



Confederation of Indian Industry

The intelligent economy

Leveraging technology for the new era

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PREFACE

Changes are taking place around us constantly, but by the time we realise them, our entire life seems to have changed. While there are many changes that we, perhaps, never think about, there are some that take us through a journey of immense yet exciting transformation. Technological innovations, not surprisingly, are driving most of these changes. Technology has significantly transformed the way consumers behave, the way businesses are conducted today and the way governments function.

Consumers are increasingly becoming technologically more literate and constantly on the look out for better products and services. They now have varied sources to obtain information about the products or services they seek, rather than relying entirely on the marketing departments of different organisations. In addition, consumer-to-consumer interactions have increased multifold and so are the opportunities for new entrants to exploit the finer weaknesses of established players. Technology, thus, is one of the biggest levelers that any economy has ever seen.

Industries are being challenged with the increase in the number of competing players on the back of technology. Smaller firms are confidently challenging the status quo and are aspiring to climb the competitive ladder faster than ever before. With an increase in competition, there is an increase in the pressure on organisations to cut costs, increase margins and, yet, provide better value proposition to customers. Businesses have realised the fact that a 'faster, better, cheaper' approach would no longer work without focussing on technological innovation. The question organisations now face is: Is your innovation innovative enough?

As citizens and the corporate world are adopting technology quickly to address their needs and wants, governments, too, cannot afford to stay behind. 'Digital India' initiative captures this thought as a vision, helping to make India technologically sound, as the government puts its effort into many other initiatives such as Aadhaar, BHIM and DigiLocker. In all these initiatives, technology plays a key role to make things simpler for citizens and help ensure easier governance. The efficiency with which public services are being delivered is rapidly increasing and continuously gaining momentum, with rising acceptance level for these technology-based approaches.





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Disruption is the new normal

The world is witnessing an internet-driven industrial revolution, evident by several billion-dollar start-ups and changes in business models by established firms. Large-scale technology adoption has not only disrupted the industry, but also brought a tectonic shift in consumer behaviour and preferences. There are companies which are valued in billions, having no physical assets, and but still became industry leaders in a very short span of time.

The internet revolution has brought significant changes to the society we live in, and the way businesses, consumers and governments are operating. Modern consumers are no longer dependent on physical banks to transfer money — it can be done using a simple banking application. Shopping has gone ubiquitous with the 'anytime, anywhere' concept offered by e-commerce players, providing a number of options to buy products in different segments. Similarly, e-ticketing has helped save approximately three to four hours of waiting time to book a railway/airline ticket.

This new phenomenon of 'internet economy' is dominated by intelligent and interconnected machines, and self-learning algorithms. A patient in a rural area, sitting far away from a distant metro city, can now consult a doctor with the help of tele-medicine, saving cost and time to access healthcare. Smart health monitors can gather patients' information and fasten the diagnosis process. Furthermore, currently, a three- or four-year-old child can watch his/her favourite cartoons and nursery rhymes on mobile screens.

People all across are getting affected by the wave of intelligent machines and sensors of this era, where multiple segments of the society are getting disrupted in a continuous manner.

Digital technologies of connectivity have one unrelenting promise — they offer innovative ways of doing things, uplift traditional practices and allow new possibilities of information and data transactions that can transform the way we live. Digitisation is essential to

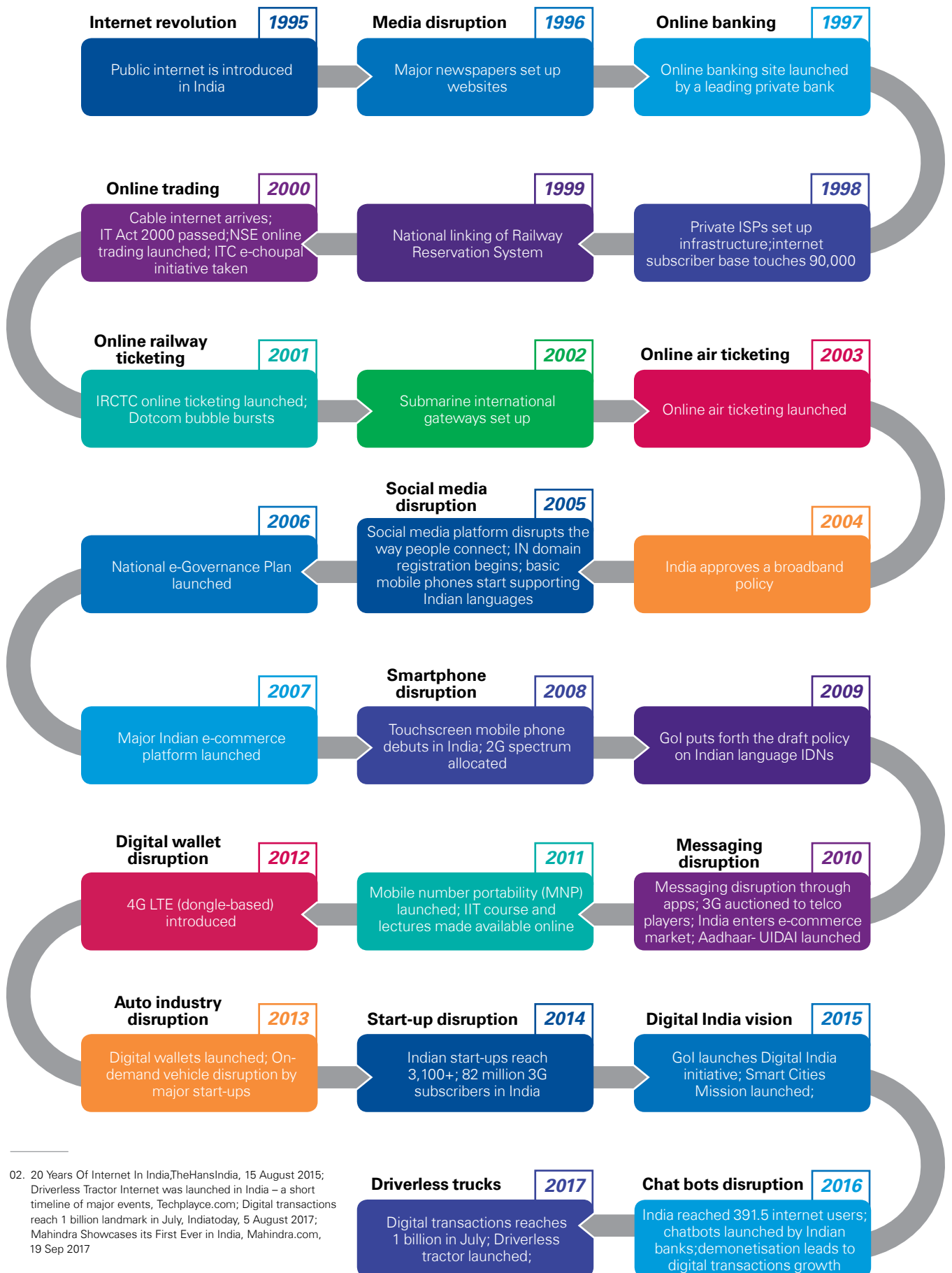
India's transition into a digital native country. India currently has approximately 422 million⁰¹ internet users growing at a rate of 7–8 per cent, which makes India one of the largest market potential for global players. This digital revolution is not only expected to generate new market growth opportunities, but also create many new jobs and revenue streams.

01. Digital Evolution in India, BusinessToday, 29 August 2017



Twenty-two years of digital disruption in India: A timeline

Please note that there may be multiple key events for each year, however only a few have been highlighted



02. 20 Years Of Internet In India, TheHansIndia, 15 August 2015; Driverless Tractor Internet was launched in India – a short timeline of major events, Techplayce.com; Digital transactions reach 1 billion landmark in July, Indiatoday, 5 August 2017; Mahindra Showcases its First Ever in India, Mahindra.com, 19 Sep 2017

Key roles in the intelligent economy

Technology has touched the lives of almost one billion Indians, changing the way they shop, interact, spend time and relax. Even businesses are not far behind — established businesses are feeling the need to re-invent themselves in the wake of new tech-based entrants, who are changing consumer behaviour and increasing the technology expenditure of their competitors. These developments have prompted the government machinery at the national, state and municipal levels to provide their services via the digital mode, resulting in transparency, cost reductions and efficiency.

Digitally-enabled consumers

On the backdrop of these changes, India has emerged as the second-largest internet user market (only behind China — the largest user base across the biggest social media network) and the second-largest market for a leading professional social network^{03,04,05}. Furthermore, during 2014–16, with over 6 billion application downloads, India overtook the U.S., as the second-largest market for Android-based operating systems⁰⁶.

Mobile has emerged as one of the prominent touchpoints for Indian consumers, overtaking other media channels such as television and print media. Currently, Indians are spending 28 hours on their mobile devices, vis-à-vis four hours on television and two hours on print, per week. In addition, of the 28 hours, people are spending 45 per cent of their time on entertainment and 34 per cent on web searching, social media and messaging⁰⁷. This paradigm shift along with smartphone penetration has increased mobile data consumption by 24 times in the last five years⁰⁸.

The paradigm shift in businesses

Technology has significantly impacted the established business practices in India across industries, such as financial services, consumer market and media. For instance, Indian banks have started deploying tech-enabled practices such as chat bots, in-house mobile wallets and virtual cards. In addition, online channels are facilitating digital enablement of front-end services and augmenting physical branches.

Furthermore, the retail industry has also witnessed significant technology-led changes such as the rise of e-commerce, m-commerce and targeted promotional campaigns, and the use of augmented and virtual reality in offline shopping experiences. As online channels gain more traction in the retail industry, the retail firms are leveraging technology to digitise supply chains and launch analytics-driven product advertisements to drive efficiency and increase consumer touch points.

6

billion

app downloads during 2014-16

2nd

largest market for Android after the U.S.

Indians spend

28

hrs

on mobiles in a week

A larger, younger consumer base coming online and the number of women shoppers growing is growing fivefold



03. India now has highest number of Facebook users, beats US: Report", Live Mint, 14 July 2017

04. India ranks as second-largest market for LinkedIn", The Hindu, 29 April 2017;

05. India is now the second largest Internet user market, after China", Forbes India, 2 June 2016

06. India Has Second Largest Android App Downloads: Mary Meeker Internet Trends Report 2017", Inc 42, 1 June 2017

07. Mary Meeker's India Internet Trends 2017: Indians spend 28 hrs on mobile vs 4 hrs on TV per week", The Economic Times, 1 June 2017

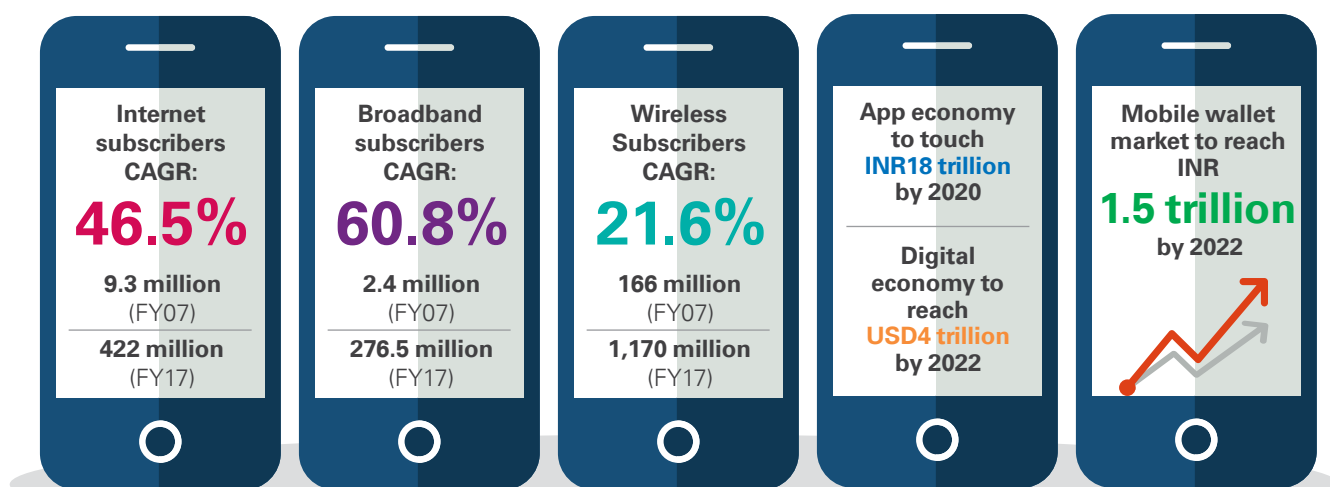
08. Increasing internet penetration to boost revenue from data services for telcos", Zee Business, 31 July 2017

Government's efforts to adopt digital

As consumers and businesses are both going digital, and India is on the cusp of a higher growth trajectory, the government has increased efforts to adopt digital technologies. The 'Digital India' programme has seen significant progress, as over 2 lakh km of optical fibre cable has

been laid across 100,299 gram panchayats, as of July 2017⁰⁹. Through this programme, the government plans to increase the ambit of digital connectivity to the rural hinterlands of the country. The government launched Bharat Interface for Money (BHIM) application in 2016 to promote digital payments and formalise the

economy. The application witnessed significant traction from consumers, as the total application downloads crossed 20 million, having registered 11.8 million transactions on its interface during first quarter of FY18¹⁰.



Sources: 'India's App Economy To Touch Rs 18 Lakh Crore By 2020', Teleanalysis, 14 July 2017 'Digital economy can reach \$4 trillion in 4 years: Tech sector to government', The Economic Times, 18 June 2017 ; 'Mobile Payment Market To Grow Extensively By 2020', CXO Today, 17 January 2017; TRAI: Annual Report 2006-07', TRAI, accessed on 28 August 2017; 'TRAI: The Indian Telecom Services Performance Indicators', TRAI, 5 July 2017; 'TRAI: Press Release', TRAI, 19 May 2017

Case in point: Telangana government leveraging cloud and artificial intelligence¹¹

The Telangana government signed a MoU with an American IT company in November 2016 to leverage its technology expertise in areas such as e-Governance, health, agriculture and education. Furthermore, to support the Rashtriya Bal Swasthya Karyakram (RBSK), a pilot project was launched to promote health and well-being of children. The government leveraged the company's cloud-

analytics capabilities, Network for Eyecare (MINE), an AI platform, for eye screening, and to detect and prevent blindness in children. MINE — a global association of eye specialists, researchers, and academic bodies — deploys AI to eliminate avoidable blindness and provides eye care services around the world.

During the pilot phase of the project in 10 districts, the American IT company conducted a health screening programme for children

up to 18 years of age. The analytic capabilities of the company facilitated identification of major conditions which impacted children's health. Going ahead, the pilot project is now getting implemented state-wide to help the government in early detection and treatment of refractive errors. Almost 6 million children in the state are expected to enjoy the benefits of this project.

09. Government plans Wi-Fi for all panchayats by March 2019 at a cost of Rs 3,700 crore", Bgr, 8 September 2017

10. BHIM app takes on Paytm and others; more cashback likely from Independence day, says report", Financial Express, 7 August 2017

11. Government of Telangana adopts American IT company Cloud and becomes the first state to use Artificial Intelligence for eye care screening for children, Companynews, 3 August 2017

Digital intervention of new technologies

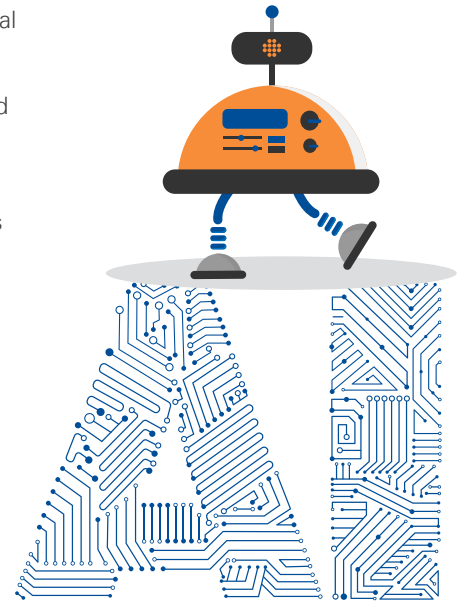
Digital evolution has changed the way things were consumed and businesses were run. Every business is looking towards modernising traditional processes with the help of new technologies and thereby creating new business models. The digital intervention of new technologies, such as cloud, big data, artificial intelligence, Internet of Things, 3-D printing, Blockchain and analytics, are the cornerstone for any transformation. Digital disruption powered by these emerging technologies is leading to a cross pollination of best practices from one industry to another. In India, the financial sector has led to the adoption of digital and emerging technologies, while other sectors like healthcare, automotive and government are catching up fast. In this chapter, we seek to explore new technologies that are disrupting businesses and articulate the state of digital readiness, specifically in the healthcare and automotive sectors.

Artificial Intelligence (AI)

AI is the buzz word in almost every industry. Indian enterprises are also betting big on AI to revolutionise their traditional solutions and processes, innovate and build new solutions, and offer better customer services. Several banks and financial institutions have adopted AI and machine learning technologies to automate highly process-based and data-intensive processes. Some of the leading private banks in India have also introduced AI-based chatbot to interact with consumers recently.

In the retail industry, India's largest domestic e-commerce player has employed over 25 data scientists to use machine learning to predict customers' future purchases based on historical data.¹² In India, AI developments are primarily focussed around enhancing customer products and services. The AI market in India is still at a nascent stage as compared to

that in developed countries like the U.S. and the U.K., where AI is being widely used in almost every industry.



Key drivers:

Building new solutions with AI is leading to new revenue streams for organisations

Growing digital customer base in India

Booming AI start-ups in the country

Wider industry acceptance in terms of cost benefit and product innovation

Key challenges faced in adoption:

Scarcity of experienced and trained workforce

Inadequate infrastructure to adopt AI solutions

Complexity of AI solutions hinders upfront investments from organisations

Lack of regulations and governance framework around AI related technologies

12. The subtle, invisible AI that Indian unicorns have made a part of consumers' lives, QZ.com, 27 June 2017

Robotics Process Automation (RPA)

The RPA revolution is already underway. Indian enterprises have been quick to determine the underlying potential of RPA. The BFSI industry, captives/shared

services centres are leading the RPA adoption in India, to automate rule-based/data-driven/high-volume processes. As per IDC, RPA is one of the key drivers of digital transformation; in fact, Indian companies are aggressively looking to embrace RPA¹³. This is likely

to lead to new revenue streams, agile business operations and help accelerate the pace of innovation¹⁴. According to an IDC survey, by 2019, 30 per cent of Indian organisations are set to hire a chief robotics officer (CRO)¹⁵.

Key drivers:

- Cost reduction, quality improvement and reduction in the rate of errors taking place
- High value creation and enhanced customer service
- Offer differentiation and gain competitive

Key challenges faced in adoption:

- Strategy and change management as RPA brings many changes to internal environment
- Fear of job displacements within an organisation
- Re-skill a large number of population at work

Big data and analytics

Big data and analytics is one the most discussed topics which has disrupted almost every industry in India. According to a research report, Indian Business Intelligence (BI) software revenue is set to reach USD245 million in 2017, a 24.4 per cent increase over 2016

revenue of USD206 million.¹⁶ Indian companies and the government have implemented big data projects in almost all sectors including healthcare, consumer goods and retail, finance, banking, telecom, and media and shipping industry, across multiple-use cases. India is one of the emerging and growing

hubs for analytics, where start-ups are playing a major role by offering innovative products and solutions. Analytics is driving the 'digitisation of data revolution', where large data pools now can be analysed within seconds to arrive at accurate decisions.

Key drivers:

- Increase in demand for outsourced analytics work
- One of the largest bases of analytics start-ups in the world
- Strong adoption by SMEs in the country
- Cloud-based solutions and predictive analytics

Key challenges faced in adoption:

- Data sovereignty leading to new challenges for enterprises
- Face data theft, reputational and legal risks
- Manage multi-country laws and comply with local country laws

13. How RPA is redefining jobs and business processes, Computerworld.com, 3 April 2017
 14. How RPA is redefining jobs and business processes, Computerworld.com, 3 April 2017

15. How RPA is redefining jobs and business processes, Computerworld.com, 3 April 2017
 16. Indian BI software revenue to reach USD 245 million in 2017: Gartner, ChannelWorld, 6 June 2017


Internet of Things (IoT)

The IoT is one of underlying technologies in building smart enterprises, and several initiatives have been proposed under the Smart City Mission and Digital India projects. The IoT is poised to transform the way data is consumed and generated by businesses, consumers and industries. According to IDC, the worldwide IoT market spend is likely to reach USD1.29 trillion¹⁷ in 2020. India is also expected to cross more than a billion sensor devices in the coming years.


Although the current demand for IoT in the country is yet to increase significantly, the country ranks the second-highest, behind China, in IoT-enabled customer maturity compared with that of other APAC markets, according to a report published by Genesys and IDC.¹⁸ Government initiatives, including Make in India and Smart Cities Mission, are likely to drive the demand for IoT-based products and solutions in the country. As IoT forms the underlying technology for various other transformative technologies like connected

cars, smart homes, smart cities, broadband highways, etc., many industries in India have linked their growth with IoT. The Government of India has also launched the first draft of the policy around IoT to support digital initiatives in the country.

Key drivers:



Government's new initiatives (Smart Cities Mission, Make in India, Digital India, etc.) driving the demand for IoT-based solutions




Rise of tech-savvy customers, and increased smartphone and internet penetration


Key challenges faced in adoption:




Slow internet connectivity



Lack of interoperability standard



Lack of security and privacy (as internet services involve sharing of personal information)



Lack of industry standards governing the IoT



17. IoT market spend likely to grow to USD 1.29 trn in 2020, Ptinev.com, 12 October 2017

18. India Leads In IoT Adoption In APAC: Study, CXOtoday, 14 March 2017

Disruption in India's healthcare sector

Digital changes or transformations are taking place across every sector today. New technologies like AI, cloud, big data and analytics, 3D printing, wearables, tele-medicine, robotics and mobile applications have disrupted the way healthcare services are provided to the common man. India's healthcare sector has also been gradually disrupted with interventions from these new technologies. According to Frost and Sullivan, India's healthcare IT market is expected to be worth USD1.45 billion in 2018, more than thrice the value (USD381.3 million) reached in 2012.¹⁹ The convergence of

healthcare with new technologies is likely to play a key role in improving the quality of healthcare services in India. Using technology, India has a big opportunity to correct the uneven doctor-patient ratio. The healthcare sector in India provides a significant opportunity for innovation to cater to the growing needs of healthcare services. The sector has been witnessing an increase in the number of start-ups, challenging and disrupting the existing business model. This is compelling the traditional players in the market to review their strategies and alter the way they provide services to match the evolutionary pace in the industry.



Technologies impacting India's healthcare sector

| Technology | Drivers | Barriers | Future |
|---|--|--|---|
| Mobile health applications (m-health apps) | <ul style="list-style-type: none"> Low penetration of physicians Growth in consumer awareness. | <ul style="list-style-type: none"> Poor network coverage Illiteracy and lack of awareness Low mobile spend in rural areas. | With growth in consumer awareness and the government's initiatives to digitise healthcare touch points, the mobile health application market in India is likely to grow at a faster pace. |
| Cloud | Cost-effective cloud-based solutions are driving adoption of HMIS and EMRs, Foundation for new technologies (such as IoT and Analytics). | <ul style="list-style-type: none"> Inadequate IT infrastructure Low IT budget in Indian hospitals. | Cloud adoption has been a positive growth rate in the past few years. However, there is significant scope for the medical sector to embrace cloud technology in India. ²⁰ |
| Wearables | <ul style="list-style-type: none"> Increase in smartphone penetration Basic wearable devices and their affordable prices. | <ul style="list-style-type: none"> Device inaccuracy, and security- and privacy-related challenges Unclear value proposition of wearable devices by sellers. | Wearable market in India is still at a nascent stage; it is expected to witness growth in the near future. ²¹ |
| Big data and analytics | <ul style="list-style-type: none"> Data analysis of clinical and non-clinical data Personalised health check-ups. | <ul style="list-style-type: none"> Unreliable quality data collection Secured storage challenges. | Slow and gradual adoption of analytics in India's healthcare sector. Analytics holds a lot of promise in India in the near future. ²² |
| Artificial Intelligence (AI) and cognitive technologies | <ul style="list-style-type: none"> Diagnoses and treatments for complex medical problems Indian start-ups driving AI solutions in India. | <ul style="list-style-type: none"> Complexity of AI solutions and functionalities Less trained manpower in using AI- and cognitive-based systems. | Currently, AI implementation is at a very nascent stage in Indian healthcare sector; which is expected to grow in the near future with wider acceptance from the healthcare providers in India. ²³ |

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19. How technology is changing the face of Indian Healthcare, ET, 2 April 2014

20. The Future Of Cloud Computing In Healthcare, CXOtoday, 31 May 2017

21. Wearable technology is expected to go mainstream, Financialexpress.com, 9 June 2017

22. Healthcare gets data analytics booster, LiveMint, 5 Nov 2016

23. Supercharging the Indian healthcare industry with Artificial Intelligence, ET, 24 May 2017

| Technology | Drivers | Barriers | Future |
|---|--|---|---|
| Telemedicine | <ul style="list-style-type: none"> Absence of quality healthcare in rural areas Low doctor-to-patient ratio in rural areas Low-cost delivery model for hospitals. | <ul style="list-style-type: none"> Last mile internet connectivity not yet achieved Fluctuating network and speed Unaffordable connectivity, high initial cost of setting up a telemedicine network Unavailability of trained manpower. | Telemedicine is already used by the Indian doctors to diagnose patients in rural areas, but the current rate of telemedicine penetration is quite low. However, with the government's efforts to bridge the connectivity gap, the penetration of telemedicine in the country is quite likely to grow. |
| Internet of Things (IoT) | <ul style="list-style-type: none"> Decline in the cost of sensors, rise of mobile applications, Rise in patient engagement initiatives and new government initiatives. | Privacy and security concerns, data sovereignty issues, inter-connectivity issues, low consumer (patients) awareness or acceptance. | IoT is here to stay and would slowly transform India's healthcare sector in the next few years. |
| 3-D printing | <ul style="list-style-type: none"> The cost for 3-D printing has declined significantly in the past few years Practicing on customised organs has helped doctors to decide the best treatment possible Reduced cost of operation. | <ul style="list-style-type: none"> Low awareness amongst patients and doctors Unaffordable Lack of regulatory guidelines for the use of 3-D printing. | 3-D printing is one of the most valuable technologies for the Indian healthcare sector, it is likely to spread its reach and penetrate deeper into India's healthcare market. ²³ |
| Augmented Reality (AR) and Virtual Reality (VR) | <ul style="list-style-type: none"> Immersive and experiential training and education for doctors and paramedics. | <ul style="list-style-type: none"> High cost of AR and VR devices Scarcity of trained manpower to operate such devices. | AR and VR are slowly being adopted in the Indian healthcare space; these technologies are likely to see greater adoption in the next 5–10 years in India. ²⁴ |



24. 3D printing revolutionising Indian healthcare, Biospectrum, 27 April 2017

25. Virtual & Augment Reality Overcoming Limitations in Healthcare, WITS Interactive, August 2017

Disruption in the Indian automotive sector

Technology, connectivity and innovation have completely disrupted the automotive sector. New-age technologies such as artificial intelligence, industrial robots, sensors, automation, machine learning, IoT and 3D printing are disrupting all major functions in the automotive value chain. India's automotive sector is one of the largest in the world and has attracted several global brands to set up manufacturing units. The automotive sector contributes more than 45 per cent to the country's manufacturing GDP (and about 7.1 per cent to India's GDP), employing 19 million people²⁸. To further propel the growth, the government has also taken certain steps under the 'Make in India' initiative. The new government also envisions to move completely towards electric vehicles (EVs) by 2030.²⁶

New-age technologies are yet to achieve strong footholds in India's automotive sector when compared to that of other developing nations. With the growing influence of digital in the country, India's automotive players could leverage new-age technologies to innovate and compete on the global platform.

Disruptive technologies are likely to impact the automotive sector in India

On-demand vehicle platforms:

On-demand vehicles have already transformed India's automotive sector over the past three years. The on-demand vehicles market in India is now led by cab aggregators, ride sharing and self-driven rental car start-ups in India.

Connected vehicles: There is expected to be a quarter of a billion connected vehicles on the roads globally by 2020.^{27,28} India is still at a nascent stage to fully adopt connected vehicles technology. Connectivity has the potential to transform India's automotive sector completely, as features like safety sensors, smartphone integration, engine maintenance signals, etc., could be utilised to improve the overall transportation system in India. One of India's leading automotive manufacturing players²⁹ recently entered into a partnership with a leading U.S.-based IT major to use cloud technology to build artificial intelligence and cognitive platforms for its vehicles.

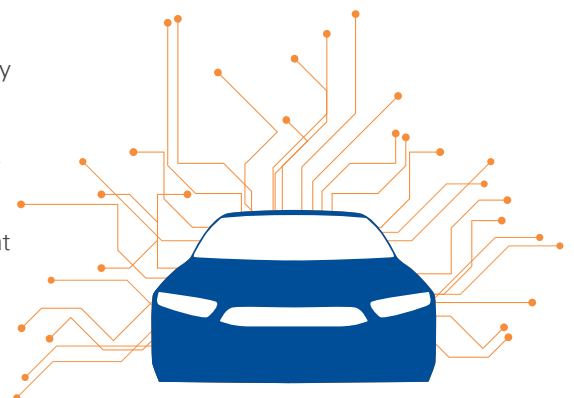
Self-driving vehicles: While the self-driving cars have created headlines globally, India's market still seems to be at a distance to adopt the phenomenon. The government has not shown much interest in self-driving vehicles with an intent to save the jobs of millions of drivers in the country. Apart from this, road infrastructure and chaotic traffic are two major drawbacks that need to be curtailed before any self-driving vehicle can be allowed on the roads.

Automation and robotics: These have made inroads into India's automotive sector. India is gradually moving towards increasing automation, especially in car manufacturing with a judicious mix of people and machines. One of the largest car makers in India has deployed more than 2,000 robots at its weld shop.³⁰

Additive manufacturing and 3D printing:

In the global scenario, additive manufacturing and 3D printing have witnessed unparalleled adoption in the automotive sector. In the automotive sector, additive manufacturing and 3D printing are being used in new product development, manufacturing automotive prototypes and on-demand spare parts. The technology has been widely accepted globally, while it is still making inroads into India. Currently, India's automotive companies primarily use 3D printing for creating rapid prototypes³¹.

IoT: Companies around the world are investing a lot of money into IoT, as it forms one of the major components for connected, self-driving cars and Industry 4.0. IoT adoption in India is poised to grow in the next few years as India's automotive manufacturers are gradually adopting connected technology in vehicles. In pursuit of making India a manufacturing hub, the government's 'Make in India' initiative is expected to drive the wider adoption of IoT in the country.



26. India is about to embark on the most ambitious electric-car transformation in the world, QZ.com, 19 September 2017;

27. India – the world's hottest connected vehicle market, Automotivemegatrends.com, 20 March 2017

28. Gartner Says By 2020, a Quarter Billion Connected Vehicles Will Enable New In-Vehicle Services and Automated Driving Capabilities, Gartner, 26 January 2015

29. India finally gets a connected vehicle strategy, automobile manufacturer partners with leading American IT giant, YouStory, 24 March 2017

30. Robots sweep across India's largest carmaker shop floor, LiveMint, 9 May 2017

31. Think it, print it, The Hindu, 14

Enabling the digital enterprise

When the order of the day is 'Either disrupt or get disrupted', it is obvious that organisations would prefer the former. What is that really separates disruptors from others that get disrupted? To answer this question, one should dive deep into the minds of digital disruptors to know how they operate in the current world. In the blink of an eye, digital disruptors can completely alter the way a business is carried out, which in turn could force well-established companies to either adapt the new norm or simply perish. The rules of the game change so fast that sometimes it can even put existing companies out of business.

What really drives these digital disruptors? How do they think? What motivates them to do what they do?

Firstly, digital disruptors are always on the look out to challenge the status quo in the market. They embark on a journey to change the so-called norms in the industry and refuse to conform them. Digital disruptors develop a compelling vision to lead technology-driven disruption rather than following one.

For instance, healthcare generally is looked at as an expensive and, sometimes, inefficient affair — and yet it is extremely crucial. Thus, it makes complete sense for companies to try and reinvent the ways through which common people can experience efficient healthcare services at an affordable price. With the doctor–patient ratio in India being alarmingly low at 1:1,700, patients completely

depend on specific doctors for critical information and treatment, making the business of medicine ripe for disruption. Some of the digital disruptors in the healthcare space have totally changed the 'sacred bond' between doctors and patients. One of the well-known Indian healthcare start-ups has changed the way patients evaluate and choose doctors. Its entry into the market and further success can be attributed to the following points:

- Healthcare concerns in India and the poor doctor-to-patient ratio
- Healthcare practitioners and establishments being averse to adopting technology
- India becoming one of the largest smartphone markets in the world

In the U.S., many telehealth companies are bringing accessible healthcare propositions to workplaces wherein employees can easily get in touch with doctors through video conferencing facilities available in booths placed in offices. The doctor can diagnose patients remotely using these facilities and, if required, send a prescription to a nearby pharmacy.

Similarly, cab aggregators in India provide organisations the ability to take care of employee transportation without really owning cars, worrying about the installments, spending on fuel and maintenance, etc. They have also given organisations an incredible control in the way they want to manage transportation services for their employees, such as giving them a free ride during odd hours,

setting monthly allowances and deciding which employees get the benefits. Cab aggregators make things even simpler for consumers who are now all the more familiar and comfortable using application-based platforms to book cabs, rather than going through websites or phone calls. The primary success of the aggregators can be attributed to the flexibility, transparency, ease of usage and ease of manageability they have offered to organisations and riders alike, when compared with the traditional cab service providers based on value propositions and pricing models.

Becoming a digital disruptor thus involves giving customers numerous compelling reasons for them to choose new products or services over existing ones — reasons that customers may already be looking out for. Most disruptors in the industry have differentiated themselves by leveraging technology effectively and are adding value to their customers in terms of:

- creating a marketplace of products and services
- achieving cost savings
- unbundling features that were earlier available as a whole
- offering convenient payment options (pay-as-you-go model or pay-per-use model for features)
- offering transparent processes
- Improving convenience.

Becoming a leader in the digital era

New technology is clearly at the heart of digital disruption. The future of technology is unpredictable and organisations are finding it challenging to adapt to latest technologies, let alone predict their future.

We recommend that organisations focus on the following areas when planning their approaches towards digital transformation:

Leadership drive: The first and foremost step is to make every initiative aimed at digital transformation, with a top-down approach. It effectively means that CEOs must move away from operational issues and focus on challenges of strategic importance. The senior leadership team members in an organisation need to become advocates of the digital revolution and evangelise the initiative internally.

View it as a strategic, enterprise-wide approach: The digital transformation journey for any organisation need to be a strategic focus rather than an approach to derive operational benefits for individual business units. Benefits from such transformation initiatives would be truly realised only when it is done enterprise-wide, thus making the use of synergies across business units and eliminate duplication of effort. It also involves the entire organization, which is undergoing a cultural shift, in order to accept the changes. Such efforts would only be successful if CEOs drive and promote initiatives rather than individual leaders in respective business units.

Encourage innovation: If one closely monitors the companies bringing in disruption to existing businesses, it is possible to identify that the only common element that connects them is 'innovation'. Therefore, to remain successful, well-established organisations need not just focus on surviving disruptions, but also focus on disrupting their own industries.

For achieve this, organisations need to encourage innovation within and latch on to ideas that may be their next big ticket to success. Conscious efforts must be taken to generate ideas from all quarters of the organization. In addition, there is a need to understand that innovation ideas would entail risks. Businesses, thus, need be careful while choosing ideas, which are in line with their digital vision and come up with risk mitigation strategies for all the potential risks associated with chosen ideas. Furthermore, innovative ideas need to be managed and executed separately, away from the mainstream activities of an organisation so that there is special focus on successful execution.

Develop digital competencies: Digital transformation means new technology and new technology means acquiring completely new skills to manage them effectively. This is by far the greatest challenge faced by many organisations looking to go digital as the talent pool for working with such technologies is quite limited currently. Organisations need to develop internal workforce

to manage these emerging technologies effectively and also be on a constant look out for relevant talent outside organisation. This may include potential acquisition which could add a great deal of value to the existing talent pool in an organisation.

Agile, yet stable IT: A good strategy is incomplete without a great operating model to support it. The focus for businesses is to be light on feet and cater to customer requirements extremely efficiently. IT in an organisation need to be able to deliver this seamlessly and yet not lose control of stability. IT determines that all business units in an organisation work together without boundaries to achieve a common goal. The bottom line is that even though the IT in an organisation has to continue existing systems where the focus is on stability, reliability, security and cost-efficiency, it needs to be prepared to be able to support new-age digital technologies that drive revenue and growth.



Challenges in the journey of digital transformation

While the benefits of digital transformation for a business are many, there are even more challenges. Not many organisations sustain the focus that they begin with owing to numerous challenges they face on the way; digital transformation eventually becomes an abandoned cause with no one to take care of it. The key challenges that hinder digital transformation initiatives in organisations are as follows:

Lack of a clear vision:

Organisations sometimes embark on a digital transformation journey without deciding on a destination. This is a definite recipe for a failure, as they tend to place more emphasis on the initiative taken rather than the objective to be met. The leadership team of an organisation need to have a clear vision and understand the benefits that they would like to derive at the end of the journey.

Legacy infrastructure:

Organisations targeting digital transformation need to possess the ability to provision IT infrastructure quickly and cost-effectively to cater to new and innovative

business demands. Furthermore, IT infrastructure needs to be scaled either up or down rapidly in response to numerous vital factors. One effective way to do this is by using on-demand, cloud-based infrastructure. Hence, it is all the more important that new solutions are tightly integrated with existing legacy applications and databases. New technology must be interoperable with the existing technology stack to protect investments, both old and new.

Cyber security: According to KPMG in India's CEO Outlook 2017 — Disrupt and grow, 84 per cent of India's CEOs surveyed are planning to invest significantly in cyber security over the next three years. This is one of the vital concerns of organisations adopting digital transformation initiatives. Leveraging new technology always needs a two-pronged approach.

On the one hand, organisations must focus on the benefit realisation from new technology investments, while on the other hand, they need to be wary of cyber criminals trying to steal sensitive data from their systems.

Shortage of digital talent:

According to KPMG in India's CEO Outlook 2017 - Disrupt and grow, 72 per cent of India's CEOs surveyed responded that their focus is on recruiting new skills and specialists. Effective talent management for handling new technology investments are of vital importance for the success of such enterprise-wide transformation initiatives. There is a shortage of skill sets and competencies currently when it comes to latest technologies and, hence, organisations need to deal with this challenge effectively.

Outdated operating model:

Digital transformation involves clarity of objective i.e., being clear about customers' needs and the way competitors are approaching to meet those needs. It means that special effort needs to be taken to listen to the voice of customers and alter the operating model, if necessary, to satisfy their expectations. Most of the time, it not the business that gets disrupted, rather it is the business model; hence, care must be taken to be on a constant look out for inefficiencies in the existing operating models.



33. India CEO Outlook Report 2017, KPMG in India, August 2017

34. India CEO Outlook Report 2017, KPMG in India, August 2017

Recommendations to the government and industry

India has successfully begun its journey to transform itself into a digital economy. The government has spearheaded this transformation by launching initiatives like Digital India in order to boost digital adoption amongst consumers. In addition, many multinational companies in India are also embracing technologies that could transform their enterprises into digital ones. As India continues to leverage new technologies to transform its industry, governance, businesses, society and economy, there is a pressing need to address some of the major challenges:

- 1) last mile internet connectivity, speed and broadband infrastructure
- 2) shortage of skilled manpower on new and advanced technologies
- 3) lower digital and mobile literacy rate
- 4) insufficient innovative products relevant to the need of rural India to fully leverage government's various new tech-related initiatives, and
- 5) growing threat of cyber-attacks.

Reskilling the workforce: There is an immediate need across all industries to reskill the entire tech workforce on new-age technologies, such as machine learning, artificial intelligence, IoT and 3-D printing. Industry players can tie-up with academic institutions for skill development on these new technologies.

Bridging the digital divide: There exists a significant digital divide in India pertaining to digital technologies. Firstly, rural areas in India have limited access to digital technologies due to high costs, inadequate infrastructure, internet connectivity challenges and intermittent electricity supply. Secondly, people in rural India are merely trained on the usage of digital technologies. This divide also obstructs people living in rural areas to understand the real benefits of various government initiatives, such as Digital India and Skill India. Lastly, the spending on internet

and mobile is significantly low in rural areas due to unaffordability. The government and industry can collaborate to resolve this digital divide by increasing awareness regarding the value-add offered by new technologies, deliver services via relevant technologies that support their vernacular languages and incentivise the rural population to make them afford the internet.

Regulatory framework for the usage of new technologies in the industry: The government needs to come up with a thorough framework for successful adoption of new technologies by India's industry players. Currently, there is a lack of clarity around the use of new technologies, such as 3-D printing, Industrial IoT, robotics, connected and autonomous vehicles and Industry 4.0. Although the government has recently released draft policies around IoT and M2M technologies, there is a need for a comprehensive framework for all new-age technologies that could affect all industries in the future in India.

Innovative and collaborative ecosystem: There is a need to create a flexible environment that allows open collaboration between industry and academia. The government and industry could partner with academic institutes to open more such entrepreneurship cells that propel creativity and risk-taking initiatives, and bring enthusiasm to continuously find better solutions to challenging problems.

Boost innovation amongst start-ups: India has one of the largest start-up ecosystems in the world, however, it still lags behind the innovation curve. According to a study conducted by one of the leading American IT major, based on a survey done in collaboration with Oxford Economics, more than 90 per cent of the start-ups

in India fail in their first five years³⁵. The most common reason for failures, according to the study, is lack of innovation. In this context, technology players can play a significant role to boost innovation amongst start-ups in the country. They can collaborate and partner with start-ups to enable the development and advancement of the entire ecosystem where innovation has become paramount for survival.

Need for a strong security and privacy framework: With the move towards digital transformation, India is painting itself as a significant potential target for cyber-attacks. According to Symantec's 2017 Internet Cyber Security Threat Report, India was ranked as the fifth-most vulnerable country³⁶ in the world in terms of potential cybersecurity breaches. The government has taken several steps, lately, to strengthen India's cybersecurity framework by setting up National Cyber Coordination Centre, creation of the Cyber Operation Centre and the National Critical Information Infrastructure Protection Centre (NCIIIPC). As the technology keeps on advancing, the nature and threat of cyber-attacks also keep evolving. The government needs to continue boosting its existing cybersecurity framework to be prepared against new breed of cyber-attacks, which can be done by having innovative solutions based on stricter data security laws, stricter policies around cybercrimes, more awareness amongst industry and consumers, and collaboration with technology security service providers.

35. 90% start-ups in India fail within 5 years, BusinessLine, 17 May 2017

36. Here's Why India Needs To Continue Boosting Its Cyber Security, Dailyhunt.in, 9 September 2017

KPMG in India

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The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

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