governance

With the advent of technology, the world is becoming increasingly connected. Now most of the devices are connected to each other via the internet and we can control them directly with our mobile devices. However, do we ever consider the security aspects when we obtrusively accept the convenience this brings?

"Cybersecurity refers to the technologies, processes and practices of protecting various systems and devices which are connected to the internet, networks, hardware and software, and the data from any attack, damage or unauthorised access. These cyberattacks have the purpose of disrupting normal business activities by accessing, changing or destroying sensitive information, which can then in turn be used to extort money or create a panic situation."

Now due to the connected world we live in, cybersecurity is not just important for businesses and the government, but it has become important for every individual who is connected to the internet. The data of governments, military, corporates, hospitals, financial organisations etc. is all stored on computers. This data includes a lot of sensitive information for which unauthorised access can have many negative consequences. Many times, these organisations transmit this data over the network in the normal course of business, and cyber security describes the discipline dedicated to protecting that information and the systems used to process or store it.

72% of organisations in Japan and **74%** in Malaysia have an overall cybersecurity strategy where cyberattacks are considered to be a leading national threat.

Cyber security – Global trends

In Dec-15, a serious cyberattack in Turkey feigned networks used by the government, the country's banks and the media[20]. In the same month, a cyberattack impacted Ukraine's power distribution systems, which led to a cut-down in electricity of 230,000 residents. It also targeted phone systems, hindering restoration efforts and was the first known cyberattack of its kind. Further, in June 2017, the Petya cyberattack, targeted at Ukrainian computers, dismantled their Business operations spreading across the globe

IT security is of extreme importance in this age of big data and collaborative artificial intelligence on data can lead to development opportunities which are yet to be explored. The focus is on how organisations can leverage, collaborate and extract monetary value from their data without experiencing any vulnerability to privacy violation, safe guarding their intellectual property or preventing their data from any kind of misuse. The technology itself must be leveraged appropriately to bring privacy to this data driven age.

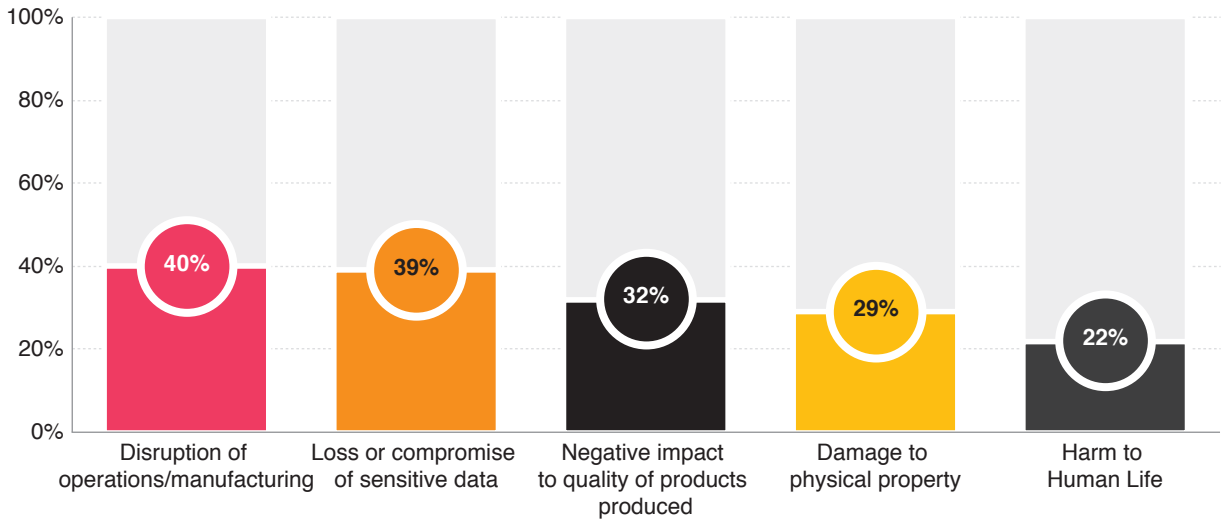
There is a huge incongruity in terms of cybersecurity preparedness among countries around the world—both "between and within regions," according to the UN's 2017 Global Cybersecurity Index. The UN mentioned that only 38% of member states have a published cybersecurity strategy while only **11%** have a dedicated un-interrupted, standalone strategy. Only **12%** nations have a cybersecurity strategy under development. Furthermore, **61%** of member states have an emergency response team which caters to cybersecurity incidents as a national responsibility, only **21%** of states publish metrics on cybersecurity incidents.[21]

20. Harvard University belfer center for science and international affairs, Too Connected to fail, may 2017

21. The Global State of Information Security® Survey 2018 – PwC Report

For instance, a very real threat is AI-driven chatbots, which can go rogue. Hackers may create malicious chatbots that can make the users download malicious files, click on links or share private information. They can also insert such malicious chatbots into vulnerable legitimate sites, so that the user is totally unaware of the risks. In future, human speech bots find their application in manipulating victims over phone connections. Using intelligent malware, cybercriminals can carry out attacks in a huge scale. Terrorist groups can cause more destructive attacks using new age technological tools. Moving up from simple ransomware attacks, they can now attach the data integrity that can easily kill computers to an extent that they might require unavoidable hardware replacements, or can physically assault the population by attacking the critical infrastructure systems (citizen database, national security systems, public health, military systems, emergency communications, and more).

Cyberattack results against automation/robotics systems



Source: PwC, CIO, CSO, the Global State of Information Security 2018, October 18, 2017.
Base: 9500 respondents

> Shifts in attack methodologies, security technologies, and observations appear to be incremental. Devoting as less as **20%** of your time around enhancing controls on the security essentials can easily yield **80%** of your security improvements. The remaining time should be spent on understanding more advanced technologies that can help fill some of the more niche gaps in your security program. —Jason Rebholz, Senior Director at Gigamon [22]

Cyber preparedness in the Indian industry

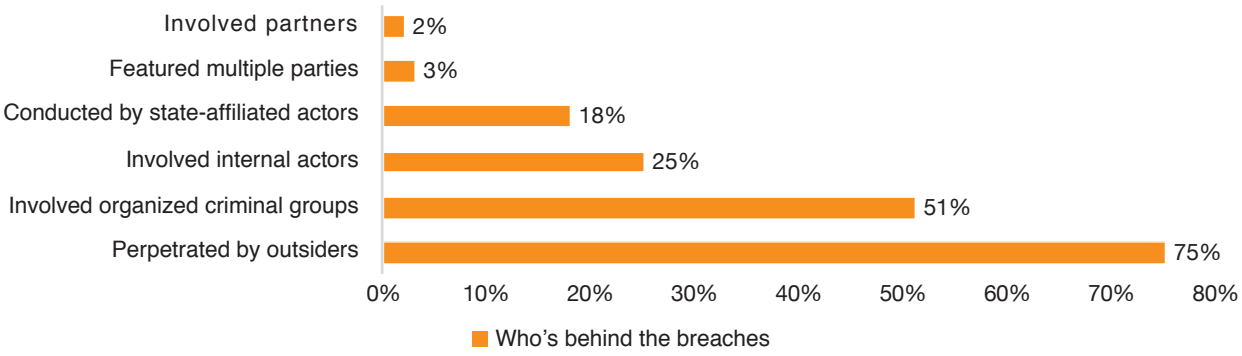
If we look at the number of internet users, Globally India ranks third, after USA and China This number has grown Six-fold from 2012 to 2017 with a compound annual growth rate of 44%.[22] India is also rated among top 10 spam sending countries in the world. According to a report, India is among the top five countries which are most impacted by cybercrimes.[22]

For instance, Cosmos Bank's Pune branch was the victim of a cyberattack in Aug-18, which saw nearly USD 13.24 million being siphoned off. The attack was targeted on the switching system, which liaison as an inter-relating module between the payment gateway and the bank's centralised banking solution.

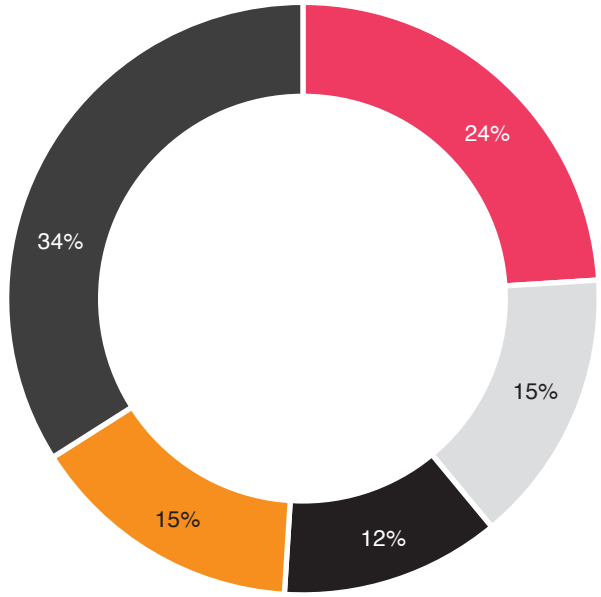
22. Cyber Security by Dr VK Saraswat Member, NITI Aayog

According to the Internet Security Threat Report (February 2019), India was among the 33 nations that were worst hit by WannaCry ransomware in May 2017. According to another report by Quick Heal India, this attack affected over 48,000 systems.[23] The attack also affected systems belonging to the Andhra Pradesh police and state utilities of West Bengal.

Involved parties for cyber security breaches[24]



Victims of cyber crime attacks[24]



The vision of cybersecurity policy of the Indian government is "To build a secure and resilient cyberspace for citizens, businesses and Government" with the mission "To protect information and information infrastructure in cyberspace, build capabilities to prevent and respond to cyber threats, reduce vulnerabilities and minimize damage from cyber incidents through a combination of institutional structures, people, processes, technology and cooperation."

The Government of India understands the sophistication of these cyber-attacks and recognises the challenges and threats that have emerged regarding cyber security. In lieu of this, it has set up National Cyber Security policy (2013), enacted Information Technology (IT) Act, 2000 and has established Indian Computer Emergency Response Team (CERT-In) in order to address the issues related to cyber security.

23. http://economictimes.indiatimes.com/tech/internet/india-third-worst-hit-nation-by-ransomware-wannacry-over-40000-computers-affected/articleshow/58707260.cms

24. Cyber Security by Dr VK Saraswat Member, NITI Aayog

Key cyber security initiatives spear-headed by the Government of India are as follows:

1. **National Cyber Security Policy (2013):** This policy outlays the vision and provides strategic direction to protect the national cyberspace.
2. **National Cyber Security Coordination Centre (NCCC - 2017):** The NCCC will perform real-time cyber security threat assessment and create awareness of potential cyber threats to the country.
3. **National Critical Information Infrastructure Protection Centre (NCIIPC):** The organization was created under section 70A of the IT Act and is designated as a national nodal agency in respect of critical information infrastructure protection. It focusses on protecting and safeguarding critical information infrastructure (CII) against cyberterrorism, cyberwarfare and other threats.
4. **Cyber Swachhta Kendra (2017):** The Cyber Swachhta Kendra provides a platform for users to analyse and clean their systems of various viruses, bots/ malware, Trojans, etc.
5. **International cooperation:** For a secure cyberspace, India has entered into nine new bilateral agreements with developed nations such as the US, Singapore and Japan in order to facilitate research and critical information sharing on cyber security. These collaborative efforts will enable India to combat advanced threats.
6. **Sectoral and state CERTs:** The government has launched sectoral CERTs, starting with critical sectors such as power and finance.
7. **Security testing:** There are plans to establish 10 additional standardization, testing and quality certification (STQC) testing facilities across the country for the assessment and certification of IT products. According to the International Telecommunication Union's (ITU) Global Cyber Security Index, India ranked fifth in 2015, but has moved to the 23rd rank among 134 countries in 2017. The security landscape of the country may be further improved with concrete initiatives and learnings from other countries.

Apart from these various national level initiatives, MoUs have also been signed with other countries to collaborate and ensure an enhanced cyber security posture.

Ensuring a cyber-secure Rajasthan

The Government of Rajasthan is the front-runner in terms of embracing the new technologies and leverage the power of Digital to deliver citizen centric services.

The state has launched "**Digital first**" initiative with a mission **to digitally empower the people of the state, especially women, farmers, youth, and children, while changing the face of healthcare, education, agriculture, SMEs and other important pillars of the state's economy**[25].

Rajasthan has also set-up a **Security Operations Centre**, which is one of the most advanced government cyber security centres in India, operating 24x7x365. The centre has adopted Artificial Intelligence-based predictive analysis and has a threat intelligence support from across the globe. The centre also has a dark web monitoring system.

In addition to this, the state has also set up **Centre for Cyber Security** at Sardar Patel University of Police at Jodhpur with the aim to transform into a centre of excellence in the sphere of cyber security. The centre is focused on developing a holistic information security roadmap for the state and help departments of Rajasthan Government including large/medium/small scale units to ensure implementation and awareness of Information Security.

Technology is helping us re-imagine the way services are offered, and with innovations comes new challenges and threats. For organisations, it is imperative to build a robust and secure cyber-security posture to protect themselves from any kind of cyber threats. When cyberattacks happen, most impacted organisations say that they cannot clearly identify the offender. It is also believed that the increasing production of unassertive internet-of-things (IoT) devices is promoting ubiquitous cybersecurity vulnerabilities.

Most of the industry sectors across the world would perform well to stress test their inter-relationship with imitated cyberattack scenarios designed to apprise risk management. Cybersecurity stress test framework will always aim at answering the primary question: "Can I afford to resist the failure of those on whom I depend?"

25. https://inc42.com/buzz/cm-raje-launches-digital-first-initiatives-for-the-police-people-and-forests-at-bikaner-digifest/

PwC has actively collaborated in projects for managing Cyber Security for various departments of the Government of India. Recently, it has been working with UIDAI to beef up the Aadhaar security to construct an additional layer of oversight by closely examining and reviewing the security of the entire ecosystem. This includes UIDAI data centres and servers along with that of government departments and private agencies such as banks that are engaging with Aadhaar for authenticating information relating to the citizens of the country.

PwC will also monitor agencies that are securing the UID infrastructure along with other 3rd party agencies such as ministries and companies using UIDAI database for verification of various kinds of data.

PwC is also involved in Digital India projects and was a key consultant to the government for building the crowd-sourced platform, MyGov.





4. Startups: Leading from the front in the digital space

India is witnessing a transition from an industrial era to a technology era. Technology has been disrupting every walk of our life including our businesses, society and choices. Information technology has become an essential enabler redefining our day-to-day activities, i.e. from the ways of ordering food, to shopping, ride hailing, socialising, and other such things. Success stories of home-grown start-ups have inspired young entrepreneurs to adopt the start-up model and operate in blitz scaling mode thereby driving growth, innovation and problem solving.

Instituted on 16-Jan-16, the Start-up India Initiative has launched several schemes and programmes with the mission of assisting the entrepreneurs, establishing a sturdy start-up ecosystem which is also focused on transforming India into a country of job creators instead of job seekers. These programmes are directly managed by a steadfast Start-up India Team, reporting to the Department for Promotion of Industry and Internal Trade (DPIIT). Start-up India is a flagship initiative of the Government of India, focused on catalysing the start-up culture and create a strong and inclusive environment for innovation and entrepreneurship in India. Metro cities have witnessed the emergence of start-ups rushing to solve important problems and bring about a change in society. The policies laid down by the Government of India have put the focus squarely on making India a leading start-up destination.

Key pillars of support for start-ups under the Start-up India Initiative are[26]:

- Simplification and handholding
  - Easier compliance, simple exit process for deteriorated start-ups, legal support, efficient and quick tracking of patent applications and a dedicated online presence through the website to lessen the information asymmetry
- Funding & incentives
  - Exemptions on Income Tax and Capital Gains Tax for eligible start-ups; a fund of funds to permeate more capital into the start-up ecosystem and a scheme relating to credit guarantee
- Incubation & industry-academia partnerships
  - Creation of numerous incubators and innovation labs, events, competitions and grants

Global start-ups: Trends and culture

This is the era of the fourth industrial revolution, an era of great developments, challenges and innovation, solving global issues like poverty, climate change and clustered global economies.

Silicon Valley, London and New York City continue to lead the global start-up ecosystem in terms of size and performance. Public and private organisations are drafting new integrated ways to support start-ups in various sub-segments like fintech, food processing and AI.

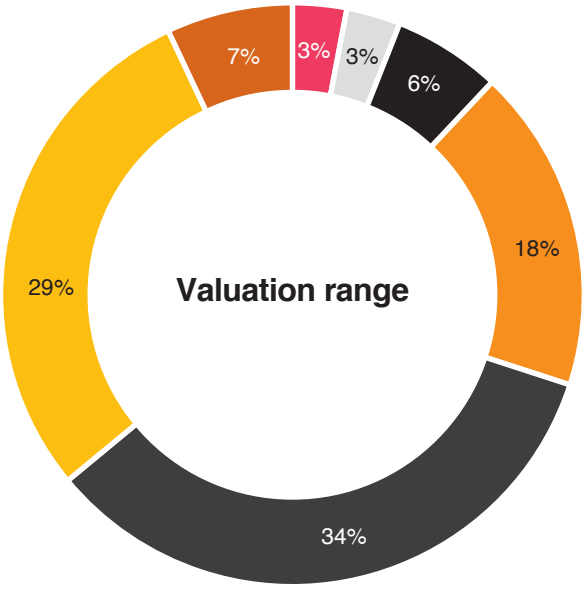
The global startup economy continues to grow, creating US $ 2.8 trillion in value between 2016 and 2018. This is a 20.6% increase from the previous period and more than double what it was just five years ago. This value creation is on par with a G7 economy and bigger than the annual GDP of the United Kingdom. Relatedly, 2018 saw a decade-high US$ 220 billion in total VC investments[26]

Globally, the top 4 fastest-growing startup sub-sectors, namely Advanced Manufacturing & Robotics (107.9%), Blockchain (101.5%), Agtech & New Food (88.8%) and Artificial Intelligence, Big Data & Analytics (64.5%) are all driven by new-age emerging technologies and are influencing the way businesses are done[26]

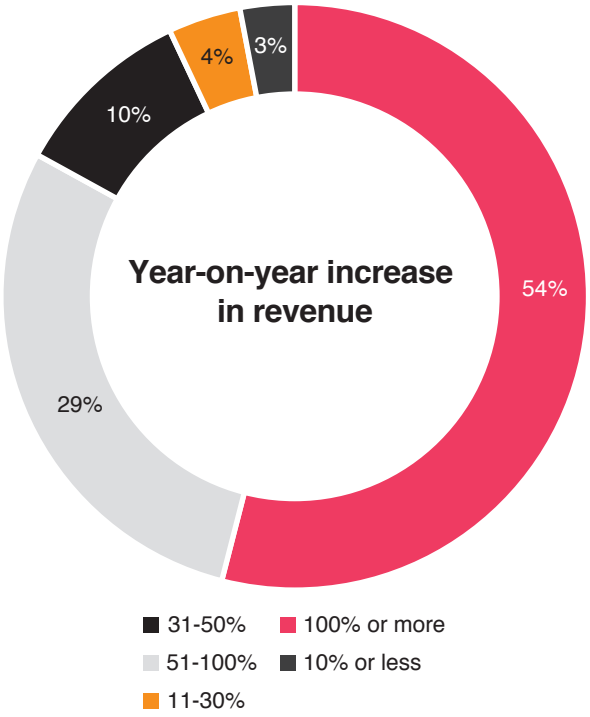
26. https://www.startupindia.gov.in/content/sih/en/about-us.html

The government's role in building the start-up ecosystem is centered on increasing the funding base and providing greater access to capital. It also includes various support policies like property rights, single-window permissions, macroeconomics, and bankruptcy.

It is noteworthy that there are unicorns in 13 sectors, with almost half of the companies concentrated in four industries significantly shaped by technology: enterprise services, media and entertainment, transportation and automotive and financial technology (Fintech)[27]



Growth metrics cited by unicorns[27]



Start-ups in context of the Indian industry

The start-up landscape in India has witnessed significant growth in the past few years. India is proudly the second largest start-up ecosystem in the world; expected to experience YoY growth of 10-12% with~20,000 start-ups; out of which around 4,750 are governed by technology. 1,400 new tech start-ups were instituted in 2016 alone; implying there are 3-4 tech start-ups born every day on an average.[28] Some of the key factors leading to the development of this ecosystem are ease and cost of doing business, proximity between customers and vendors and size of the domestic market.

27. PwC China Unicorn CEO Survey, 2018
28. https://www.startupindia.gov.in/content/sih/en/home-page.html

Small Industries Development Bank of India's ecommerce and service aggregator areas have already been explored and now enjoy a vast consumer base while its segments of fintech, healthtech and edutech are making strides to enter the mainstream corporate space. The Government of India has identified enablers for Indian ecosystem including incubators, accelerators and co-working spaces. 280 such facilities have been created spanning across Tier 1, 2, and 3 cities.

The Government of India has declared various grants to promote startup culture. Fund of Funds for Startups, India Aspiration Fund and ASPIRE Fund are managed under SIDBI (Small Industries Development Bank of India). USD 1.43 billion available for contribution to various Alternative Investment Funds (AIFs)[29]

iStart Rajasthan: A flagship initiative

Rajasthan has been at the forefront of embracing the start-up culture and has performed exceptionally well in the State Start-up ranking exercise 2018. The state has defined important initiatives in implementation of the Start-up policy, seed funding and angel/venture funding. Rajasthan has been acknowledged as a 'Top Performer' in the State's Start-up Ranking 2018 conducted by the Department for Promotion of Industry and Internal Trade, Government of India.

iStart Rajasthan is the flagship programme under the Government of Rajasthan to strengthen, evolve, and facilitate investment in the state, and create jobs at all levels. iStart is an integrated comprehensive platform, facilitating a single-window resource for start-ups, mentors, investors, accelerators and incubators. The focus of this initiative is to support start-ups in the idea stage, early stage and the ones with MVP (Minimal Viable Product). This platform also facilitates these start-ups to bridge with 100+ investors, which are already on board the platform.

In order to create a right mix in the start-up portfolio, the Government of Rajasthan has announced Bhamashah Start-up Promotion Fund of USD 700 million, which encompasses components for women-led and green solutions start-ups and has designated USD 14 million and USD 70 million for both respectively. The funding for green start-ups, which has been capped at USD 0.035 million per start-up, will be disbursed from the funds available with Rajasthan State Pollution Control Board. Start-ups are ranked as Bronze and Silver (capped at USD 0.02 million), Gold, Platinum (capped at USD 0.028 million), and Signature (capped at USD 0.035 million).

Start-ups have been using advanced technologies such as AI and machine learning to provide solutions in diverse areas. They have initiated a convergence of emerging tech, business model and customer requirement so as to create a significant impact on healthcare, economics, jobs, education, and in other facets too. Start-ups need a flying start in digital strategy in the commencement years and be acquainted with new emerging technologies. Budding start-ups are using AI and machine learning to process vast amounts of data to find the optimum solutions.

Healthcare is one of the major sectors where we can significantly leverage the potential of emerging technologies. There are start-ups that are using artificial intelligence (AI) for detecting early stage cancer with sensitivity and specificity as high as 90 percent. Automated diagnostic tool, combines thermal imaging with artificial intelligence providing a solution that strives towards making screening more accessible and affordable for the citizens of India. .

Healthcare can also be an early adopter of Virtual and Augmented Reality. From enhancing the effectiveness of existing procedures to ameliorating the potential to communicate compound and abstract information, thus delivering impactful results to healthcare providers. Various services include delivering virtual therapies at any place and at any time, will empower doctors to unite. It also allows all the stakeholders in a surgical procedure – from surgeons to anaesthetics and operating room staff – to submerge themselves in a 3D environment and collectively analyse patient-specific information.

Finance and Technology are very closely associated and digital innovations have affected the sector drastically over the period. Blockchain technology has the potential to disrupt financial business applications as it provides permanent and immutable recording of transactions in a distributed network. Start-up firms are designing and developing blockchain powered enterprise solutions for smart contracts, supply chain, finance, insurance, healthcare and manufacturing. The product helps suppliers avail loans against approved invoices by the manufacturer with no paperwork.

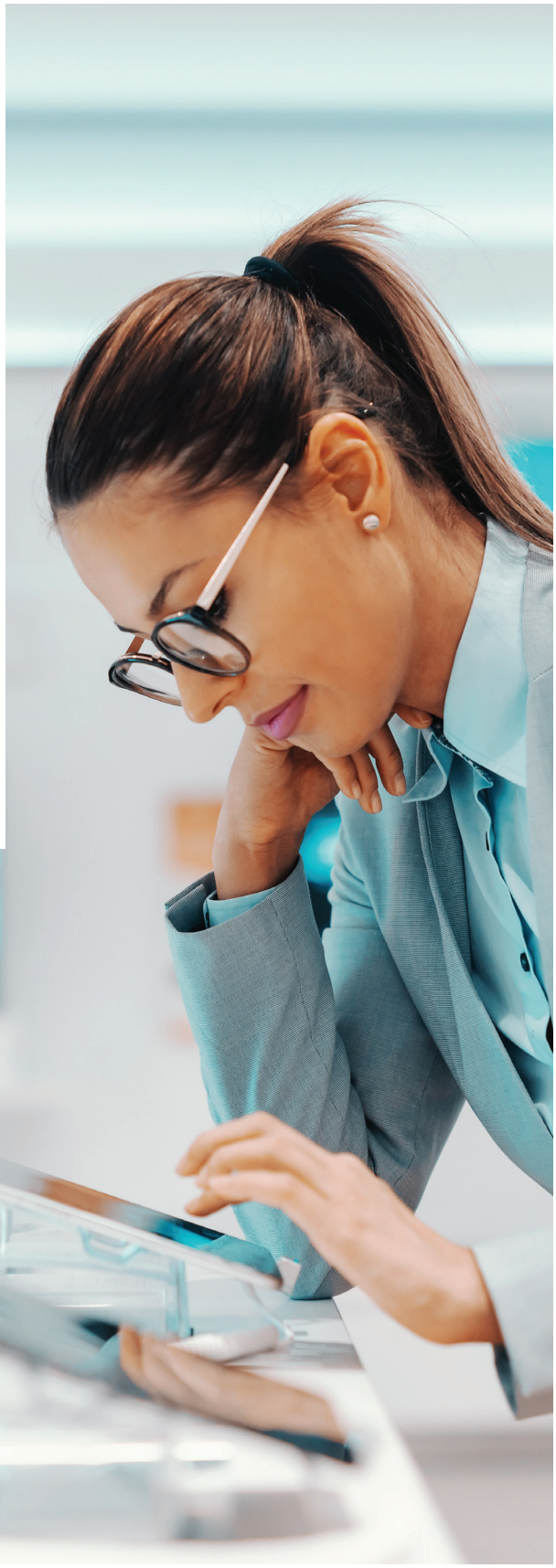
The education sector is not untouched by the potential of technology and is creating ripples in the education sector to revamp the age-old teaching methodologies including components of immersive learning and data analytics. Digital assistants and school ERP solutions are trying to

29. https://www.startupindia.gov.in/content/sih/en/home-page.html

set a personalised approach to imparting knowledge as per the student's learning command. There are start-ups that are providing solutions to boost teacher productivity and encourage parent engagement. The system promotes improved collaboration with better automation. All grade calculations, reports, report cards and sharing results with parents and students happens automatically using digital schedulers.

The government has identified a specific target for start-ups in achieving the USD 5 trillion mission. Some of the biggest business conglomerates operating in India right now have benefitted from government reforms in the 90s to promote industrial production. The government wishes to narrate a similar success story for start-ups. Start-ups already have a significant impact on an individual's life providing utility services like the digital assistant, online marketplace, cabs on the go etc. They would also play important role in driving e-governance initiatives, providing methods of data-backed decision-making, infrastructure development, disaster management and public sentiment analysis. Officialdom is making way for open-door policies and a blitz scaling environment promised by the start-ups.

Be it in the embracing of the start-up culture or digitisation, which is fast-becoming an integral part of the industrial and commercial landscape of the country, it is evident that Rajasthan has chosen to walk on the path of progress and innovation.





About FICCI

Established in 1927, FICCI is the largest and oldest apex business organisation in India. Its history is closely interwoven with India's struggle for independence, its industrialization, and its emergence as one of the most rapidly growing global economies.

A non-government, not-for-profit organisation, FICCI is the voice of India's business and industry. From influencing policy to encouraging debate, engaging with policy makers and civil society, FICCI articulates the views and concerns of industry. It serves its members from the Indian private and public corporate sectors and multinational companies, drawing its strength from diverse regional chambers of commerce and industry across states, reaching out to over 2,50,000 companies.

FICCI provides a platform for networking and consensus building within and across sectors and is the first port of call for Indian industry, policy makers and the international business community.

Contact us

Atul Sharma
Head – Rajasthan State Council
Federation of Indian Chambers of Commerce and Industry
202, Gravita Tower
A - 27 B, Shanti Path, Tilak Nagar
Jaipur – 302 004
T: +91-141-2621345 / 4061345
E: rajasthan@ficci.com
Web: www.ficci.in

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Authors

Pankaj Khurana
Partner
Government and Public Sector
Email: pankaj.khurana@pwc.com

Kushal Bansal
Associate Director
Government and Public Sector
Email: kushal.bansal@pwc.com

Contact us

Shubham Arora
Associate Director
Government and Public Sector
Email: shubham.arora@pwc.com

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Rahul Gupta
Principal Consultant

Kanika Kalra
Senior Consultant

Shashank Mittal
Senior Consultant

Shailendra Singh
Consultant

Editorial support: Arti B. Rau and Vishnupriya Sengupta

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