

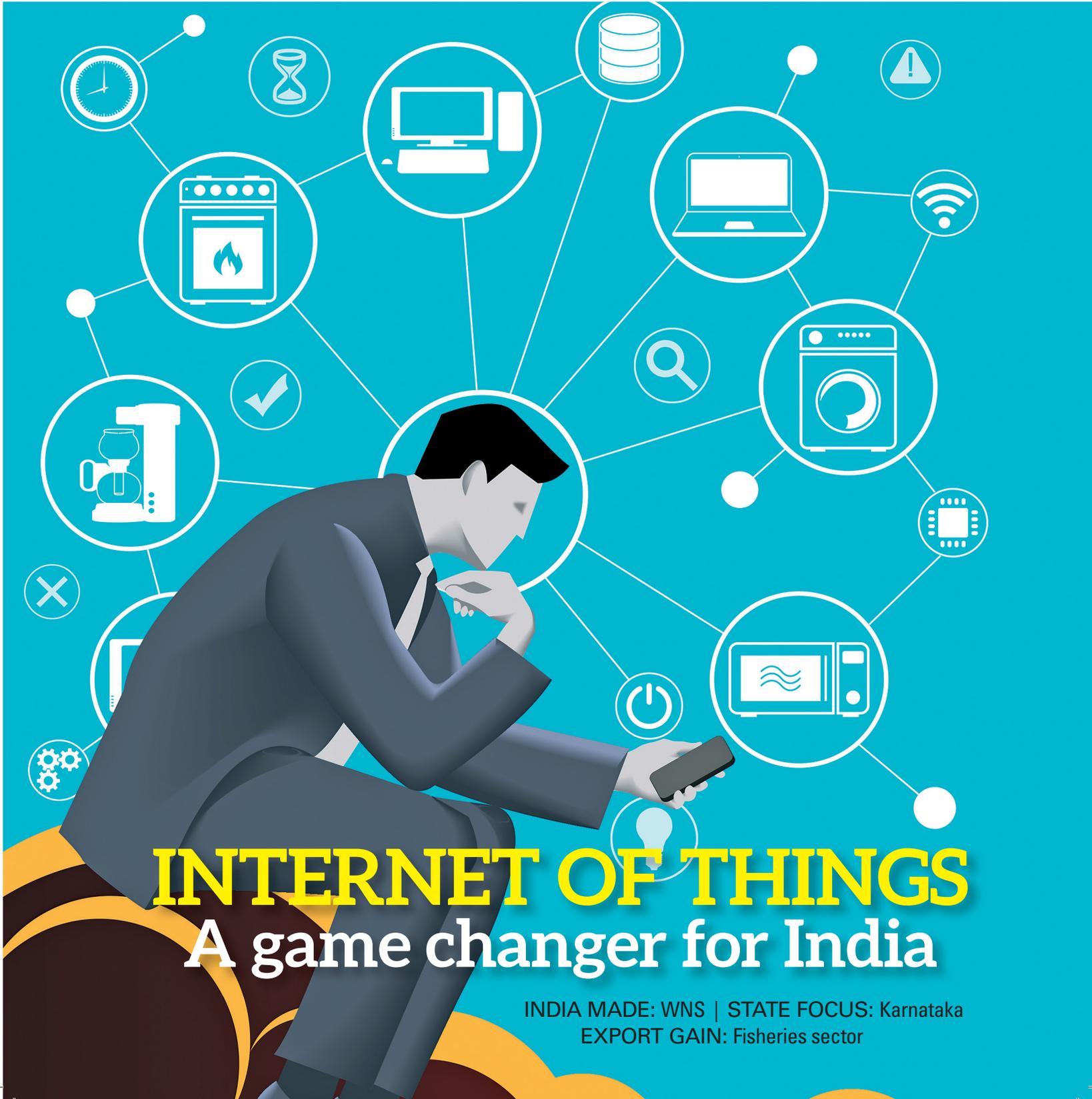
VOLUME 04 | ISSUE 04 |

IndiaNow

BUSINESS AND ECONOMY

DECEMBER 2017-JANUARY 2018

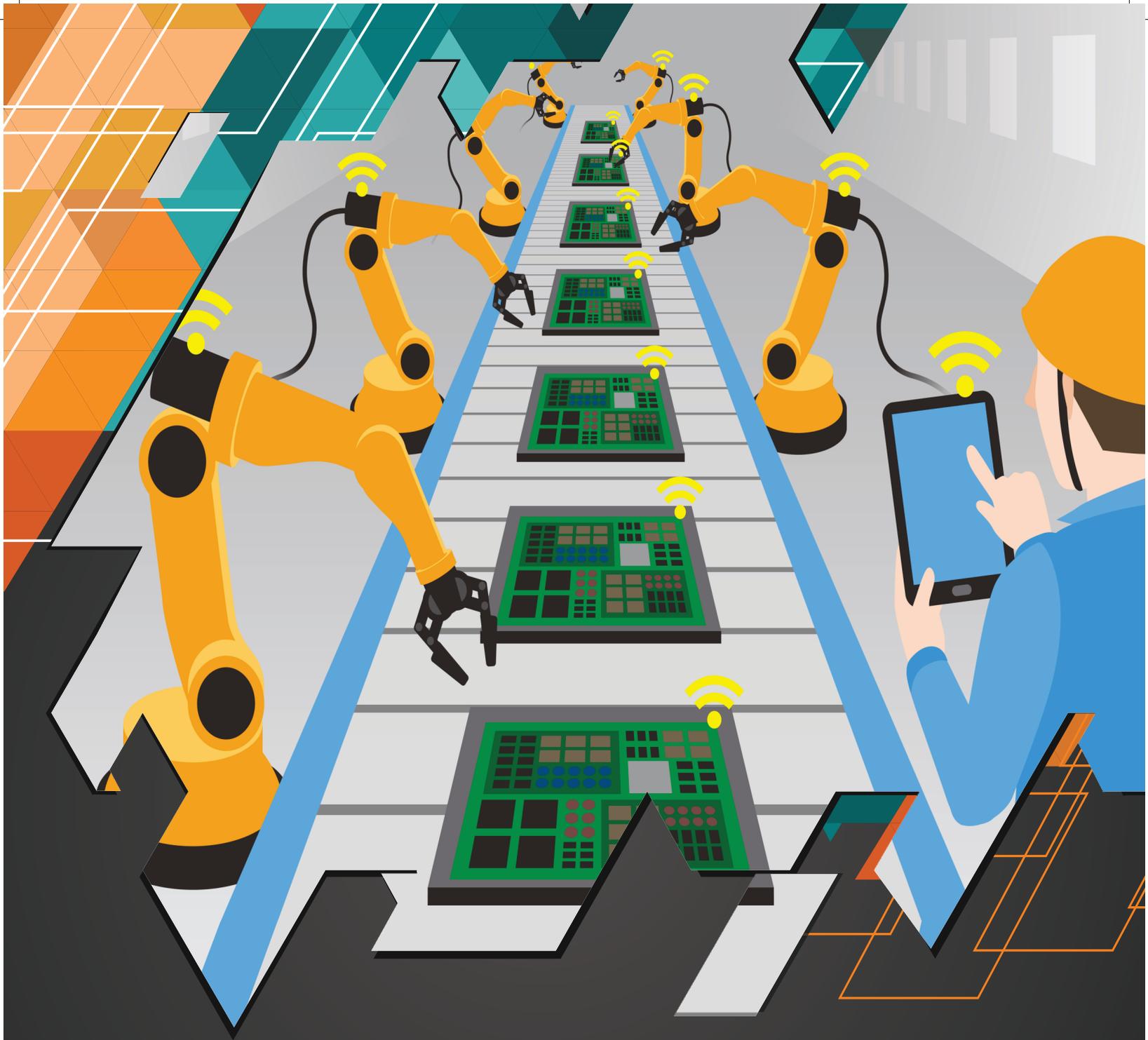
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INTERNET OF THINGS

A game changer for India

INDIA MADE: WNS | STATE FOCUS: Karnataka
EXPORT GAIN: Fisheries sector



ON THE RIGHT TRACK

India's electronic products industry is expected to reach US\$ 75 billion by 2017



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CEO SPEAK

DEAR READERS,

The presence of ten esteemed leaders of ASEAN nations at India's Republic Day celebrations this year marked a 'historic milestone' in their growing bilateral partnership, as pointed out by Hon'ble Prime Minister Mr Narendra Modi in his column titled *ASEAN-India: Shared values, common destiny*. It also commemorates the completion of 25 years of the ASEAN-India Dialogue Partnership.

India has a long history of commercial and cultural linkages with the ASEAN region. As the country progressively embraced liberalisation in the early 1990s, it also adopted a 'Look East' policy to widen its global horizons, and relations with ASEAN nations have remained a critical component of this policy. This has evolved into a more dynamic and outcome-oriented policy approach in tune with the evolving global scenario. Under the present government, India formally enunciated the 'Act East' policy in 2014, with a focus on accelerated engagements between the two regions across the board. Currently, there are 30 dialogue mechanisms between India and ASEAN across sectors.

Indo-ASEAN bilateral trade and investment have witnessed a steady increase over the years, and ASEAN is currently India's fourth largest trading partner. Bilateral trade reached US\$ 70 billion in 2016-17 as compared to US\$ 65 billion in 2015-16. India's exports had increased to US\$ 31.07 billion during 2016-17 from US\$ 25 billion in 2015-16, while imports rose by 1.8% year-on-year to US\$ 40.63 billion. FDI inflows into India from ASEAN countries stood at US\$ 514.73 billion during April 2000 to August 2017, accounting for 12.5% of India's total inflows (Ministry of External Affairs). FDI outflows, on the other hand, from India to ASEAN countries reached US\$ 38.67 billion during April 2007 to March 2015 (Department of Economic Affairs). The two sides formalised the ASEAN-India Trade in Goods Agreement in 2009, and signed agreements on trade in services and investments in 2015, thereby completing the ASEAN-India FTA.

In order to improve mutual trade and investment, the Ministry of Commerce and Industry and Ministry of External Affairs organised the ASEAN-India Business and Investment Meet and Expo 2018 during January 22 to 23. For this event, the Trade Ministers of ASEAN member states were invited by the Hon'ble Commerce and Industry Minister Mr Suresh Prabhu. IBEF was engaged to help develop a uniform fascia design to showcase the presence of India and ASEAN countries in the exhibition area and also creatives to cover all strategic positions across the venue and outdoors.

In addition, IBEF was involved in branding for three major international events during the December 2017-January 2018 period. At Arab Health 2018, held in Dubai, IBEF showcased its strengths in the healthcare and medical devices sector and managed the branding and communication for the Indian medical devices sector through strategic venue branding and media coverage. The second event for which IBEF extended branding support was Heimtextil Germany, where India was represented by over 300 exhibitors from various EPCs. Finally, IBEF handled the brand campaign for the Indian leather sector at Expo Riva Schuh, Italy through venue branding at prominent locations including main lobby escalators, hall entrance digital screens, and reception screens. Expo Riva Schuh is one of the largest footwear expos, in which over 100 players participated from India this year.

Ms Anu P. Mathai
CEO, India Brand Equity Foundation

EDITORIAL

DEAR READERS,

A powerful disruptor, the rise of IoT has several implications in a country like India. It has immense power to transform—from how cities are built to how businesses are run and how individuals organise their daily life. Take Amazon Echo, for instance, a smart speaker that serves as a home automation hub that helps one make to-do lists, set alarms, and play audio books; it also provides latest weather, traffic, and other real-time information updates. A simple example of how IoT can change the way we function.

A thriving software and analytics industry, world-class technical education institutes, availability of talent, increasing penetration of the internet, vibrant domestic market, and effective governmental support have created a conducive environment for the growth of IoT. It is little wonder then that the number of IoT devices in the country is expected to increase ten times to touch 200 crore in the next three to four years. Further, IoT will add value to the development of Smart Cities in the country in areas like sanitation, electricity distribution, waste collection and disposal, and water supply. Pilot projects are already underway.

While businesses, consumers, and nations are embracing IoT, there still are some challenges in the adoption of this technology. The chief among them is the notion that IoT is complex to implement and expensive. The industry as a whole has to work together to dispel these myths and facilitate wider adoption. Only then can IoT deliver what it is fully capable of—providing a better quality of life to everyone.

Maneck Davar

MANECK DAVAR

IndiaNow
BUSINESS AND ECONOMY

I Volume 04 | Issue 04 |
December 2017-January 2018

www.ibef.org

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India Now Business and Economy is a bi-monthly magazine published and printed by India Brand Equity Foundation (IBEF), New Delhi, Editor – Maneck Davar. It is published from 20th Floor, Jawahar Vyapar Bhawan, Tolstoy Marg, New Delhi- 110001 and got printed by Arihant Offset, Plot Number 212F and 229, Nangli Sakrawati Area, Nazafgarh Road, New Delhi - 110043.

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Content Creation, Editorial and Design by



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Registration No.: HARENG/2014/58353



A SHADE BETTER

India grows its coffee under a two-tier mixed shade canopy of evergreen leguminous trees



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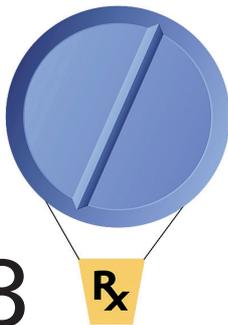


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INDIA IN NEWS

ASEAN leaders attend India's Republic Day parade

As India celebrated its 69th Republic Day, leaders from the Association of Southeast Asian Nations (ASEAN) attended the grand parade at Rajpath, New Delhi, as chief guests. Prime Minister Mr Narendra Modi had invited the leaders for the Republic Day celebrations and for the ASEAN-India Commemorative Summit, marking 25 years of the nation's partnership with these countries. The parade showcased the country's military might with a display of marching contingents and strategic defence weaponry. Myanmar State Counsellor Ms Aung San Suu Kyi, Vietnam Prime Minister Mr Nguyen Xuan Phuc, Philippines President Mr Rodrigo Duterte, Thailand Prime Minister General Prayut Chan-o-cha, Singapore Prime Minister Mr Lee Hsien Loong, Brunei's Sultan Haji Hassanal Bolkiah, Indonesian President Mr Joko Widodo, Malaysian Prime Minister Mr Najib Razak, Prime Minister of Laos Mr Thongloun Sisoulith, and Cambodian Prime Minister Mr Hun Sen—joined President Mr Ram Nath Kovind and Mr Modi at the parade.



India's first agri-commodity options contract launched

Union Minister of Finance and Minister of Corporate Affairs Mr Arun Jaitley launched the country's first agri-commodity options contracts in *guar* seed in New Delhi on the occasion of Makar Sankranti. Speaking on the occasion, he said that NCDEX Agri-options will play a major role in realising the Prime Minister's vision of doubling farmers' incomes by 2022. *Guar* seed is a suitable commodity to start such an initiative because it majorly contributes to revenue generation. This is a welcome move as it will go a long way towards ensuring that farmers receive a better price for their commodities.



Israel Prime Minister visits India

Prime Minister of Israel Mr Benjamin Netanyahu arrived in India on January 14 for a six-day visit, aimed at strengthening bilateral relations between the two countries. Indian Prime Minister Mr Narendra Modi welcomed Mr Netanyahu and members of the Israeli delegation. Both the prime ministers discussed ways to boost cooperation in fields of investment, manufacturing, services, startups, technology, defence, and cyber security. Mr Netanyahu called on the President of India, Mr Ram Nath Kovind. The President remarked that India-Israel security cooperation is defined by "our common fight against terrorism." To pay homage to Indian soldiers who died in the battle of Haifa in Israel, India renamed the iconic Teen Murti Chowk to Teen Murti-Haifa Chowk.



Improving connectivity in the Northeast

The Union Minister of State (Independent Charge) for Development of North Eastern Region (DoNER), Dr Jitendra Singh, announced that the government will be improving rail, road, air, and inland waterways connectivity in the north-eastern region with a host of power projects. Dr Singh said that the Northeast will get India's first-ever 'air dispensary' based in a helicopter and the DoNER Ministry has already contributed ₹25 crore to the initiative. On December 16, 2017, Prime Minister Mr Narendra Modi said that the Centre aims to execute 15 new projects in all the state capitals of the Northeast at a cost of over ₹47,000 crore.



Online portal 'NARI' launched

Union Cabinet Minister of Women and Child Development, Ms Maneka Gandhi, inaugurated an online portal 'NARI' in New Delhi on January 2. During the launch, she said that for the first time women will be able to access information about the benefits being provided to them by the government—both central and state. NARI summarises all the schemes that provide equal rights, social support, legal aid, and housing for women, and also provides necessary links to the ministries, departments, and autonomous bodies. NARI also offers tips on nutrition, gives suggestions for health check-ups and information on major diseases.



Matunga railway station enters Limca Book of Records

Matunga railway station in the Mumbai Division of Central Railway entered the Limca Book of Records 2018 for recruiting all women staff to manage the operations of the stations. Women are hired across all departments—operating, commercial, RPF, ticket checkers—making it the first-of-its-kind in the country. A total of 41 women are posted at the station and work under the supervision of station manager Ms Mamta Kulkarni, who was also the first woman ASM to be recruited in the Mumbai Division of Central Railway in 1992. The staff has been handling overall operations of the railway station.



Drones to monitor Indian Railways efficiency

Indian Railways will deploy drone cameras to monitor the maintenance of tracks and other railway infrastructure. Zonal railways have been given instructions to procure these cameras and use them to observe efficiency of trains and accordingly enhance safety in operations. The cameras will be used to monitor activities of relief and rescue, progress of important works, conditions of track, and other activities. It will also be used to assess crowd management during fairs and *melas*. It will provide real-time inputs to ensure the safety of railway infrastructure. West Central Railways has become the first zonal railway to procure these cameras.

“One step we can take is to increase our trade and economic cooperation. There is significant potential for further growth. South-East Asia and India represent a quarter of the world’s population—about 1.8 billion people—and a combined GDP of more than \$4.5 trillion.”

LEE HSIEN LOONG, PRIME MINISTER, SINGAPORE

“We applaud the Government’s vision and commitment towards Digital India and the Digital economy. The Finance Ministry has recognised the importance of a resilient cyberspace and doubled the allocation for Centres of Excellence across the country to be championed by the DST.”

RAJAN S MATHEWS, DIRECTOR-GENERAL, CELLULAR OPERATORS’ ASSOCIATION OF INDIA

INDIA IN NEWS



NPCC to undertake infrastructure projects

Union Minister of State for Water Resources, River Development and Ganga Rejuvenation and Parliamentary Affairs, Mr Arjun Ram Meghwal, announced that the National Project Construction Corporation Limited (NPCC) will take up basic infrastructure projects like road, buildings and environment-related projects. Mr Meghwal made this announcement on the occasion of the 61st annual day celebration of the corporation in New Delhi on January 10. He stated that the government is paying sufficient attention to infrastructure development and projects related to linking of rivers and cleaning Ganga. NPCC has also begun working as nodal agency in Jharkhand for the Clean Ganga Mission.



Ministry to revamp public transport system

Mr Nitin Gadkari, Minister of Road Transport and Highways has signed an MoU with Transport for London (TFL), which is aimed at revamping public transport architecture in the country. The MoU will use the expertise of TFL, an agency that manages the transport system in Greater London. Mr Gadkari said that an effective transport policy will promote a convenient and comfortable public transport system. It will be one that runs on electricity and is less polluting and cost-effective. The proposed MoU will help revamp the public transport system and expand passenger capacity.



India strengthens tech ties with Sri Lanka

On an official visit to Sri Lanka, Union Minister for Law and Justice and Electronics and IT, Mr Ravi Shankar Prasad, inaugurated gigabit connectivity between the National Knowledge Network of India and LEARN network of Sri Lanka. This high-speed connectivity will boost association between the educational institutions of both countries. Both the countries also signed an MoU for improving ties in the IT sector, cyber security, and eGovernance. eOffice software, developed by the National Informatics Center, Government of Sri Lanka, was also inaugurated during the visit.

Market for home healthcare services to double

According to health economists, the market for home healthcare services in India will double within a year. Home healthcare services, a cheaper and comfortable option for patients, is largely serviced by unorganised firms, startups, and hospital initiatives. The market stood at around US\$ 3.20 billion in 2016 and is expected to grow to approximately US\$ 4.46 billion by 2018 and US\$ 6.21 billion in 2020, according to Cyber Media Research (CMR) Limited analysis and industry estimates. Even hospitals are stepping into the home healthcare market—Max Healthcare, a healthcare provider, introduced Max@Home, its home-based healthcare service that is backed by Max Healthcare's 12-hospital network.





LEADING THE VIRTUAL ZONE

India is world's second-largest internet market

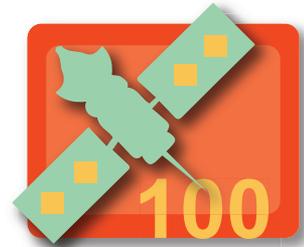
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TECH CORNER

ISRO launches its 100th satellite

Using its Polar Satellite Launch Vehicle (PSLV-C40), which lifted off the Satish Dhawan Space Centre, Indian Space Research Organisation (ISRO) successfully launched a Cartosat-2 series weather observation satellite, along with 30 other satellites. This success of ISRO's first mission in 2018 was lauded by the President and the Prime Minister of the country, among many others. The PSLV has so far launched 51 Indian satellites and 237 satellites for international customers. Commenting on the success of the space agency and highlighting its impact on the country's development, Prime Minister Mr Narendra Modi said that benefits of India's success are available to its partners. Out of the 31 satellites launched, 28 belonged to six other countries.



Groupe PSA partners with TCS for smart cars

French car manufacturer Groupe PSA has partnered with Tata Consultancy Services to develop smart cars, a move aimed at manufacturing products for Indian buyers at affordable costs. The joint venture will rely on TCS's proven capabilities while competing with the likes of Maruti and Hyundai. All soft designs will be created by PSA whereas TCS will take care of sourcing parts at the right cost, testing metallurgical capabilities, and coming up with the final product. Emphasis is being laid on building products with state-of-the-art technologies keeping cost in mind. The company intends to manufacture and export 200,000 engines and 300,000 transmissions, shipments of which are likely to begin by the first half of 2019.



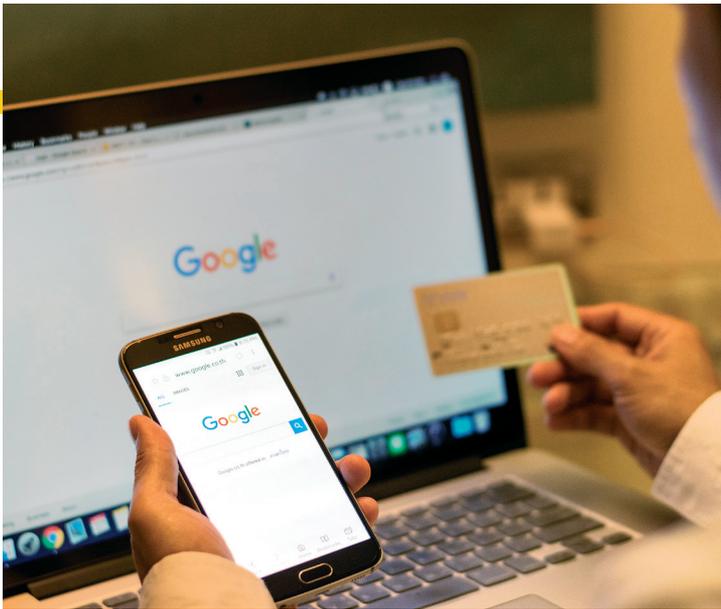
Endress+Hauser (India) bets big on water management projects

Switzerland-based instrumentation and process automation company, Endress+Hauser is eyeing water management projects under Smart Cities Mission, with an aim to grow its business in the country. Process measurement and automation offers solutions for measuring temperature, flow, pressure, level, and providing real-time data to optimise processes that find use in industries such as water and waste water management, life sciences, chemicals and oil & gas, and beverages, among others. Presently the company's total revenue from India is ₹1,500 crore, of which domestic sales account for nearly ₹475 crore. According to the company, domestic sales are poised to increase to ₹ 800 crore by 2020-21.



Aadhaar gets facial scanner update

UIDAI, in order to tackle problems with biometric verification, has decided to introduce facial authentication for Aadhaar. This feature will be available alongside the existing means of authentication—it will only work in combination with at least one of the already existing means—and is expected to be operational by July 2018. This facial recognition system will use Aadhaar users' photographs that are already available with UIDAI for verification and hence, no additional data will be required. Union Minister of Law & Justice and Electronics and Information Technology, Mr Ravi Shankar Prasad assured that the fingerprint and iris data stored in the Aadhaar system was impenetrable.



Tez users in India can now use Google Pay

Google announced that its payments platform Google Pay will be brought to the users of Tez, its UPI-integrated mobile payments interface in India that works in partnership with Axis Bank, HDFC Bank, ICICI Bank, and State Bank of India. With this, users can access payment information saved to their Google account, which will expedite the transaction. Google Pay has already been made available on Airbnb, Dice, Fandango, HungryHouse, and Instacart, among other apps and websites. Pali Bhat, VP of Product Management of Payments, wrote in a post, “Over the past year, we have been working to make these experiences simpler, safer, and more consistent. We are excited to announce we will be bringing together all the different ways to pay with Google, including Android Pay and Google Wallet, into a single brand: Google Pay.”

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Number of satellites launched so far for international customers by ISRO using PSLV.



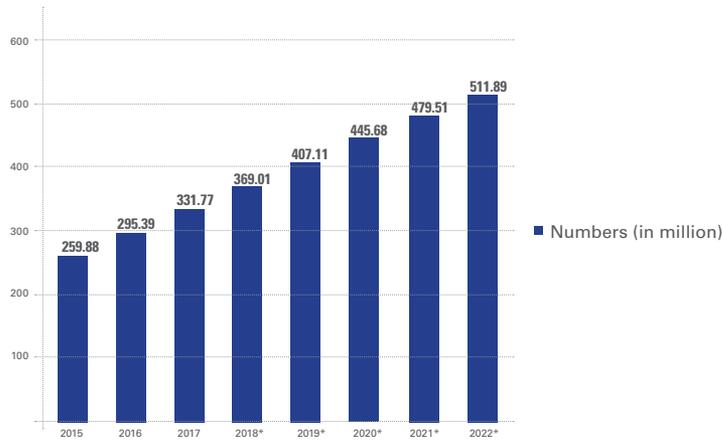
Israel-India Technology Group launches US\$ 50 million fund

NASSCOM, in partnership with Indiaspora, organised Tech Triangle Summit with the aim of strengthening ties between India, Israel, and the US for innovation and entrepreneurship. It was attended by entrepreneurs, government officials, and investors, and it focused on exploring the different ways in which the three nations could deepen relationship in domains such as geopolitics, business and industry, innovation, entrepreneurship, and financial investments. A fund of US\$ 50 million was also launched by Israel-India Technology Group. Dennis Mehta of Israel-India Technology Group said, “We are launching a trilateral investment partnership, a platform which is primarily for the needs and aspirations of the trilateral opportunities. Our model uses Israel as the supplier of technology, India as a mass market opportunity, and the US, which will bring in capital.”

STATISTICS

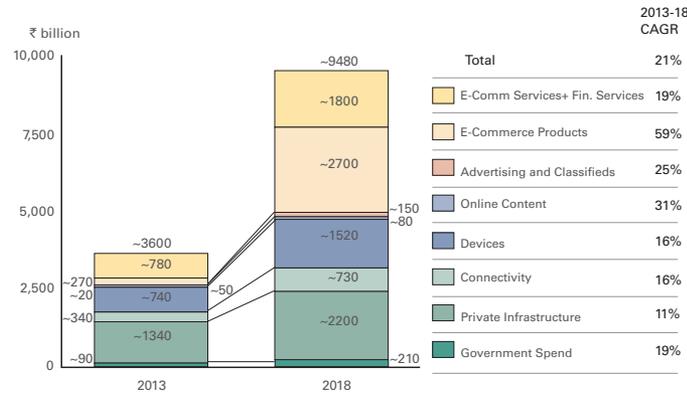
THE FUTURE OF THINGS

NUMBER OF INTERNET USERS IN INDIA FROM 2015 TO 2022



Note: *= Estimated
 Source: <https://www.statista.com/statistics/255146/number-of-internet-users-in-india/>

INTERNET CONTRIBUTION SET TO GROW AT 23% COMPARED TO 13% OVERALL GDP GROWTH



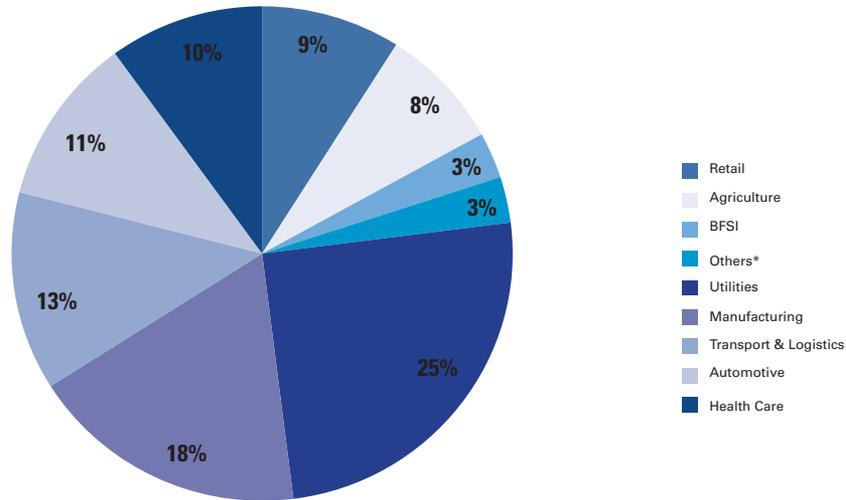
Source: <http://www.iamwire.com/2015/01/rise-internet-penetration-changing-face-digital-india/108808>

INDIA'S YEAR-WISE EASE OF DOING BUSINESS RANKING

YEAR	2014	2015	2016	2017	2018
RANKING	142	134	130	131	100

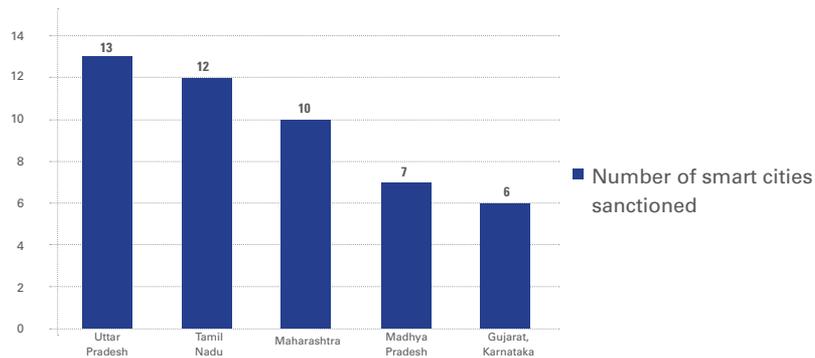
Source: <http://www.makeinindia.com/eodb>

IoT MARKET IN INDIA AND THE SPLIT BY INDUSTRY, EXPECTED AS OF 2020



Source: <https://www2.deloitte.com/content/dam/Deloitte/in/Documents/technology-media-telecommunications/in-tmt-interactivity-noexp.pdf>

STATE-WISE NUMBER OF SMART CITIES SANCTIONED



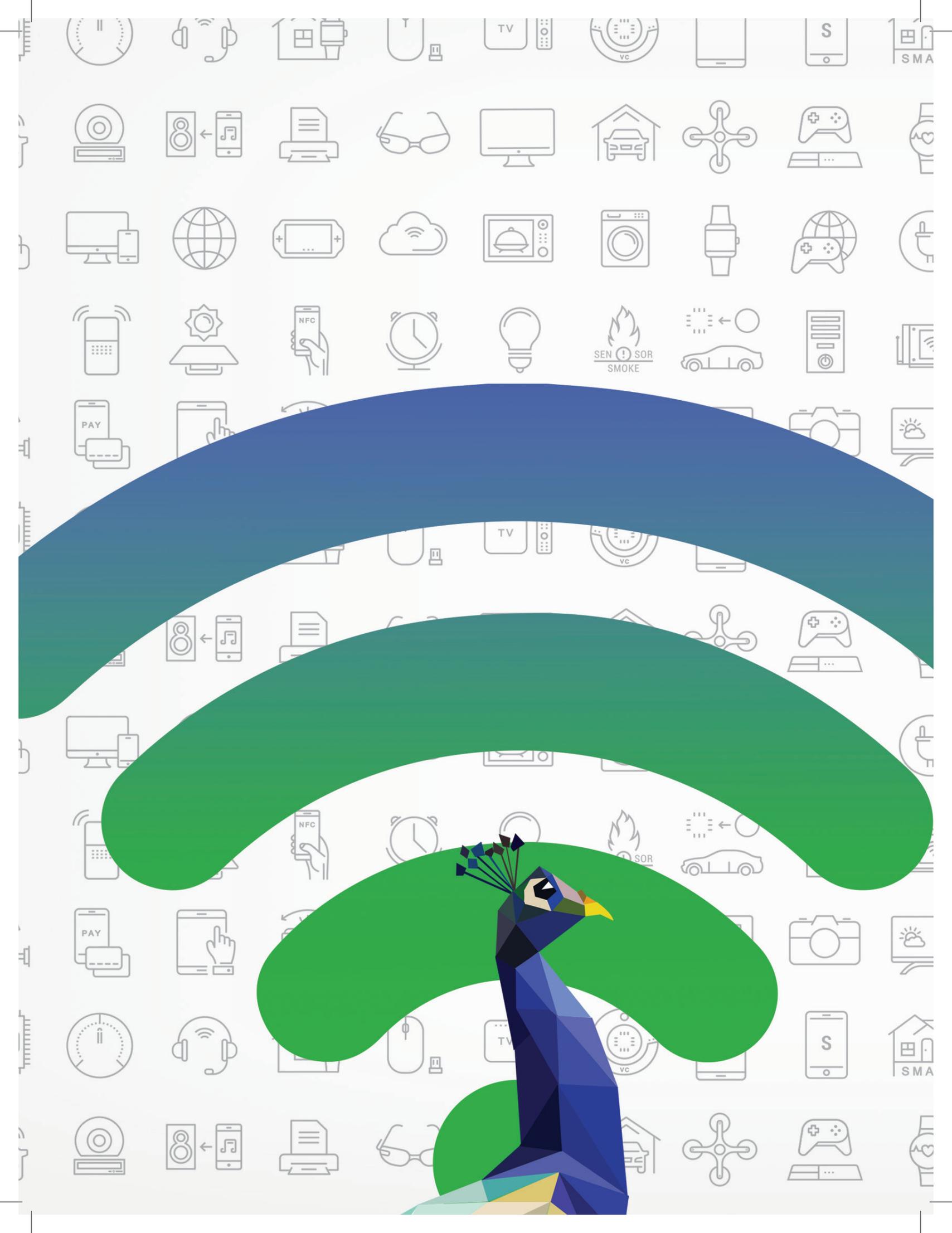
Note 1: Only five states in the order of the highest number of smart cities sanctioned have been mentioned.

Note 2: Data is for number of cities allocated to States based on urban population and number of statutory towns.

Note 3: The numbers are as per the present allocation under the Ministry of Housing and Urban Affairs' Smart Cities Mission. The distribution will be reviewed after two years of the implementation of the mission.

Source: <http://smartcities.gov.in/content/innerpage/no-of-smart-cities-in-each-state.php>

http://smartcities.gov.in/upload/uploadfiles/files/No_of_Smart_Cities_in_each_State.pdf





RIDING THE IoT GROWTH WAVE

- **IoT IN INDIA: LOOKING AT THE BIG PICTURE**
- **BUILDING A SMART NATION**
- **MEGA IMPACT**
- **POWERING ENERGY EFFICIENCY**

IoT in India: Looking at the Big Picture

The country has identified the transformative power of IoT and is fast leveraging its potential vis-a-vis every facet of development.

RANJAN MUKERJEE

The relationship between India and technology adoption has traditionally resembled a game of leapfrog. In the past, it was not uncommon for the country to hurdle generations of tech development in order to keep up with more technologically advanced countries. While not ideal for consumers in the short term, this has yielded desirable results in the long run. Indians in 2018 are far more likely to have access to the same tech devices as Americans, Europeans, or Chinese. More importantly, though, it has meant that R&D and innovation in India have been able to focus more on ‘the next big thing’ rather than playing catch-up. The Internet of Things (IoT) has emerged as one sector in which India has been ahead of the curve and can make an impact at a global level.

LAYING THE GROUNDWORK

The recent startup revolution in India has been quite favourable to the development of IoT, especially with regard to consumer devices. This technology may not have been the face of India’s tech startups (that distinction goes to fintech), but it would be a folly to assume that it was sidelined over the past decade. Startups specialising in IoT are stepping into the limelight in larger numbers, and a quick glance reveals that this rise to prominence has been years in the making.

Wearable technology has emerged as undoubtedly the best way to bring people into the folds of IoT. In the consumer goods sector, health and fitness monitoring devices have been at the forefront of introducing Indians to IoT. It was not so long ago that such devices were more likely to be considered aspirational rather than utilitarian. However, with local manufacturers challenging established players, prices have dropped gradually to the point where there is something available for every budget. Indian companies have

spent the past decade in perfecting wearable devices with a more long-term goal in mind—to provide consumers with a financially viable alternative to international brands; one that does not compromise on performance for affordability. By working behind the scenes on R&D rather than rushing to market, a number of Indian manufacturers—big and small—have avoided falling into the trap of playing catch-up.

One Indian manufacturer that embodies India’s focus on R&D is HUG Innovations. Set up in 2015, HUG has already become a major player in the Indian smartwatch segment, selling to over 17,000 customers since 2016. Leveraging the benefits that ‘Make in India’ offers to startups, HUG is set to launch its North America operations this year.¹

VISION FROM THE TOP

Private enterprise is not the only one that has been keeping tabs on the potential of IoT. The Government of India considers it a game changer that can leverage the massive IT services industry, which is already a bedrock of the Indian economy. According to Ms Aruna Sundararajan, Telecom Secretary and Chairman, Telecom Commission, “IoT has huge potential for job creation, and most of these will not be created by large companies but by startups. India can have 10 to 15 million new jobs created in IoT alone.” As a result, unlike many other countries, the Indian Government wants to go one step further—rather than letting the private sector dictate the development of IoT by itself, it wants to play an active role in doing so.

The Department of Electronics and Information Technology is already working on an IoT Policy framework that will be based on five pillars: demonstration centres, capacity building and incubation, R&D and innovation, incentives and

engagements, and human resource development.² At the IoT India Congress 2017, held in Bengaluru, greater access to affordable healthcare and a burgeoning digital economy were identified as the prime drivers why the Indian government should continue to heavily invest in IoT.

Efforts are already being made by the government to help multinational companies set up IoT hubs in India. Qualcomm, one of the world leaders in wireless technology and innovation, has already partnered with the 'Make in India' initiative, helping to control valuable water resources for numerous small farms throughout the country. According to Jeffery Torrance, Vice President of Business Development for Qualcomm Technologies, this new 'smart water/smart farming' experiment in India could serve as a model for other parts of the world, such as the state of California in the US where drought problems continue to recur. IoT might just become India's next ISRO story—becoming a global leader and blazing a trail.

GROWING BIG, FAST

According to NASSCOM, the worldwide IoT market is poised to be worth US\$ 328 billion by 2020—at an expected US\$ 15 billion, the Indian IoT market will account for 5% of the total global market.³ While IoT will be important for consumers, it is industries that will rely on it most heavily—81% of IoT adopters say their digital strategy is generating measurable business value.⁴ This directly translates to a US\$ 262 billion market for IoT software capabilities, services, and analytics. One does not have to be a savant to realise that this plays right into India's hands—a country that, over the past few years, has built a solid industry, infrastructure, and reputation specialising in just these sectors.

IoT is already showing visible results, by changing the face of Indian manufacturing and bringing it forward to Industry 4.0 standards. John Deere, one of the world's largest agricultural machinery manufacturers, has started incorporating sensors into its tractors the world over—these sensors are connected with John Deere's manufacturing plants in India, providing a constant stream of information to the facilities. This data is then used for numerous purposes, including R&D, improved quality, changes in manufacturing standards, and better customer support. This transmission of information in real-time, thanks to inter-connected devices, allows John Deere to make changes and improvements at a rate never seen before in manufacturing history.

The success of big companies experimenting with IoT has spurred the startup sector as well. As of November 2017, Bengaluru—the startup hub of India—

was home to 51% of all IoT startups in the country. In fact, the number of IoT startups in India grew by 60% in 2016, and 100% in 2017. This is symbolic of the fact that IoT is more than just the next big thing; its time is now. Combining the R&D efforts of these startups with the already existing industry infrastructure—and progressive policies from Central and State governments—guarantees that India is perfectly poised to make the most of the IoT revolution. In fact, India is already thinking beyond what IoT can offer.

INTERNET OF EVERYTHING

The country has not been focusing just on Internet of Things, but also on Internet of Everything (IoE). According to Cisco, where the idea originated, IoE is

Internet in India by 2020



75% of new internet user growth to come from rural areas



Number of online shoppers to reach **175 million**, a 3.5x growth over 2015



730 million internet users



Mobile video content to grow at **83% CAGR** in the next five years



75% of new internet users to consume content in local languages



70% of e-commerce transactions via mobile phones



50% of travel transactions to be online

Source: NASSCOM Report: *The Future of Internet in India*

a networked connection of people, data, process, and things, encompassing many technological transitions, including IoT.⁵ India's Smart Cities Mission is a golden example of what IoE is all about. Cities selected for the programme will be getting more than just Wi-Fi access in public spaces—it will be about interlinking different aspects of the city (from traffic management to weather forecasts to provision of public services) in order to make them citizen-friendly as well as sustainable.

Cisco predicts that IoE is potentially a US\$ 19 trillion industry over the next decade, which dwarfs any and all predictions for IoT as a standalone segment. Back in 2013, they published their Internet of Everything Value Index, which stated that India had a US\$ 35 billion IoE industry at stake, a figure that has undoubtedly gone up significantly over the past half-decade.

Information and communications technology solutions provider Huawei is already betting big on India's digital transformation leading towards IoE. According to Jay Chen, CEO of Huawei Telecommunications India, digitisation via initiatives like Digital India and Smart Cities Mission has provided Huawei with a unique opportunity for exponential growth. It expects the Indian IoE market will contribute about 2.2% of the global digital opportunity in the next decade, with the public

sector accounting for up to 75% of it.⁶ Huawei and a host of other global giants have already expressed interest in becoming active partners in India's IoE growth.

The real takeaway here is that while pursuing IoT development is a terrific endeavour for public and private enterprises in India, it is merely a small part of the bigger picture. India will be leveraging all the progress it has made in IoT as a launchpad towards mastering the IoE domain. This will not only help India become a global growth driver in the sector but also go a long way towards improving the standard of living of its own citizens. ■

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CASE STUDY: SMART HOME SOLUTION

Shishir Gupta, co-founder, Oakter talks about how IoT-based appliances are being used across industries and residential units.

Oakter Smart Home is an IoT appliances company operating in the consumer domain—their products and marketing activities are focused on the Indian market. Still about 20% of their products are installed at businesses, mostly SMEs. The most popular usage of Oakter products is twofold:

- **Monitoring high-energy consuming devices:** Business owners use these devices to get notifications whenever a particular high-energy consuming appliance is switched on or off in their absence. Also a daily/monthly usage report is sent to them, which helps in monitoring these appliances.
- **Setting on-off schedules:** On/off schedules for energy saving or to restrict usage during off-work hours are set for a wide variety of appliances such as light, glow sign boards, ACs, and printers.

Since Oakter's products are mass produced for a large consumer market, the pricing is particularly

enticing for businesses. There is no recurring fee and any appliance can be automated for less than ₹5,000. In many cases the upfront cost is recovered in less than a year. Indian SMEs tend to act more like consumers since they are good at adapting their processes around the best available products.

Hotel industry is another sector that is fast adopting Oakter products. This is particularly true after the launch of Amazon's new product, a smart speaker named Echo—an IoT-connected speaker, it uses the power of internet to carry out commands. For example, you could ask it to play your favourite song. Oakter smart home products are compatible with Amazon Echo, so Oakter and Echo work together to fulfil commands such as 'switch on bedroom light'. This combination makes it convenient for adoption of IoT in high-end hotel rooms. The guests do not want to fiddle with tablets or mobile phones to operate lights, and voice makes it convenient.

In the last couple of years the awareness and adoption of IoT-based devices has substantially increased for Indian businesses. However, it is still early days. In the next five years, we will see much more adoption by businesses to enhance energy saving and improve productivity.

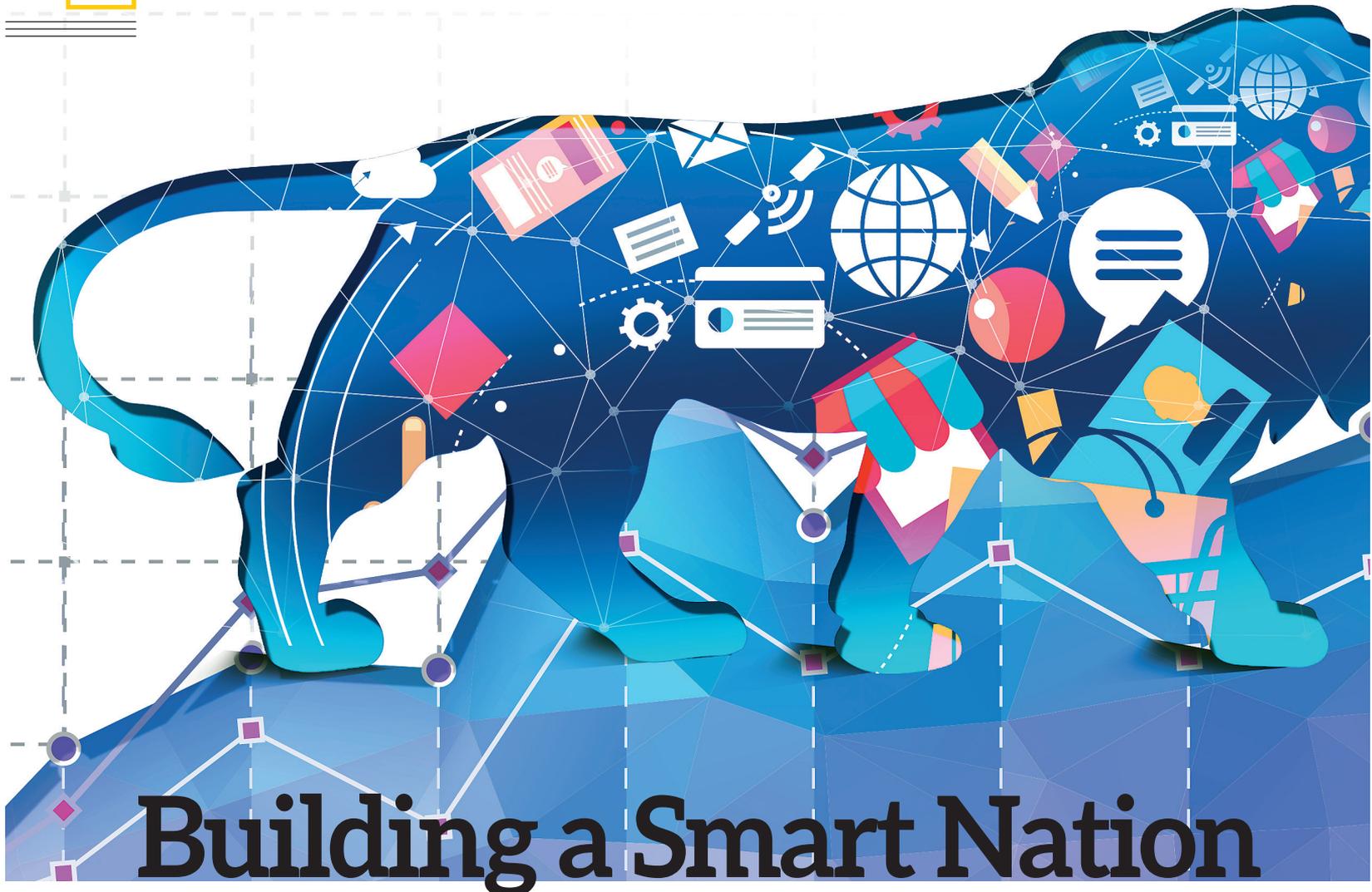


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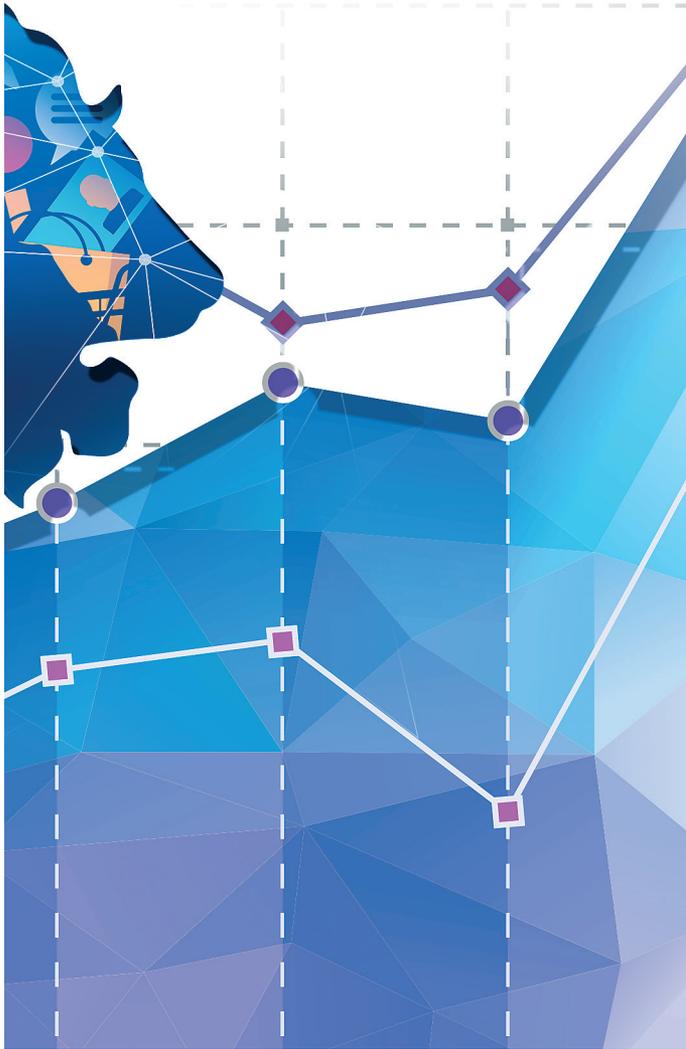
Building a Smart Nation

The proliferation of the internet in the operations of most industry verticals and its accessibility in even the remotest parts of the country indicate India's preparedness to face, and leverage to its advantage, the next level of internet disruption—Internet of Things. This all-pervasive technology is changing the way of businesses, manufacturing, communications, and even our lifestyle.

ASHUTOSH GOTAD

It has been over a decade since the term Internet of Things (IoT) was officially recognised;¹ today, this phenomenon has grown so big that as per Gartner's estimate, the number of IoT-connected devices in the world will reach 20.4 billion by 2020.² Though the terminology and the technology have come into popular and commercial usage only in the last few years, its existence can be traced back to the 1980s when a modified Coke-vending machine at Carnegie Mellon University was connected to the internet such that it could show the number of bottles available on each level and also indicate whether the drinks were cold or not. This saved people the time and frustration of walking up to the machine from the other side of the campus and then not finding the desired drink.³

Today, IoT technology has evolved from being just an innovative, college-level experiment to a global disruptor (and at the same time, enabler) in most sectors—automobiles and heavy machinery, domestic and corporate appliances, healthcare devices,



agricultural equipment, and even entire cities (called smart cities) are being built to be IoT-compatible. The printer in our office sure indicates when it will be out of paper, but what if it could automatically place an order for more paper when empty? Most cars have climate control technology, but what if our car could sense our return from an intense session of squash and set an apt temperature by itself, upon receiving signals from the wristband we were wearing during the game? The possibilities seem endless, and this is crudely what IoT is set to achieve—to usher in an age of smart devices, thereby reducing human dependence and efforts. And India, an emerging R&D and manufacturing hub of the world, is squarely at the centre of it.

THE MAKE IN INDIA EDGE

The time could not have been more apt for the country to embark on a journey—through ‘Make in India’—to becoming self-sustaining in terms of manufacturing. This will also boost export capabilities as the IoT bandwagon takes off. Launched in 2014



“IoT is now indeed an all-pervasive technology. India has tremendous potential to lead the world in IoT and we already have successful implementation stories in healthcare, transport, manufacturing, to name a few. The business, revenue and social impact possibilities are indeed manifold. IoT has the potential to create over 15 million jobs in India alone in the next few years. To support this potential we set up the only neutral credible authoritative voice in India, ‘The IET IoT Panel’, a think tank-cum-platform, which brings together the best in IoT from industry, academia, government and startups. The Annual IoT India Congress is India’s most significant conclave for all stakeholders and ecosystem players in IoT. In short, IoT is changing the way we interact and do business and will indeed fuel the next wave of India’s growth, and at IET, we are providing the vehicle, which should be used to ride this wave.”

Shekhar Sanyal, Director and Country Head, Institution of Engineering and Technology (The IET), India

TODAY, IoT TECHNOLOGY HAS evolved from being just an innovative, college-level experiment to a global disruptor (and at the same time, enabler) in most sectors.

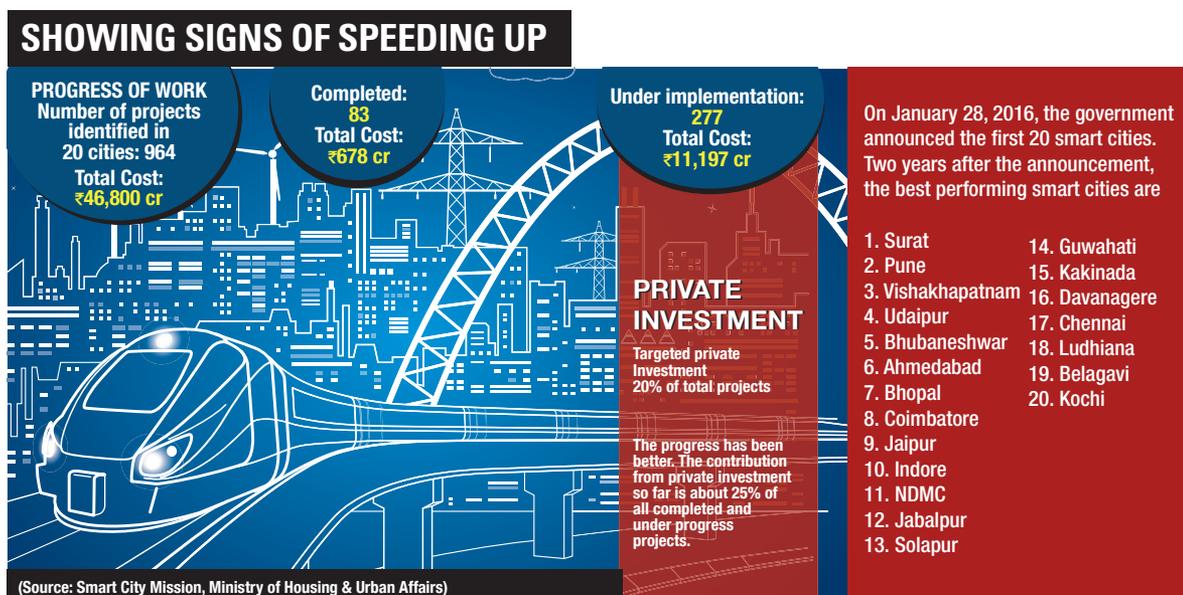
by Prime Minister Narendra Modi, 'Make in India' is a set of nation-building initiatives that has attracted partnerships and investment pledges to the tune of US\$ 222 billion as of February 2016 from domestic as well as international companies.⁴ Also, the country's position in World Bank's Ease of Doing Business rankings went up from 134 in 2015 to 131 in 2016.⁵ In 2017, this further improved drastically and the country leapt to the 100th position.⁶

Riding on the 'Make in India' wave, the presently nascent-looking IoT market in the country is projected to progress at a CAGR of 28.2% during the period 2016-22, as per a study report by 6Wresearch.⁷ Another report by Zinnov forecasts that the IoT market in India will grow to US\$ 15 billion with 2.7 billion installed devices by 2020.⁸ It also estimates that there will be more than 120 IoT startups in the country, and around 52% of these will be based in Bengaluru. These predictions only strengthen the Make in India narrative, providing impetus to the projects, especially related to IoT, being undertaken under it.

OF COLLABORATIONS AND DISRUPTIONS

The disruptive nature of IoT and the fact that many IoT systems and devices are still in the experimental stage warrants collaborations—multinationals with multinationals, multinationals with small, regional players, financial powerhouses with IT and tech giants, and so on. Some of these that have already been initiated are:

- Tata Consultancy Services launched Center of Excellence for IoT solutions in collaboration with Intel in 2015, with focus on integrating IoT solutions developed by TCS on Intel® IoT platforms. This will expedite the creation of end-to-end solutions.
- In December 2017, NASSCOM and China's Dalian Municipal People's Government entered into a joint venture to develop a Sino-Indian Digital Collaboration Plaza, an online/offline platform to enable matchmaking between the two ecosystems to leverage each other's strengths in technology.
- IBM and Reliance Group's UNLIMIT entered into a strategic collaboration in September 2017 to come up with IoT solutions for specific industry verticals such as automotive, insurance, utilities, and industrial automation. An example of this is an IoT-based vehicle-tracking system through which car leasing companies will have a better visibility of their leased vehicles through GPS and sensor data, which will help prevent fraud, thereby reducing losses.



Note: The ranks are based on the proportion of total smart city projects under progress and completed for a city. The more the proportion of total cost of projects under progress and completed, the higher the rank.

Source: <https://economictimes.indiatimes.com/news/politics-and-nation/surat-tops-ranking-of-smart-cities-with-largest-number-of-projects-completed/articleshow/62548416.cms>

The Department of Electronics and Information Technology (DeitY), Ministry of Electronics and Information Technology, Government of India formulated a Draft Policy on Internet of Things⁹ in 2015 to leverage India's strengths as a leader in the global service industry, through suitable promotion and supportive mechanisms. As per this policy, the government plans to develop 100 smart cities for which an amount of ₹7,060 crore has been allocated.¹⁰ IoT will be critical to making these cities smarter as it will help facilitate smart parking, intelligent transport system, smart urban lighting, waste management, maintenance, tele-care, citizen safety, smart grid, energy, and water management among other things.

IoT ADDING VALUE TO THE ECONOMY

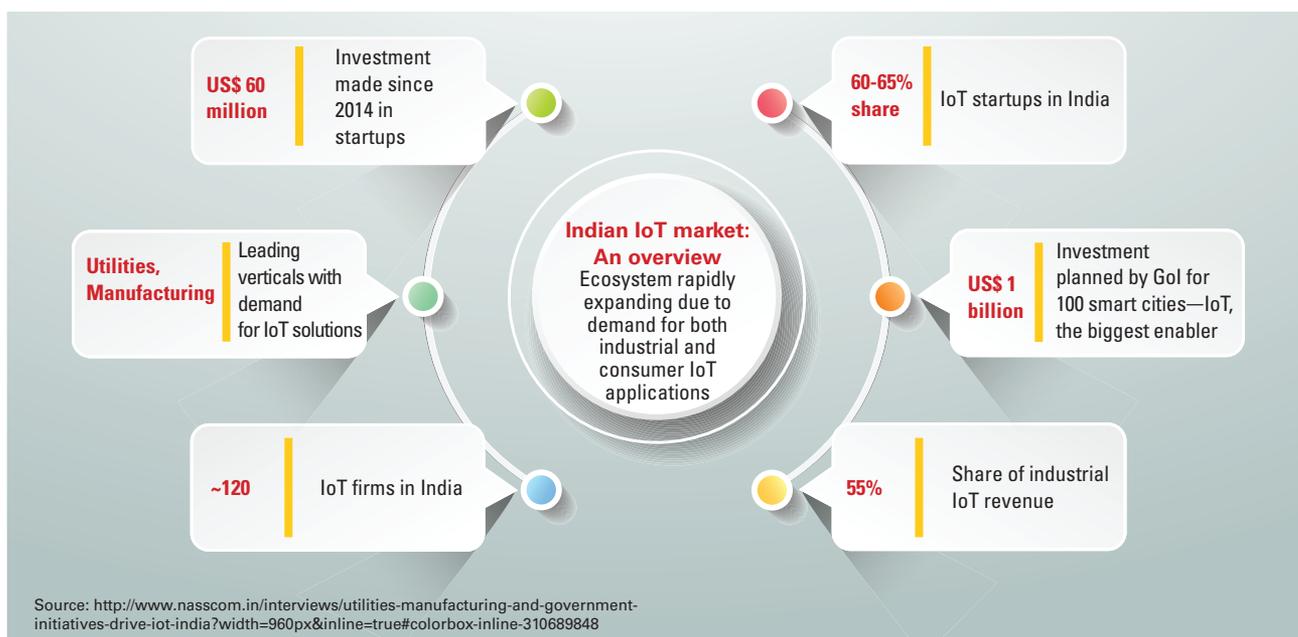
Revenue from IoT technology and services for discrete and process manufacturing in India is expected to reach US\$ 3.9 billion in 2020 at a CAGR of 20.1%, as per an IDC forecast.¹¹ In October 2017, during the unveiling of Dell Technologies' IoT vision and strategy, Rajesh Janey, President and MD, India Enterprise, Dell EMC said that as per NASSCOM, the global market for IoT in 2020 will be worth US\$ 373 billion in revenue, and India will account for US\$ 10 to 12 billion out of this.¹² The company is set to invest US\$ 1 billion in new IoT products, solutions, labs, partner programmes and ecosystem over the next three years.

Back in 2016, German multinational engineering and electronics major Bosch announced plans of investing ₹1,300 crore in the IoT space in India and is also exploring opportunities for collaborations with tech startups in the country.¹³

Japanese technology giant NEC, through its Indian arm NEC Technologies India, has announced the setting up of FIWARE, an open source IoT platform funded by investors from multiple countries and endorsed by FIWARE Foundation. It is set to go live commercially from April 2018, and aims at helping Indian academia, app developers, and government bodies develop solutions for smart cities.

A host of other big names are paving the way for IoT technology to disperse across the length and breadth of the country in response to Make in India and other government initiatives, all adding value to the economy. This is being well-complemented by the emergence of several IoT startups with innovative propositions. A few such names are:

- CarSense (formerly known as Carnot Technologies), a Mumbai-based startup that connects your car to your smartphone through their app. Some of the features on offer are GPS tracking, accident SOS alert, towing and break-in alerts, rash-driving notification, car diagnostics, performance and trip data, roadside assistance, and fuel efficiency report.
- Cyclops MedTech Private Limited, a Bengaluru-based startup has been working in the area of eye tracking and vestibular science with the aim of making innovative medical technology affordable for the masses. Their first product Cyclops BalanceEye, a 'complete balance assessment tool' that makes use of machine learning in the form of a wearable device to diagnose vertigo, received an overwhelming response from ENT specialists from across the country. ■



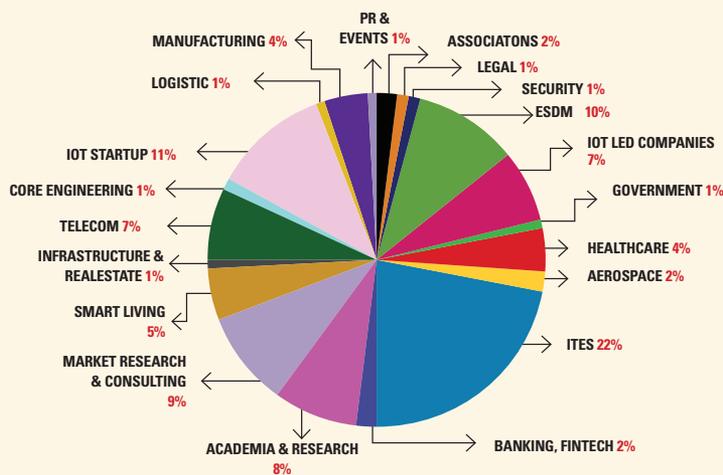
IoT INDIA CONGRESS 2017^{14,15}

The second edition of IoT India Congress 2017 organised by The Institute of Engineering and Technology (IET) and India IoT Panel and supported by Department of Telecommunications, Ministry of Communications and Information Technology, Ministry of Electronics and Information Technology, and NITI Aayog, Government of India was held on September 14 and 15, 2017 in Bengaluru. The event—one of the many being annually held in the country for the past few years—aimed at empowering business outcomes using IoT.

Ms Aruna Sundararajan, Secretary, Ministry of Electronics and Information Technology, inaugurated the two-day event, which brought together over 80 speakers from some of the biggest names in the Indian and international technology, communications, and manufacturing sectors. The focus was on eight tracks—Ganga rejuvenation, emerging technologies, healthcare, manufacturing, smart living, telecom, standards and digital payments, and financial inclusion.

The resounding success of the event can be gauged from the presence of the miscellany of speakers from the government and the industry, the ₹14.5 million worth of funding raised for startups, and 26 interactive sessions, held over two days.

A LOOK AT THE VARIOUS INDUSTRIES THAT PARTICIPATED IN THE EVENT¹⁶



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QUICK FACTS

- By 2020, about 250 million vehicles are expected to be connected to the internet.¹⁷
- Machine-to-machine connections are expected to grow from 5 billion in 2015 to 27 billion by 2024.¹⁸
- At a recent Paris Fashion Week, a British-Cypriot designer partnered with Intel on an IoT-in-clothing technology in which, as models walked the runway, visual projections showed their stress levels on the wall beside them, via biofeedback being sent from the connected accessories they were wearing.¹⁹
- 99 cities have been selected so far in Government of India's Smart Cities Mission with a proposed investment of ₹203,979 crore.²⁰

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Mega Impact

Rajesh Maurya, Regional Vice President, India & SAARC, Fortinet, talks to India Now Business and Economy on the potential IoT holds for India.



Rajesh Maurya, Regional Vice President, India & SAARC, Fortinet.

The IoT landscape in India is expanding at a rapid pace. How will it reshape businesses—both in terms of product development and delivery of services?

There are a variety of IoT devices and categories, each with its own implications. Consumer IoT includes the connected devices we are most familiar with, such as smart cars, phones, watches, laptops, connected appliances, and entertainment systems. Commercial IoT includes things like inventory controls, device trackers, and connected medical devices. Industrial IoT covers such things as connected electric meters, waste water systems, flow gauges, pipeline monitors, manufacturing robots, and other types of connected industrial devices and systems.

The implications for business are huge. Increasingly, IoT devices are being woven into local, national and global networks, including critical infrastructures, creating hyperconnected environments of transportation, water, energy, communications, and emergency systems. Healthcare agencies, refineries, agriculture, manufacturing, government agencies, and even smart buildings and cities use IoT devices to automatically track, monitor, coordinate, and respond to events.

With IoT automating decisions and processes at machine speeds, it can help generate revenue, improve our quality of life, make us more productive, and even save lives.

What kind of business opportunities does IoT hold for a developing economy like India? Which ancillary industries can we see coming up?

IoT devices are a critical component of the new digital economy, collecting and sharing information about a myriad things—from smart appliances, irrigation systems, and shipping containers to wireless energy meters and mobile healthcare devices. The information they collect allows for more efficient inventory and manufacturing management, and can be mined for competitive advantages from everything like knowing that you need to immediately produce more green, left-handed widgets, or that a shipment of soybeans is coming into port and local pharmacies ought to stock up on your allergy nebulisers.

Since most IoT devices are mobile, they tend to connect to the network via wireless access points. As IoT was not on the horizon when most wireless solutions were deployed, the growing volume of IoT and user devices is now overwhelming these access points. In addition, since most IoT devices do not have security installed, the need to apply security inspection and monitoring is creating a bottleneck. This problem of plenty presents a huge business opportunity for innovation and growth in the wireless, security and networking industries.

How is India preparing for the IoT challenge in terms of technology and support and establishing a bigger, country-wide IT infrastructure?

Over a million new IoT devices are connected globally to the internet daily, and these numbers are accelerating. By the year 2022, the IT Ministry of India predicts there will be as many as two billion IP-enabled IoT devices connected in India. This growth is already contributing to an escalating explosion in data. When compared to traditional data centre traffic, which will triple in the next three years to 15.3 zettabytes (ZB) according to *Forbes*, IoT growth over the same time is mindboggling—39 times higher or 600 ZB.

Cybersecurity providers are beginning to address these issues by promoting authentication, and key and credential management, among other capabilities. These tools add to an already overly complex security environment.

In addition, these new capabilities need to be tested, integrated with the network architecture, updated, managed, and monitored—often stretching bandwidth and resource-constrained organisations beyond breaking point. IoT is a vital part of most businesses and is here to stay. The following are a few security recommendations:

- Security must be redesigned to provide seamless visibility on what is happening across all networks

“IoT DEVICES WILL HAVE A HUGE impact on the quality of life by making everyday life more comfortable, simple, convenient and fast thereby increasing productivity.”

and devices, from IoT to multi-cloud networks.

- Security monitoring and management need to be done through a single console. Enterprises must be able to see all devices, access risk levels, segment traffic, and assign policies across the entire network in real time.
- Look for security solutions that automatically adapt to network changes, anticipate threats, interpret and implement business language commands, share threat intelligence, and proactively coordinate responses to threats across all security devices and network ecosystems.
- View IoT as part of your broader security environment rather than as isolated units.

How big is the security challenge with so many interconnected devices?

The challenge is that many IoT devices were never designed with security in mind. Security challenges include weak authentication and authorisation protocols, insecure software, firmware with hard-coded back doors, poorly designed connectivity and communications, and little to no configurability. And most IoT devices are ‘headless’, with limited power and processing capabilities. This not only means they cannot have security clients installed on them, but most cannot even be patched or updated. Simply put, IoT introduces new risks and widens the threat landscape.

- Some of the data passing from, to, or between connected devices contains personal information that can be exploited, including locations, names and addresses, ordering and billing information, credit card and bank information, medical records and government-issued ID numbers.
- When compromised IoT devices are connected to IT networks, they can become a conduit for breaches or injection of malware.
- Compromised industrial and commercial IoT devices can be used to make changes on the manufacturing floor. Operations technology, SCADA, and industrial control systems actually control physical systems, not just the bits and bytes of traditional IT networks, and even the slightest tampering can sometimes have far-reaching—and potentially devastating—effects.
- Increasingly, IoT is also being integrated into our

critical infrastructure. Transportation systems, chemical refineries, wastewater systems, energy grids, culinary water, and communications systems all use IoT devices. The cascading effect of a serious compromise can be potentially catastrophic.

The government’s focus is on making India a digital economy, and much encouragement is being given to the IT sector. What implications does this have for the job market?

The Fourth Industrial Revolution is upon us, with the digital transformation of business largely consisting of automation, AI, and rapid technological innovation. Industrial processes and machines are becoming smarter and more modular.

A critical enabler of this transformation is IoT. Smart, always-connected devices provide real-time contextual information with low overhead to optimise processes and improve how companies and individuals interact, work, and live. IoT devices will have a huge impact on the quality of life by making everyday life more comfortable, simple, convenient and fast thereby increasing productivity. It will have a cascading effect in the market considering it will provide new opportunities for business and startups, which in turn will introduce new products and services, expanding and creating new job markets.

The Department of Electronics and Information Technology has come out with a ‘draft IoT Policy document’ to create an IoT industry worth US\$ 15 billion by 2020. How does the ‘Make in India’ initiative align with this goal?

Most medical, industrial and consumer appliances were designed to work in isolation. All these devices now need to be IoT ready to get connected to the internet and work with other devices, as part of a network. The modification or upgrading of these existing devices will spur the ‘Make in India’ initiative, tapping India’s vast IT talent pool.

IoT is also contributing to new technologies like blockchain and creating a lot of data for automation and artificial intelligence. To keep pace with IoT growth, the government has proposed to start new centres for technologies from cyber security to blockchain and these technological innovations will add to ‘Make in India’. Also, Digital India has plans to build 100 smart cities, which will be dependent on IoT devices, leading to ‘Make in India’ and IoT each complementing growth and creating more opportunities for the other. ■

As told to Ashutosh Gotad)



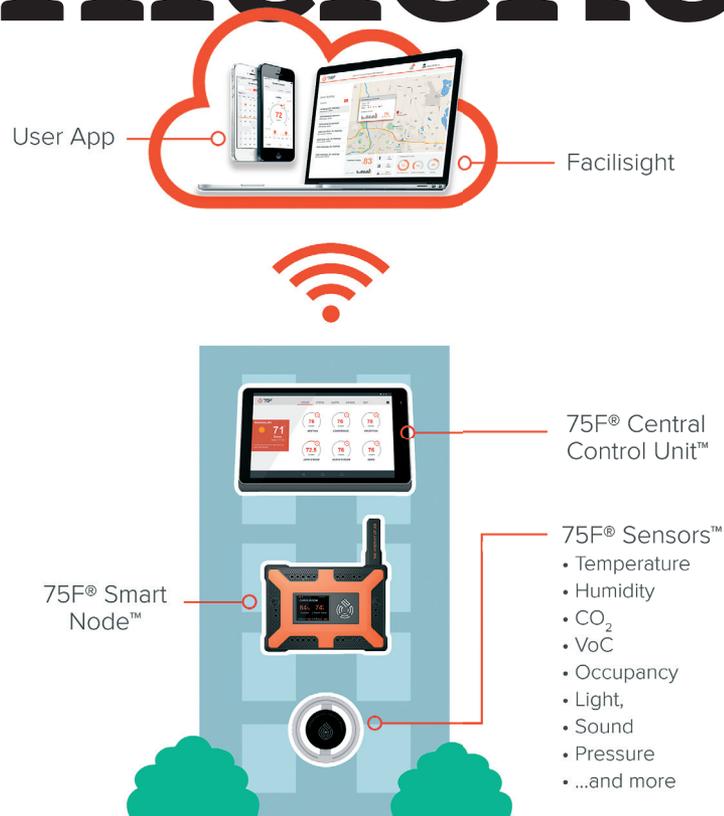
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Powering Energy Efficiency



The mushrooming of numerous IoT-based startups in India and the entry of several foreign players point to the country's robust ecosystem and policy initiatives. Gaurav Burman, VP and Country President, India, 75F shares his views on how the future looks for this rapidly emerging phenomenon.



Gaurav Burman, VP and Country President, India, 75F.

“INDIA HAS ABOUT 43% OR US\$ 1.5 billion of the global US\$ 3.5 billion market. IoT and machine to machine (M2M) have led to the evolution of ‘smartness’ in all sectors and more evidently in the energy sector.”

How can IoT help in creating smart energy solutions for a growing economy like India?

IoT is expected to be the largest driver of economic growth and employment in the next decade. In fact, according to a research report by Zinnov Zones, India has about 43% or US\$ 1.5 billion of the global US\$ 3.5 billion market.* IoT and machine to machine (M2M) have led to the evolution of ‘smartness’ in all sectors and more evidently in the energy sector. According to Gartner, IoT usage in the energy sector is expected to grow to 50 billion devices by 2020, and manufacturers, utility providers, and consumers are taking advantage of information that flows from multiple assets.

Take for instance, IoT-powered building intelligence solutions that make retrofits hassle-free, and automate a multitude of significant tasks along with providing in-depth monitoring and analytics. Systems such as HVAC, lighting control and automation, security and surveillance, monitoring of utilities, energy management, and other specific tasks such as parking garage fare collection are efficiently managed with these solutions. It gathers and analyses data, and formulates and recommends future actions making the building automated and truly smart.

How can India leverage the power of IoT in manufacturing?

Commercial IoT is a vast field with solutions in manufacturing, healthcare, hospitality, R&D, pharma, IT, and intelligent buildings. Of these, our expertise is in the last one. However, theoretically speaking, a system of connected machines with the aid of IoT will enable higher efficiency and quick information sharing. Factory floors are no longer shying away from this smart revolution. The IoT platform in the manufacturing industry will be able to provide a system for capturing and analysing real-time data and information, resulting in accurate insights and automated management and control.

Could you list a few IoT-based projects 75F has undertaken in India and their impact on your clients’ businesses?

Having launched our IoT- and machine learning-based approach to HVAC, lighting and controls in commercial buildings in India in August 2016, we have been growing steadily since then with our clientele including Firstsource Solutions, Flipkart India, Bennett-Coleman Group, Mercedes Benz, Mapletree India and other leading brands joining US customers such as Border Foods, Magnet 360, Rockler, and Yoga Fit.

One of our most recent projects, an installation at Firstsource Solutions Limited, is a great example of how IoT-based building intelligence solutions impact not just the facility but the business as well.

Firstsource Solutions Limited (FSL) was an interesting site, approximately 80,000 sq ft running three shifts a day with 24/7 occupation, with highly dynamic loads. So, one of the challenges was to install our solution with minimum possible disruptions. We provided FSL’s facility with a cloud- and IOT-based solution that micro-zoned the entire space, providing nearly 45% savings, on their HVAC bills each month. But it is much more than just savings.

Which are your focus areas in India and how challenging has integrating IoT been?

We want to empower people to work better and fulfil their desire for comfort. We are proud that our solution, which can contribute up to 38 LEEDv4 credits, is helping construct a more sustainable world. 75F has developed a unique approach to HVAC zone controls—Dynamic Airflow Balancing™. Leveraging IoT design philosophy and the power of cloud computing, we have achieved what was once thought of as only theoretically possible—

Facing page: A vertically integrated suite of wireless sensors, equipment controllers, and cloud-based software delivering predictive, proactive building automation.

continuous commissioning or perfect air balancing. We are focused on establishing ourselves in a few verticals, for example, IT/ITeS, BFSI, healthcare and hospitality, in the four metros, over the next few years. We launched operations in India in August 2016, and hope to hit ₹ 100 crore in revenue by end of fiscal year 2018-19.

IoT is paving the way for next-generation building intelligence, energy efficiency, profitability, business continuity, optimisation and protection of assets or goods in a building, physical security and surveillance, and so on. All these form an integral part of today's business objectives when it comes to commercial buildings, and IoT enables all of these at a much lower cost and in a more user-friendly way than before. However, the challenge remains vis-a-vis adoption of these new-age technologies and awareness levels. Many Indian companies are still sceptical about change and are reluctant to investing in emerging technologies. There needs to be heightened visibility on the impact of IoT and how it can benefit respective industry segments.

What are your views on the availability of skilled manpower in the country?

For development and economic growth, every country requires the requisite skilled manpower. Human resources therefore are an integral part of a country's development.

However, as with any new technology, IoT companies too are struggling to find the right people with the right skills, which makes the hiring landscape more competitive and complex. According to a report by Limitless Mobil, some 45% organisations would like to see more IoT-skilled manpower working with them.

That said, I am confident in the Indian workforce to be at the forefront of new technology and to gain expertise in this sector too in no time.

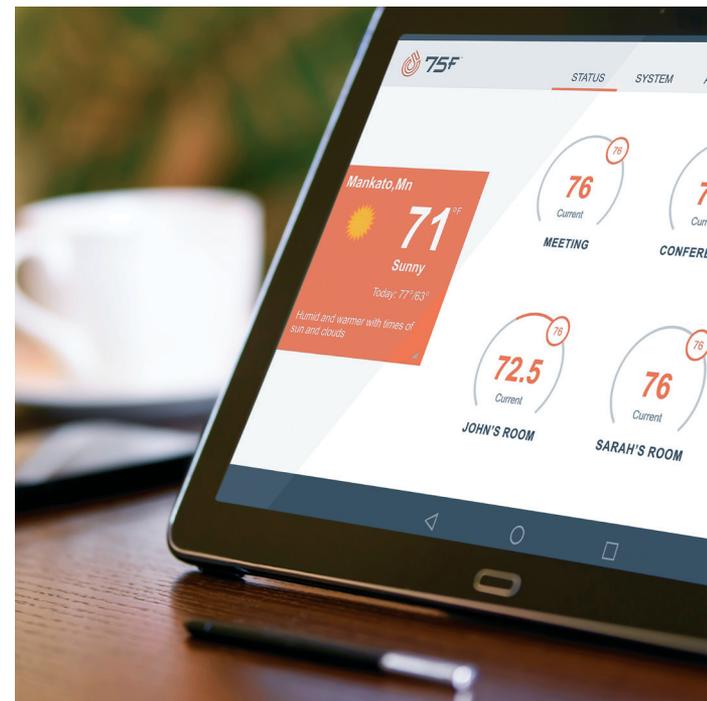
How has the government supported the sector?

The US Green Building Council was recently quoted saying that the green building industry in India is expected to grow by 20%, driven largely by environmental regulations and the demand for healthier neighbourhoods. We hope that in the years to come, the government will continue to encourage and support intelligent and green buildings.

How does the future look for your business in the country?

We are optimistic about business growth, given that new building deployments represent an enormous opportunity with the Indian economy appearing to

“WE WANT TO EMPOWER PEOPLE to work better and fulfil their desire for comfort. We are proud that our solution, which can contribute up to 38 LEEDv4 credits, is helping construct a more sustainable world.”



be robust for medium-term growth. Additionally, we have a much larger growth opportunity with the existing buildings, given that our solution is retrofit-friendly.

With India being an emerging economy, there is a lot of potential for IoT in buildings and developments. As for intelligent buildings in the commercial arena, our market studies indicate the PAM (potential available market) for us in the US is approximately US\$ 5 billion and in India it is approximately US\$ 1 billion. As IoT complements our business model, we expect a positive growth towards intelligent business solutions. ■

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(As told to Ashutosh Gotad)



A WELL ENGINEERED GROWTH STORY

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Turning the Tide

India's fisheries industry is on the crest of an exports wave, and all stakeholders—the fishing and aquaculture communities, individual organisations, and state governments—are making sure the tide remains in their favour.

NALINI RAMACHANDRAN

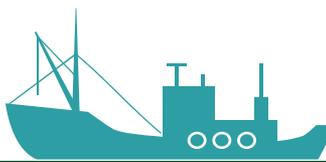
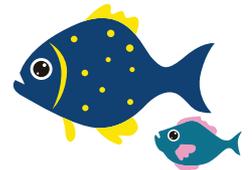
A peninsula in terms of geography, India boasts a coastline of more than 7,516 kilometres. It also contains a canal system of about 195,210 km, consisting of 14 major rivers, 44 medium rivers, and numerous small rivers and streams¹, thus offering much room for the growth of the fisheries industry. FishBase, an online fish catalogue, states that as many as 2,707 different species of fish can be found in India.² It should not come as a surprise then that the country has earned the tag of being the second-largest producer of fish in the world.

With the demand for Indian fish increasing in other countries and dedicated initiatives being put into place by the entire network, the country's exports too have reached a new high.

A GOOD CATCH

Indian fish exports cater primarily to two sectors: obviously, the first is seafood. The country exported 1,134,948 MT of seafood in 2016–2017, bringing in revenue worth US\$ 5.78 billion.³ These figures owe much to the large market that the Indian shrimp enjoys internationally.

While Vietnam, Ecuador, Indonesia, and Thailand have earned their place in the list of five leading shrimp exporting countries in 2016–2017, the top spot has been bagged by India (434,484 MT). Countries that have developed a taste for the Indian shrimp include the US (which imported 165,827 MT of frozen shrimp), the European Union (77,178 MT), Southeast Asia (105,763 MT), Japan (31,284 MT), Middle East (19,554 MT), China (7,818 MT), and others (27,063 MT).⁴



Photos courtesy: shutterstock

THE VANNAMEI WAY

Prawn Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2017–2022, a December 2017 report by the IMARC Group—which states that the global prawn market is expected to reach a volume of more than 6 million ton by 2022, at a CAGR of more than 4% during 2017–2022—lists India among the foremost prawn-producing countries. The report also states that of the many varieties of prawn, *penaeus vannamei* is the most popular. In a bid to boost the country's seafood exports, the Indian fisheries industry is focusing its energy on the cultivation of this king prawn—*vannamei*.⁵ States such as Odisha and West Bengal are slowly expanding cultivation of this variety. Meanwhile, the Fisheries Department of Telangana has been conducting farm trials of *vannamei*, along with those of a shrimp variety that could be an alternative to the much-loved prawn. The Commissioner of Fisheries (Telangana State), C Suvarna, has said, "This is a pilot project. We have to wait for the results till April–May [2018]. If the experiment, the first of its kind in the country, is successful, we will scale up the production."⁶

FISH FANCY

Ornamental fish, the other sector to which Indian fish exports cater, is a US\$ 3.5 billion international market. Joining the roster of countries such as Thailand, Malaysia, Singapore, and Indonesia is India, with its ornamental fish exports revenue reaching ₹9.5 crore in 2016.⁷ A fascination for colourful aquatic organisms, the positive role of fish in Feng Shui, and the belief that watching the finned animals swim through an indoor aquarium has a soothing effect are some of the reasons that have made this a rapidly growing sector.

Market Trends in Indian Ornamental Fish Trade, an article by Mini Sekharan N published in *INFOFISH International* in March 2017, states, “Exports of unique and beautiful wild-caught indigenous ornamental fishes from Indian water bodies began in the 1960s and presently, about 150 indigenous ornamental fish species are listed in the export portfolio. Barbs, catfishes, and loaches form the main group of fishes exported from India. Of these, only selected varieties of indigenous ornamental fishes are exported on a continuous basis, most important of which are redline torpedo (*Sahyadria denisonii*), reticulated loach (*Botia lohacata*, *Botia striata*), puffer fish (*Carinotetraodon travancoricus*), and snakeheads (*Channa sp.*”).⁸

Not wanting to be left behind in playing an important role, the National Fisheries Development Board (NFDB) has invested ₹61.89 crore in an ornamental fish cultivation pilot project, which has been instituted across eight states—Assam, Gujarat, Karnataka, Kerala, Maharashtra, Odisha, Tamil Nadu, and West Bengal.⁹ Plans are underway to establish a technologically superior hatchery for decorative fish in Andaman and Nicobar Islands, Lakshadweep, Haryana, Punjab, and Rajasthan as well.

FISHERIES ECOSYSTEM

The European Union (EU) had sent an inspection team to India in 2017. While seafood exporters anxiously anticipated the consequences—the EU had made export regulations stricter since 2016, mainly with regard to the presence of antibiotic remains in shrimp consignments—the team declared that all export practices of the country met the necessary requirements. This came as a big relief, for the EU constitutes a market share of 18% of India’s seafood exports.

Credit for the positive outcome also goes to the government’s efforts in creating a healthy and sustainable fisheries network in the country. The demand for organic marine produce has been seeing a rise, since more and more people around the world are becoming aware of fish farming practices. To encourage the Indian aquaculture ecosystem to adopt organic measures, environmental organisations and departments of various state governments have been working on awareness campaigns for fish farmers—to explain the ill effects of antibiotics and help them find green solutions for a good, healthy harvest.

Knowing the potential of the global organic fish products sector, the Marine Product Export Development Authority (MPEDA) started the India Organic Aquaculture Project (IOAP) way back in 2007—the project assisted in successfully developing certified organic feed mills and food processors as well as shrimp/scampi hatcheries and farms. As a result, in 2008, farmers from the state of Kerala became the first in the world to have harvested organic scampi.

NEW HORIZONS

Going especially by India’s latest distinction as ‘the biggest exporter of shrimp in the world’, this is one



Photo courtesy: Shutterstock

AN UNDERWATER RAINBOW

Tamil Nadu ranks second in the country for exports of ornamental fish—West Bengal being the first. The Fisheries College and Research Institute (FCRI) in Ponneri (Tamil Nadu) is developing a futuristic facility, at the cost of ₹10 crore, to multiply production of decorative marine fauna. Funded under the Tamil Nadu Innovation Initiatives, it will be located in Chennai and will be India’s first Aquatic Rainbow Technology Park (ARTP).¹⁰

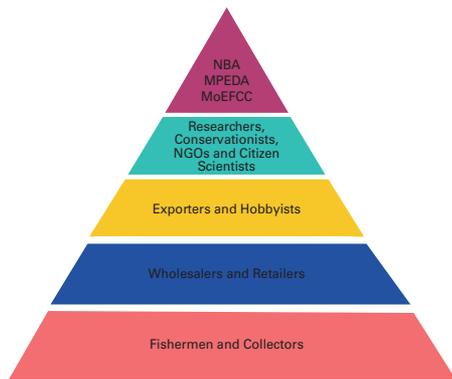


THE KERALA CLAM

Fishing is among the two most ancient Indian occupations—the other being agriculture. Capture fisheries, or aquatic organisms caught through traditional fishing methods, comprise a small percentage of India's total exports, whereas the larger share is catered to through fish farming or aquaculture.

The clam fishermen of Ashtamudi estuary in Kerala are India's first and Asia's third recipient of the prestigious Blue Label Certification—recognition showered by the Marine Stewardship Council upon those using sustainable fishing methods. This has been made possible due to the concerted efforts of WWF-India, Central Marine Fisheries Research Institute (CMFRI), and Fisheries Department of Kerala.

As per the sustainable practices, the fishermen avoid fishing for clams during the breeding season (December to February), follow restrictions of net size and export volume, and have also done away with mechanisation earlier used for fishing. This is beneficial for both the marine organisms and the fishermen, for the clam are conserved even as the community continues to manage an annual catch of 10,000 tonnes.¹¹



A model representing different stakeholders from fishermen to government agencies (NBA-National Biodiversity Authority, MPEDA-Marine Product Export Development Authority and MoEFCC-Ministry of Environment Forest and Climate Change) to highlight the integrated management approach for sustainable ornamental trade.¹²

INDIA IS NOW THE LARGEST EXPORTER of shrimp in the world. A December 2017 press release by CRISIL projects 'shrimp exports from India to nearly double to US\$ 7 billion by 2022'.

sector in sharp focus. A December 2017 press release by CRISIL states that "it expects shrimp exports from India to nearly double to US\$ 7 billion by 2022, driven by strong demand, high quality, improved product mix, and an increase in aquaculture area in Andhra Pradesh, Gujarat, Odisha, and West Bengal".¹³

State governments and individual organisations are helping fishing and aquaculture communities combine knowledge, technology, and their skill well. And with increasing awareness of organic and sustainable methods, not just the country's ecosystem but the future of fisheries exports too is set to thrive. ■

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Karnataka—IT Capital of India

Karnataka's remarkable strides have been the sum of a multitude of factors—innate IT and R&D potential, rich talent pool, and solid industrial foundation. Seizing the best of opportunities and leveraging every facet of its body of strength, the state is fast emerging as a role model.

ANITHA MOOSATH

Being the country's knowledge capital and home to the fourth largest technological cluster in the world, after Silicon Valley, Boston, and London¹, Karnataka has contributed immensely to placing India on the international business circuit. Futuristic policies and ease of doing business have helped the state shape and nurture its eclectic industrial profile, which in turn has spurred growth.

That the capital city of Bengaluru has earned the epithet 'Silicon Valley of India' is a pointer to the IT prowess of the state, which houses 3,500 IT companies and 47 IT/ITeS SEZs and dedicated investment regions. Further, it contributes to 1/3rd (550,000) of the total number of IT professionals in the country. Also, at least 400 Fortune 500 companies have outsourcing operations in the state.²

Karnataka has a vibrant startup culture too, one aimed at creating a world-class ecosystem through prudent investments in incubation infrastructure, forging of partnerships, and policy interventions. The Startup Policy 2015-2020 is aimed at creating 20,000 tech startups, including 6,000 product startups by 2020, creating about six lakh direct and 12 lakh indirect jobs. A dedicated StartUp Cell provides services such as legal/accounting advice, mentoring, subsidised tariffs, seed funding, and so on;³ a Startup Booster Kit, offering facilities like access to mentors, cloud credits, and incubators, was announced in July 2016.⁴ In 2017, the government received

Top: Infosys Technologies Limited, the second-largest IT company in India, is a leading global player in areas such as IT consulting, modular global sourcing, and BPO services.

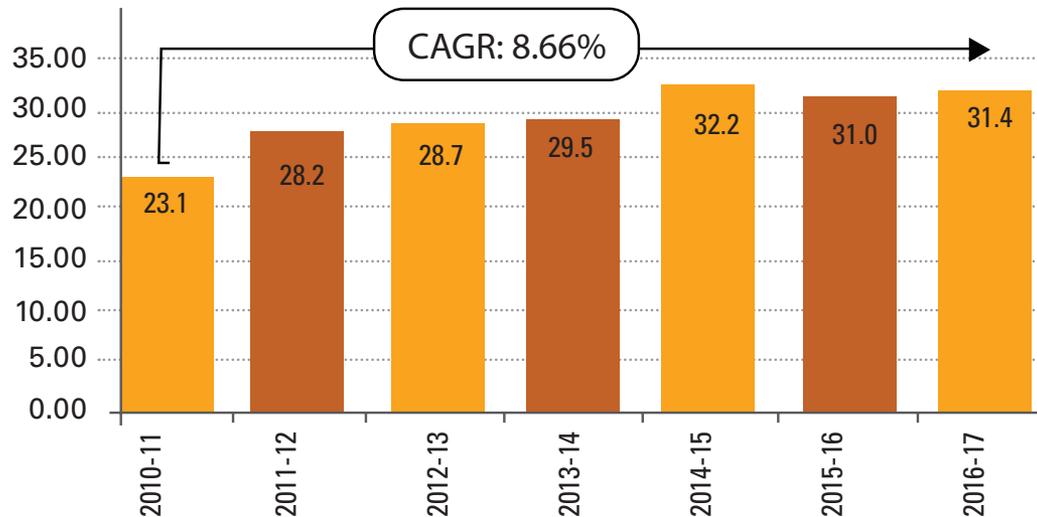
Below: Biocon Limited is committed to enhancing global healthcare through innovative and affordable biopharmaceuticals.



Photo courtesy: Infosys



Photo courtesy: Biocon

ELECTRONICS AND SOFTWARE EXPORTS FROM KARNATAKA (US\$ BILLION)

Source: IBEF

applications from 1,700 startups across the state under its Elevate 100 programme, catering to the IT and biotech sectors.⁵ Also, the State Department of Information Technology and Biotechnology announced ₹3.18 crore in grants to 12 startups in areas such as agriculture, biotechnology, security, communications, and robotics.⁶ At the Bangalore Tech Summit, 2017, the government signed an MoU with Business France India, a move aimed at fostering cross-learning, incubation, and partnerships.⁷

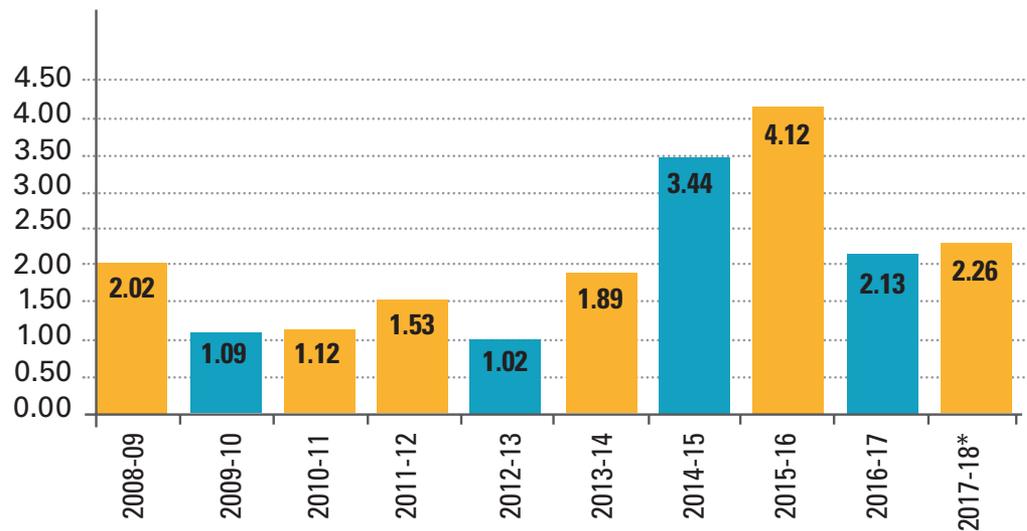
It was way back in 1985 that the state stepped onto the global R&D stage when Texas Instruments set up an R&D centre in Bengaluru. In a short span, they graduated from developing and supporting proprietary software systems for their integrated chip design into becoming a full-fledged design centre for application-specific products.⁸ The 1990s saw a slew of MNCs setting up GICs in the state, and as per Zinnov's annual report on GICs, there were nearly 943 MNCs with 1,208 R&D centres in the country in 2016 and 35% of them were in Bengaluru.⁹ Prominent among them are General Electric, Siemens, Bosch, Pfizer, Groupon, Unilever, SAP, Altran, Twitter, and Kellogg's. Among the most recent entrants is Intel Corporation, which has announced an investment of ₹1,100 crore in an eight-acre R&D facility in the city.¹⁰

NATIVE EDGE

What lies at the core of Karnataka's attraction is undoubtedly its enabling ecosystem and robust policy paradigm, which have helped bring in investments in the IT/ITeS, biotechnology, engineering, electronics, automotive, textiles, agriculture and food processing sectors.

The government has always followed an inclusive approach wherein the needs and demands of entrepreneurs and industrialists are taken into consideration while drafting policies. The Department of Industries and Commerce, committed to the avowed goals of promoting investment and trade, has been focusing on modernisation, collaboration, upgrading technology as well as infrastructure, and adoption of best practices.

The Karnataka Industrial Policy, 2014-19 ushered in a wide range of fiscal and policy incentives for businesses. Sector-specific policies are also in place to promote industries such as IT, biotechnology, tourism, and manufacturing. Domestic as well as foreign players have been optimally utilising the state's policies and single-window clearance mechanism for investors and entrepreneurs.¹¹ This has, in turn, as mentioned earlier, spurred growth as well. Further, Karnataka Udyog Mitra, constituted under the aegis of the Industries Department, serves as a catalyst for facilitating investments.¹²

FDI EQUITY INFLOWS, 2008-09 TO 2017-18 (US\$ BILLION)

Source: IBEF
*During April to June 2017

The state's talent pool has also been a source of strength and its merits are widely acknowledged. German Chancellor Ms Angela Merkel, had remarked, "Researchers here in Germany are probably wonderful and great, but those in India are quite creative and innovative."¹⁵ Bengaluru occupies a prominent position in the global strategy of many a firm. For instance, it was a strategic move when GE set up its first and largest R&D centre outside the US, in Bengaluru, in 2000. In an interview with *India Now Business and Economy* (June-July 2017), Mr Munesh Makhija, Managing Director of the Centre, said that many of the technology solutions developed at the John F Welch Technology Centre here find application in over 100 countries. GE technologists in India have contributed to over 3,400 patent applications filed by the parent company, according to him.

GROWTH GRAPH

Karnataka is undoubtedly one of the country's fastest growing economies. At current prices, the gross state domestic product (GSDP) was about US\$ 175.8 billion in 2016-17.¹⁴ Cumulative FDI inflows between April 2000 and June 2017 were recorded at US\$ 24.63 billion, the fourth highest in the country, and accounted for a share of 7.2% in India's cumulative FDI inflows.¹⁵ Karnataka's Large and Medium Industries Minister Mr R V Deshpande, in a statement, had said, "In the past

two decades, economic and administrative reforms have transformed Karnataka from being an inward looking state-based economy into a globalised market-based economy, now identified as one of the most attractive investment locations globally."¹⁶

KEY INDUSTRIES

- Karnataka is a leading player vis-a-vis a wide spectrum of industries, the most prominent being IT and ITeS. It has a high concentration of IT firms, and nearly 50% of the world's SEI CMM Level 5 certified companies are located in Bengaluru.¹⁷ Homegrown companies such as Infosys Technologies Limited and Wipro Limited have made a mark in various geographies. The state is India's largest software exporter too, with electronics and computer software exports totalling US\$ 31.43 billion during 2016-17 (up to September 2016).¹⁸
- The state is also poised to contribute to the growth of India's biotechnology industry, which is expected to reach US\$ 100 billion by 2025. With over 300 biotech companies, it comprises nearly 60% of the country's biotech units and 50% of the total revenues. An 86-acre biotechnology park, Bengaluru Helix, comprising the 52-acre Alexandria Knowledge Park operates in the capital city.¹⁹ The presence of sector-focused SEZs and institutions such as Indian Institute of Science and National Centre for Biological

KARNATAKA IS AMONG THE top chip designing hubs in the country—around 70% of chip designers in India are in Bengaluru.

Science and Jawaharlal Nehru Centre for Advanced Scientific Research have offered further fillip to this sector. Private players such as Biocon and Jubilant Life Sciences Limited have made remarkable strides at a global level.

- The fastest growing sector of the state, engineering, is marked for its voluminous body of exports to countries including the US, Germany, China, South Korea, Brazil, and Singapore. Exports of engineering products, which stood at US\$ 1,605 million in 2010-11, touched US\$ 2.26 billion by September 2016.²⁰ Products—including machine tools, industrial machinery, automotive components, construction equipment, and helicopter spares—are being exported to countries such as the US, Germany, China, South Korea, Brazil, and Malaysia.²¹
- Karnataka is an auto hub too, with investments touching nearly US\$ 713 million and earning annual revenues of US\$ 604 million. There are also three auto clusters, and one industrial valve cluster and auto component cluster each.²² Many auto majors including Volvo and General Motors have set up base here. General Motors Technical Centre, located in Bengaluru, is actively involved in research, design, analysis, and development of vehicles and power trains for foreign destinations as well as the domestic market. Karnataka is also set to seize the first-mover advantage in the electric vehicle sector in the country. The 'Karnataka Electric Vehicle and Energy Storage Policy' was unveiled in 2017²³, and the state has a robust ecosystem in terms of skilled manpower, R&D facilities, and manufacturing expertise. Electric vehicle manufacturing here is expected to attract investments worth US\$ 4.82 billion and create 55,000 jobs.²⁴ A dedicated automobile policy, which is on the anvil, is expected to attract more companies.
- The foundation of the Indian aerospace industry was laid with the establishment of Hindustan Aeronautics Limited (HAL) in Bengaluru in 1940. It now produces more than a quarter of



Photo courtesy: Shutterstock

the country's aircraft and spacecrafts. A state-of-the-art 1,000-acre aerospace park with a 252-acre sector-specific SEZ has been set up at Devanahalli near Kempegowda International Airport.²⁵ And Karnataka is the first and the only state in the country to announce a dedicated aerospace policy; it has identified an investment potential of US\$ 12.5 billion in this sector during 2013-23.²⁶ All these have equipped the state with competencies which in turn lend it the competitive edge of offering low-cost aerospace manufacturing and MRO activities in Asia and the Middle East. Aerospace products are being exported to the US, the UK, Germany, Russia, Mauritius, Malaysia, Nepal, Oman, and Ecuador.²⁷ Its core strengths also make it a base for many global players such as Honeywell and Airbus. Boeing plans to set up an engineering and technology facility at an investment of ₹1,152 crore, at the aerospace park in Devanahalli.²⁸

- Karnataka is among the top chip designing hubs in the country—around 70% of chip designers in India are in Bengaluru. The availability of low-cost skilled/technical manpower makes the city a global hub for R&D activity in the software industry too. By 2020, the ESDM sector is expected to generate a turnover of US\$ 400 billion, including exports to the tune of US\$ 80 billion, with an investment of US\$ 100 billion.²⁹ The presence of high-end R&D organisations—Indian Institute of Science, Cosmic Industrial Laboratories Limited, Indian Space Research Organisation (ISRO), CSIR Centre for Mathematical Modelling and

Premier institutes such as the Indian Institute of Science contribute to the richness of Karnataka's talent pool.

Computer Simulation (CMMACS), National Aerospace Laboratories, Centre for Soft Matter Research—makes the state a leading player in telecommunications too.³⁰

- Adding sheen to Karnataka's industrial prowess is its silk sector. It produces 65% of raw silk and 11% of wool, and is the second largest in garment exports. The state is a sourcing hub for international brands like Nike, Tommy Hilfiger, Adidas, and Allen Solly. There are 144 skill development and 168 private training centres along with seven textile parks, driving its growth.³¹ Karnataka Silk Industries Corporation (KSIC) is a much-sought-after brand, known for its fine quality and textural richness.
- Karnataka has a good agricultural base too, and exports stood at US\$ 204.72 million in 2016-17; it also accounts for around 71.3% of the country's total coffee production.³² Tourism too is a thriving sector with world heritage sites such as Hampi and many a sanctuary across the state. Private sector participation has boosted the tourism sector in a big way.

INFRASTRUCTURE

Karnataka's strengths on the infrastructure front are an offshoot of its unwavering focus on quality education, development of a rich talent pool, skill development initiatives, and strategic investments in industrial clusters, SEZs, and PPP projects. As of September 2017, the state had 26 operational, 51 notified, and 62 formal approval SEZs. The Karnataka Industrial Areas Development Board has developed 141 industrial areas across the state, and promoted more than 135 startup ventures through equity participation. In October 2017, the government approved setting up of a 904.86-hectare industrial park in Harohalli, which is expected to entail an investment of US\$ 242.8 million and generate more than 23,500 jobs.³³

The state houses premier institutions such as Indian Statistical Institute and Indian Institute of Management. That it has 44 universities, 206 engineering colleges, 293 polytechnics, 47 medical colleges, and 38 dental colleges, explains the richness of the diverse talent pool it offers.

The state has five domestic airports and 13 ports, and good road, rail, water and air connectivity and substantial port infrastructure.³⁴

Karnataka's rise into the global arena and its remarkable strides in industrial development have been made possible, to a great extent, owing to its

urbanisation quotient (it is among the top ten most urbanised states in India). In budget 2017-18, US\$ 2.13 billion has been allocated for urban development and seven cities have been selected under the Smart Cities Mission.³⁵

Availability of power, especially from renewable sources, has been a major attraction for those setting up business in the state. As of October 2017, renewable energy was recorded at 7,773.47 MW out of the total installed capacity of 21,632.09 MW and installed capacity for solar power in the state reached 1,492.88 MW. Karnataka Solar Policy 2014-2021 plans to add solar generation of minimum 2,000 MW by 2021. By the end of August 2017, the installed capacity for wind energy was recorded to be 3,840.36 MW.³⁶

Karnataka's trajectory of phenomenal growth is rooted in its commitment to knowledge sharing and innovation across sectors, a theme centric to its industrial policy too. The state has aligned its objectives with the socio-economic realities and is fast moving towards its goal of achieving inclusive and sustainable development. ■

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IN GREAT DEMAND

India is the world's largest producer and consumer of black tea



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Delivering Outperformance

As per NASSCOM's Strategic Review 2017 report, India's IT-BPM sector registered a growth of 7.8% as exports increased from US\$ 35 billion in 2016 to US\$ 38 billion in 2017. This was complemented by the domestic market, which grew from US\$ 108 billion in 2016 to US\$ 117 billion in 2017. Historical trends and future growth prospects make the IT-BPM landscape in the country conducive to growth and foreign investment. In this interview to India Now Business and Economy, Keshav R Muruges, Group CEO of WNS, talks about the future prospects of this industry and how the company will play a critical role in spreading its global reach.*

You have repeatedly emphasised the fact that these are exciting times for the BPM industry, which is quite in contrast to the mainstream discourse of an impending slowdown. What are the reasons behind this optimism? How is the Indian BPM industry poised to leverage this?

My confidence stems from the fact that BPM has proved to be one of the most agile and resilient industries in the world. We are well on our way to reach US\$ 55 billion in 2025 from the present US\$ 30 billion. We have successfully aligned the industry to technology disruptors and evolved its business model to meet other emerging challenges. India is well entrenched as the world's number one sourcing destination with 36% share of the global market.

The BPM industry is way ahead of the game when it comes to digital transformation and is building innovative solutions around advanced technologies such as cloud, artificial intelligence, robotics, and data analytics.

We are meeting political challenges by diversifying into new markets, and thereby de-risking the business. We are delivering solutions from around the world—onshore in clients' markets such as the US and the UK, near-shore destinations in East Europe and Latin

America, and offshore centres across Asia. This global delivery approach allows us to help our clients meet regulatory requirements. The BPM industry in India services 78 countries in over 35 languages.

We have moved up the value chain by impacting our clients' bottom line and are supporting them as they transition their business to meet new market demands. One example of strategic impact is digital transformation where we are an integral partner of our clients' digital journey. With proprietary platform solutions, cloud enablement, robotic and automation solutions, and analytical tools, BPM companies are helping their clients across industries become digital enterprises and meet the expectations of their customers. Digital technologies are driving the total addressable market for global technology and business services, and are expected to reach US\$ 4 trillion by 2025, growing at an average annual rate of about 3.6%.

In an interview, you have said the business scenario is still under-penetrated as far as the BPM sector is concerned. What are the new markets and sectors for this industry?

NASSCOM estimates that in 2017-2018, IT-BPM export revenue will grow at a rate of 7 to 8% and domestic



Keshav R Murugesh, Group CEO, WNS.

revenue at 10 to 11%. Digital is driving growth across industries and geographies, with as much as 15 to 20% of the revenue of large BPM companies today coming from services related to digital technologies.

The increased momentum towards digital among enterprises in India is driving the domestic BPM market. This is largely due to government policies and programmes including Smart Cities, Digital India and Startup India and a fast-growing internet and smartphone base in the country. The digital front-runners in the domestic market are banks and financial institutes, e-commerce companies, and healthcare providers.

In terms of markets, besides consolidating our presence in the US, the UK and Asia-Pacific, we are expanding to continental Europe, Japan, China, and Africa. Globally, the growth industries have been manufacturing, healthcare, travel, and transportation.

How has the BPM industry transformed over the last five years? How have changing client expectations impacted processes at your end?

The evolution of the BPM industry is closely tied to changing customer needs. As our capabilities grew and our understanding of our clients' businesses deepened,

we started developing solutions that met the unique requirements of each client. Over time, the relevance of BPM services in a company's business grew as we added value, both in terms of immediate cost benefits and long-term business effectiveness.

Organisations expect strategic advantages from their BPM partners, besides the traditional expectations of reduced costs and improved efficiency, productivity, and customer satisfaction. We are helping our clients transform their business processes with the right use of process improvement and technology tools for sustained profitable growth. We support CXOs with decision-support services. They rely on us for data analytics-backed insights for their marketing, sales, investment, and operation-related decisions.

In 2010, WNS, under your stewardship, took a vertical- or industry-specific approach to business process management. How has this strategy worked for the company?

What we started in 2010 in WNS continues to be a key growth driver for the company. Over these years, we have built strong vertical-specific solutions

and centres of excellence in 13 client industries. Our domain university, The Gateway has produced thousands of domain experts who are trained and certified in these industries. We are not only a pioneer but also the first name in the industry when it comes to the vertical-specific approach.

What factors contribute to WNS being an ‘outperforming organisation’?

WNS has beaten industry trends to post double-digit growth in the past three quarters. We reported 32.4%, 26.9%, and 24.5% year-over-year growth in FY18 Q3, Q2 and Q1 respectively. A number of factors have contributed to it—our global network of 53 delivery centers in 13 countries through which we offer clients the right mix of delivery options, knowledge leadership in our clients’ verticals, which has helped us create domain-specific solutions, our people policies that nurture outperformance and client centricity, expansion into new markets and industries, and a flexible engagement model including an outcome-based approach.

Acquisitions have been a preferred growth strategy for WNS. How much has this helped in enhancing capabilities and fuelling growth?

Our acquisition strategy is based on our business objectives to gain new capabilities, strengthen domain specialisation, or enter new markets.

Our acquisition of Value Edge, a provider of commercial research and analytics services in the

“DIGITAL IS DRIVING GROWTH across industries and geographies, with as much as 15 to 20% of the revenue of large BPM companies today coming from services related to digital technologies.”

pharma and biopharma industry, in 2016 has helped us gain access to mature pharma analytics solutions and talent.

Earlier this year, we acquired Denali Sourcing Services, a US-based provider of strategic procurement solutions. Denali complements our existing F&A capabilities and fills a gap in our procurement service offerings. With this acquisition, we have become an end-to-end source-to-pay solutions provider.

Our other acquisition this year was HealthHelp, a provider of care management solutions. This has helped us consolidate our presence in the healthcare and insurance market with an end-to-end solution that meets the needs of payers, providers, and insurance companies.

Healthcare and analytics are two high-growth areas for the company. Could you detail efforts towards capability building in these areas?

We have mature analytics practices with a team of over 2,500 comprising of data scientists, big data specialists,



Photo courtesy: Shutterstock

data modelers, data infrastructure specialists, and statisticians.

Anticipating the growing demand for data professionals, we launched an MBA programme in business analytics in association with NIIT University in 2016. Each year, we expect 120 data analysts to graduate and join our analytics practice.

Besides talent creation, we are building a strong portfolio of proprietary analytics solutions. WNS Analytics Decision Engine (WADESM) is an integrated service framework for data-driven insights; ProGenie is a web analytics tool; SocioSEER is a big data analytics platform around social media and SmartPro offers our airline clients an advanced analytics driven proration engine for improved revenue management.

Our acquisition of Value Edge and strategic partnerships with firms with mature analytics capabilities give us a distinct advantage in the market.

How will automation, AI, and robotics disrupt the BPM industry? What will be the impact of these on human resource hiring? How do you balance automation and human resource needs at WNS?

We are integrating robotics and automation in processes that are routine and repetitive. These low-skilled, low-paying jobs are rule-based and do not require human intelligence. By automating these processes, we are able to offer clients higher efficiency and better quality of service. We are reskilling and redeploying people in processes that are judgement-based.

The BPM industry will continue to be people-centric. Our talent requirement remains diverse from graduates to professional degree holders such as chartered accountants, actuarial professionals, lawyers, medical practitioners, engineers, MBAs, insurance specialists and banking professionals. In our vertical driven service delivery, domain expertise will continue to rank high.

The BPM industry presently employs close to 1.2 million professionals directly and over 3 million people indirectly. By 2020, we expect to reach 3 million.

WNS now has around 53 delivery centres across the globe. What role will India play in the Group's future?

India will remain the centre of the BPM universe, even as the universe continues to expand. WNS delivers most of its high-value work out of India. The country is the base for our core finance and accounting work and technology services. We are investing in growing the analytics talent pool here, which we expect, will take us to the next level of growth.

“THE BPM INDUSTRY WILL continue to be people-centric. Our talent requirement remains diverse from graduates to professional degree holders.”

How do you deal with competition from other geographies offering the same services?

Each geography comes with its own niche skills, which adds to a company's portfolio. With global delivery capabilities, a BPM company can harness the unique skills of each region and offer its clients end-to-end service. For example, voice services from the Philippines, F&A from India, and automation and AI from China. So, what looks like competition, can be effectively turned into complementary capabilities that can greatly enhance a global BPM player's market position.

You believe future growth will depend not only on reskilling and upskilling but also on how we provide career growth opportunities. Could you elaborate on how WNS is developing its talent pipeline?

People practices in a company must not only be aligned to the company's business objectives but also to each employee's career goals and aspirations. Unless we achieve this balance, we cannot retain talent and grow the business.

In WNS, we have launched a number of programmes to hone the skills of our employees and create a future-ready workforce. Some of our innovative programmes to nurture talent and provide our employees opportunities to meet their aspirations are Front Line Manager (FLM) Development Program, The Gateway (to learn industry domain skills), League of Champions (an employee recognition programme), WiNS (our talent management and engagement programme), Aspire (our senior manager development programme for lateral movements) and Springboard (our learning programme with business schools). Thanks to the FLM Program, over 80% of our front-line managers are homegrown. All these initiatives have contributed to higher employee retention. Our leadership attrition is among the lowest in the industry.

We have recently launched a women leadership programme called Centurion to increase the participation of female employees in the leadership team. ■

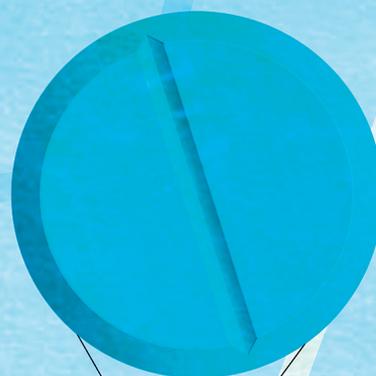
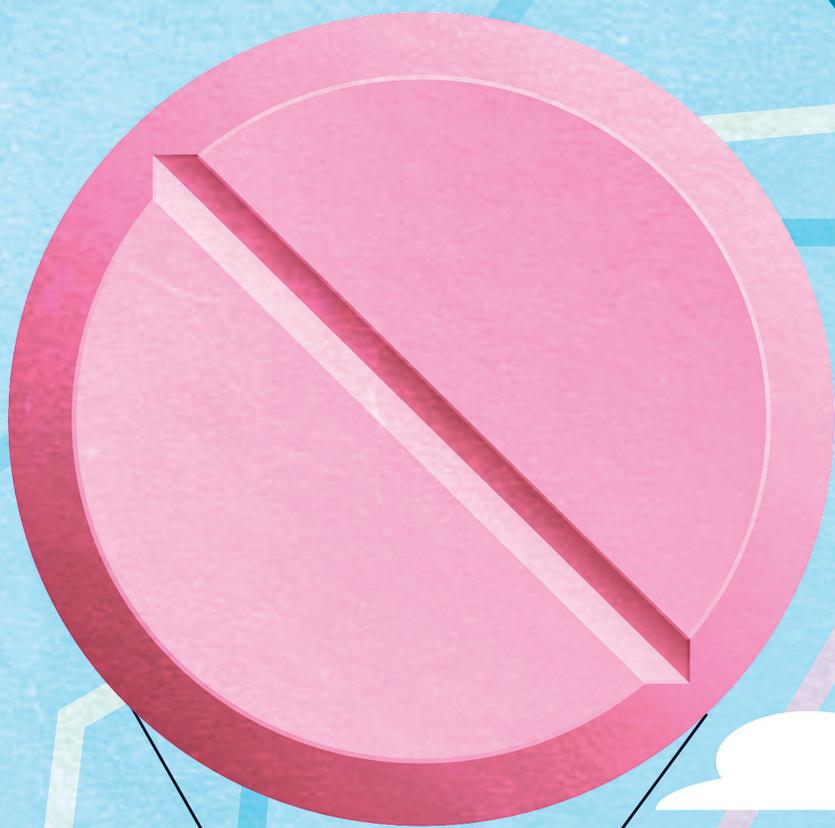
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A Clean Bill of Health

Government policies, innovative measures, and advanced technologies are not only helping India's healthcare industry grow at a robust pace, but are also ensuring a healthier India.

NALINI RAMACHANDRAN



The year 2017 saw a number of high points in India's healthcare sector, but significant amongst them was the institution of the National Healthcare Policy (NHP), 2017. With the numerous changes the industry had undergone during the past decade and a half, this was the need of the hour. The government approved this policy keeping in mind four key changes: growing strength of healthcare in India, rise in the cases of non-communicable illnesses, high cost of medical treatment, and the industry's revenue-generation potential. And to a large extent, one can say, these four changes give an overview of how the healthcare industry is developing in the country today.

HEALTHCARE GETS HEALTHIER

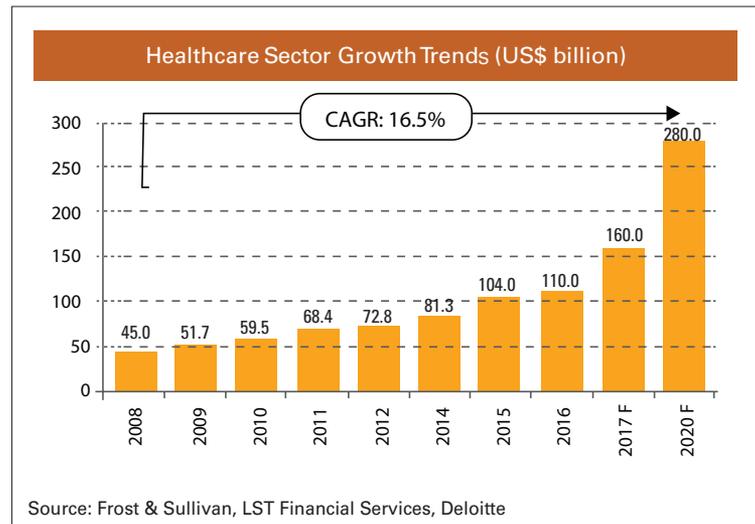
Deloitte Touche Tohmatsu India estimates that with increased digital adoption, the Indian healthcare market, which is worth around US\$ 100 billion, will register a CAGR of 23% and reach US\$ 280 billion by 2020.¹ A number of factors have been adding vibrancy to the industry:

- The country boasts a good percentage of knowledgeable and experienced healthcare professionals.
- Since treatment proves to be more cost-effective in India, in comparison to Western/European countries, medical tourism has received a big boost. India is experiencing 22–25% growth in medical tourism and the industry is expected to double its size from US\$ 3 billion (April 2017) to US\$ 6 billion by 2018.²
- Healthcare services provided by private organisations can claim to be among the best in the world—diagnosis equipment and methods, use of telemedicine, and adoption of hospitality-like-treatment by hospitals being a few examples.
- The Ministry of AYUSH aims to evolve India as the global epicentre for traditional medicine. While a total of 3,598 hospitals and 25,723 dispensaries offer AYUSH treatment³, the All India Institute of Ayurveda (AIIA) was established in October 2017.

FROM 'BEWARE!' TO AWARE

In a complex cycle, improved healthcare services are helping people lead a better lifestyle, even as the tech-savvy population makes an effort to seek enhanced medical facilities. This has primarily been facilitated by the increasing ability of people to afford best-in-class treatment as well as accessible insurance.

Investment in Healthcare Sector in India, a June 2016 paper by Nishith Desai Associates, states, "The domestic health insurance business at ₹12,606 crore



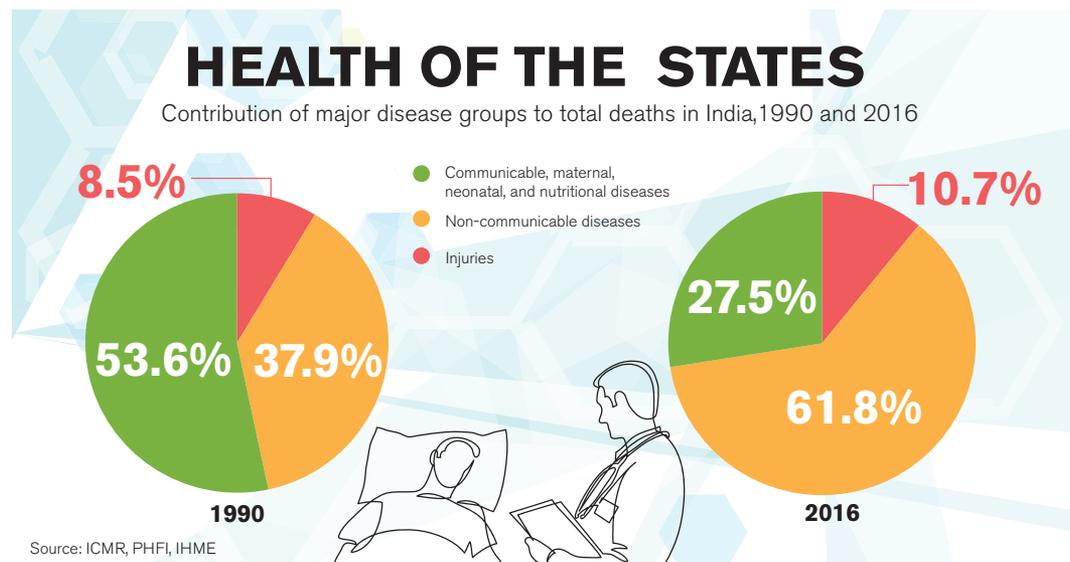
(US\$ 2.03 billion) accounts for about a quarter of the total non-life insurance business in the country. An increase in people opting for health insurance has been witnessed over a period of time. New products that also cover certain ailments not covered earlier are seeing more buyers of such insurance policies.⁴

But there is more to this cycle. Lifestyle being the keyword here, it also includes the population's sedentary routine with little or no exercise and an erratic sleep schedule, along with an unhealthy diet and cigarette and alcohol consumption. In September 2017, World Health Organization (WHO) launched the NCDs (Non-Communicable Diseases) Progress Monitor, and stated that NCDs—primarily cardiovascular and chronic respiratory diseases, cancers and diabetes—are the world's biggest killers, and claim the lives of 15



Dr Usha Manjunath,
Director, IIHMR,
Bengaluru.

“Government initiatives in ‘public health cadre’ [along] with National Health Policy, 2017 that calls for multidimensional mainstreaming of AYUSH doctors and capacity building of non-MBBS [personnel] like nurses and rural medical assistants to create mid-level service provider cadre would be a positive way forward for meeting the manpower needs of primary health care. On the specialist side, plans to start DNB (Diplomate National Board) courses in district and municipality hospitals across the country is a welcome move.”



Source: <http://www.news18.com/news/india/india-has-moved-towards-lethal-non-communicable-diseases-from-infectious-ones-report-1577341.html>

million people aged 30 to 70 years annually.⁵ According to an article in *The Times of India* (September 2017), nearly 61% of deaths in India are now attributed to non-communicable diseases.⁶ It is little wonder then that NHP 2017 aims to reduce premature mortality from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases by 25% by 2025.⁷

With treatment becoming quite expensive over time, people understand that a longer life means that they require healthcare for a longer duration. Thanks to awareness spreading through the use of the internet, people are slowly becoming health-conscious—they would rather make lifestyle changes and stay fit than face medical complications.

THE COST OF CARE

PricewaterhouseCoopers has estimated that the total expenditure on healthcare by OECD and BRIC countries from 2010–2020 would be around US\$ 68.1 trillion, apart from US\$ 3.6 trillion on healthcare infrastructure.⁸ India's Union Budget 2017–2018 increased the overall allocation to the country's healthcare needs from US\$ 5.96 billion to US\$ 7.3 billion.⁹

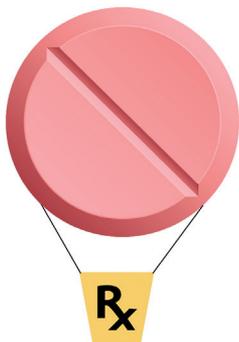
The government plans to take this figure further up through public-private partnership (PPP) initiatives, which will particularly facilitate last-mile delivery of medical services—capacity building, diagnosis and primary healthcare centres and trauma/emergency units, availability of medical equipment (especially for radiology and dialysis) in existing public hospitals, beneficial insurance plans, e-health projects, and more.

Having perceived that when the quality of healthcare services provided falls under the high-end category, they automatically become inaccessible to the economically weaker sections of the population, the government has also planned to transform 1.5 lakh smaller medical centres in rural regions into wellness centres, revisit policies to enable the manufacture of affordable medical devices, and promote low-cost generic medicines.¹⁰

INVESTING IN INNOVATION

The growing demand for advanced treatment and the PPP schemes are opening new doors for investment. Considering the demand–supply context of healthcare infrastructure, Confederation of Indian Industry (CII) has calculated that an investment of US\$ 86 billion would be required to fulfil the need of 1.8 million additional beds by 2025 and 1.54 million more doctors to cater to the country's population.¹¹ As stated earlier, opportunities for investors also lie in medical tourism, which is estimated to touch US\$ 6 billion this year.¹²

Established private players are strategising to stay at the top of their game—they are partnering with international medical firms to take their services to the next level, increase business footprints, and thus boost development. Meanwhile, healthcare startups are ensuring they bring innovative ideas and practices to the table, especially technology-driven ones. The good news is that the government is in the process of setting up a single-window clearance system to provide all permissions within a month to innovative ventures applying for a global patent.



In keeping with the vision of Digital India, many of these are adopting usage of IoT and implementing AI-based solutions. A January 2018 article in *Business Today* states, “It is expected that by 2020, around 20% of healthcare and 40% of science organisations will achieve productivity through the adoption of AI technology between 15% and 20%.”¹³

Healthcare apps too are rapidly transforming the industry’s landscape, with each making niche services its USP. For example, even as Practo helps people find doctors region-wise and book appointments, Portea arranges for doctors and other medical professionals to make home visits. Concepts such as e-consultation and e-prescriptions are making the whole treatment process—usually associated with separate medical files for each doctor—paperless. The wearables market is also helping tech-oriented fitness-conscious people

monitor everything from their heart rate and BMI to oxygen levels and sleep patterns.

Information technology is thus driving the growth of the home healthcare market. Cyber Media Research (CMR) has estimated that this market will touch US\$ 4.46 billion in 2018 and grow to reach US\$ 6.21 billion by 2020.¹⁴ Meanwhile, *Augmented Reality in Healthcare Market Research Report – Global Forecast to 2023* states that as a result of more and more people using electronic devices these days, the adoption of augmented reality in the global healthcare market will approximately touch US\$ 1.32 billion by 2023, and India is viewed as an emerging market.¹⁵

With these medical technology innovations and much-needed policy interventions bringing about change, India’s healthcare sector as well as the population would soon be in fine fettle. ■

FOR A SOUND MIND

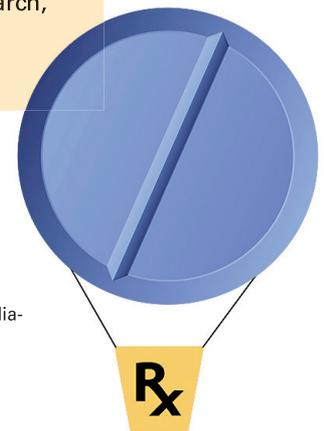
At the inauguration of the 21st World Congress of Mental Health held in New Delhi in November 2017, the President of India, Mr Ram Nath Kovind, noted that mental health issues faced by the country’s population are rapidly increasing.¹⁶

It is to address this problem that the George Institute for Global Health India has been striving since a decade. The Institute had found that due to inaccessibility to mental health professionals and a lack of awareness, the number of people seeking cure, chiefly in rural areas, is less. So, it began the SMART Mental Health Programme in 2014, which uses mobile technology to bridge the widening treatment gap.

Under this programme, around 50,000 people from 40-plus villages were interviewed and screened by rural healthcare workers for symptoms of mental disorders such as anxiety and depression. Their responses were then fed into a tablet installed with a specially created app, which indicated if participants required medical attention—a commendable achievement since mental health issues tend to be nebulous in nature. The outcome was positive as “the uptake of mental health services in these areas went up by 1,500 times”¹⁷, Dr Pallab Maulik, the Institute’s Deputy Director, Head of Research, has noted.

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Making Learning Smarter



On a mission to change the way children look at learning, Smartivity employs technology to make learning 'smarter'. We speak to Tushar A Amin and Ashwini Kumar, co-founders, and find out more about how their innovative toys and activities use playful methods to teach.

MELISSA FERNANDES AND ASHUTOSH GOTAD

A portmanteau of ‘smart’ and ‘activity’, Smartivity was founded with the belief that play is the most powerful form of learning. Children learn best through play. The next generation is growing up in a rapidly evolving technological world, but there is little innovation in the field of toys. Most technology-based products are created for entertainment and offer passive engagement and mind-numbing experiences. Smartivity addresses this gap and strives to focus on mind-and-body engagement.

With DIY and augmented reality (AR) products, Smartivity aims to inspire children to make things with their hands and give them that unique sense of accomplishment, pride, and ownership. Their products encourage children to become ‘makers’ instead of ‘consumers’. Based on their experiences, the founders are of the opinion that the most promising opportunities for success in the future will be in the fields of science, technology, engineering, arts, and mathematics—the STE(A)M subjects. “As engineers, we realise the importance of scientific training in our day-to-day life, even in spheres that are not remotely science related—be it decision-making or creative brainstorming. We believe that strong STEM fundamentals will ensure that a child grows up to be an active contributor in shaping the future, rather than being just a mute observer,” says Mr Amin.

Understanding the evolving technology-savvy society that the next generation is growing up in, the Smartivity portfolio spans purely physical DIY activities, augmented reality, robotics, virtual reality, and IoT technologies, and bridges the physical and digital worlds. While a lot of emphasis is placed on analytical reasoning, Smartivity founders believe that success in real life requires a wholesome approach, which can only be achieved by striking a perfect balance between creative, practical, and analytical intelligences. Their ‘smarter learning’ philosophy is based on enhancing multiple intelligence. Their passion for STEM subjects, desire to inspire children to be makers of the future, belief in the power of play, and their core strength in integrating bleeding-edge technology and playful learning came together in the form of Smartivity. Mr Amin adds, “All our products—both physical and technology—are designed in-house by a team of product designers and technologists hired from India’s premier design and technology institutes

(IIT, Delhi, NIFT, NID-Ahmedabad, Srishti School Of Design). We own design and technology patents on all our products.”

IMPORTANCE OF STEM LEARNING

According to the National Science Foundation, 80% of the jobs created in the next decade will require some form of math and science skills.” Smartivity leverages this finding and emphasises the education component of their products to create a strong foundation. Mr Kumar says, “The education system often fails to ensure that students are able to make practical application of concepts. As a result, our society has not been able to ‘make things’. We just consume things. Through Smartivity, we want to change this situation.”

Smartivity believes that STEM skills will have a much broader impact—way beyond employability.

STEPPING ASIDE FROM TRADITIONAL LEARNING

Contrary to traditional approach, which mainly encourages rote learning, Smartivity focuses on practical understanding of concepts through play. For instance, in Smartivity Mouse Hunt Automata, children are not told how gears work but are made to build a toy that incorporates the gear mechanism with different gears. The child learns the practical implications of gears through play, which can then be put in perspective when they encounter the topic in their class. The company’s products encourage



Photo courtesy: Shutterstock



Photo courtesy: Smartivity

children to not only assemble a toy but also experiment by trying to put different parts together to see how it affects the performance even if it is wrong, as mistakes are also a part of learning.

CHALLENGES

Smartivity started in the apartment of Ashwini Kumar and Apoorv Gupta, in New Delhi. This was their design studio, testing lab, and warehouse, rolled into one. Over a couple of years, they grew from a four-member team to a 50+ strong organisation. During their initial bootstrapping stages, finances were critical, which forced them to pivot from a digital sales-based business model to the more difficult retail-sales focused approach to earn revenue. Their products were not easily welcomed by retailers. Eventually, the founders received positive response from parents, which encouraged retailers to start stocking their products. Smartivity soon started focusing on increasing their retail footprint. Here, they faced a problem finding the right material to implement their designs. After a lot of exploration, they zeroed in on high-quality engineered wood, which allowed them the freedom to create sturdy, durable, and dynamic products with more engaging gameplay.

Mr Kumar adds, “As our operations expanded, we rented a warehouse for packaging. Since our products consisted of small parts, formulating a packaging and quality control process was another challenge. In order to ensure there were no missing parts, we had to go back to the drawing board and redesign the way our products were packed.”

“TECHNOLOGIES LIKE AR AND VR are powerful tools to democratise access to information and deliver immersive learning.”

Smartivity expanded their portfolio and redefined colouring and jigsaw puzzle-solving activities by adding augmented reality technology to these traditional favourites of children. Familiarising parents and children with this technology was a challenge, which was only resolved through demonstrations and BTL activations.

Apart from these, being a startup, Smartivity faced common challenges such as fund-raising, cash-flow management, and zero-money marketing. Nevertheless, from an annual revenue of ₹64 lakh when they started, they are now clocking revenue of ₹10.5 crore. From six stores in South Delhi, they have expanded to evolved global markets such as the US, Europe, and Australia. Smartivity was also titled the winner of the India Emerging Twenty award, which recognises 20 startups from the country with global potential. Recently, they also received the top AR/VR company honour from the Karnataka Chief Minister, based on research by Growth Enabler.

ROLE OF INNOVATION AND TECHNOLOGY

Smartivity bridges the physical and digital worlds through innovative solutions like their AR-enhanced activities. Colouring and jigsaw puzzles have been

taken up a notch, by incorporating the latest technology and a right dose of learning. For instance, Smartivity has taken the traditional colouring sheet and brought it to life with the Smartivity Edge Jungle Safari. Using this product, a child can scan a coloured sheet of an animal on the free Smartivity Edge AR app. The animal, say a lion, will come to life in the app, in the exact same colours that the child has used, bringing the child's imagination to life. The child can then interact with it, hear it roar, and watch it attack. The app will also provide trivia about lions, quiz questions, and spellings. Mr Kumar says, "Technologies like AR and VR are powerful tools to democratise access to information and deliver immersive learning. From dinosaurs to marine animals, and from the structure of a cell to the solar system, these products invite children to learn about different topics in a way they love and expect to be taught in."

QUALITY CONTROL

Giving quality paramount importance, Smartivity focuses on packaging small parts, which has driven a lot of in-house innovation, resulting in a switch from packaging individual parts to the present sheet-based packaging. Smartivity has secured the highest safety certifications in the form of ASTM (American standards) and EN-71 (European standards), since their products are for children. The required raw materials are also purchased from some of the best vendors.

STEM LEARNING IN SKILL INDIA CAMPAIGN

The Skill India campaign, launched in 2015, aims to train people in different skills by 2022. In alliance with this, STEM learning is integral to any training—be it imparting instructions or combining analytical, creative and practical intelligences to acquire the skill. Mr Amin adds, "Skill building is critical if we are to empower members of the society with tools to help themselves. While increasing employability or encouraging self-employment is the desired end-result of any skill development program, the training involved is at the heart of such a programme. Moreover, the world of tomorrow will be driven by technology. As technologies like robotics and artificial intelligence begin substituting human labour, emphasis on STEM learning can ensure that the government's Skill India campaign stays relevant in the future."

The government has also extended adequate support to startups, through its Startup India programme. While Smartivity has not been part of any government

"SKILL BUILDING IS CRITICAL if we are to empower members of the society with tools to help themselves."

initiatives directly, it has benefitted from government's export promotion initiatives and has started exporting to the US, Europe and other countries. Smartivity's products were also selected among the top 15 innovations by NITI Aayog and showcased in front of a global audience at Global Entrepreneurship Summit in Hyderabad, last December.

BUSINESS MODEL AND MARKET SHARE

Their business model is based on sales through four channels—retail sales, which includes traditional toy stores and modern retail chains like Hamleys and Crossword; exports to the US, Europe, and Australia; B2B, where they tie up with schools; and online sales, where products are sold on e-commerce platforms like Amazon and Flipkart, and their website. For exports, Smartivity has partnered with PlaSmart Inc, a US-based toy company that helps them reach out to children in the US and Canada through online and retail channels. iToys, Smartivity's global partner and representative in the US, has also guided and showcased their products to the right international buyers. This has helped the firm branch out to markets like the Scandinavian countries, the UK, Japan, and South Korea. They are also developing custom-made products for school chains in collaboration with their academic teams.

Due to their wide reach and quality products, Smartivity has shipped over 500,000 units till date and their products are sold through over 800 prime toy retail stores across India. They have raised a total of US\$ 1.2 million in funding (over two rounds - April 2015, July 2016) since inception in January 2015.

FUTURE OF LEARNING

Efforts made by players like Smartivity align with the government's goal of augmenting its skilled talent pool and complement its Skill India programme. The unwavering focus on STEM learning will certainly contribute to strengthening India's innovative, knowledge-based economy. ■

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Mountain Surprise

Mist surrounds the charming hamlet of Chitkul, situated on the Indo-China border (above); a grain storage barn on the outskirts of the village.



TEXT & PHOTOGRAPHS
GUSTASP AND JEROO IRANI

Strains of lilting music wafted over the crisp cool air as we crossed a weather-beaten wooden bridge that straddled a gushing stream and sabotaged our plans to go on a trek in the mountains. Like little children drawn to Pied Piper's hypnotic tune, we were lured into the little village of Chitkul to seek out the source of the music. This charming mountain village in the Kinnaur district of Himachal Pradesh is the last outpost on the Indo-China border. It is where the road on the Indian side of the border ends. A narrow paved road, hemmed by traditional slate-roofed cottages, led us to a troupe of musicians and dancers, decked up in festive costumes, performing in an open courtyard.

Suddenly, a tramp in tattered and dirt-encrusted clothing ambled into the middle of the



EVERY HEAD, MALE and female, was covered with a green-band Kinnauri headgear; many sporting floral tassels in keeping with the festive occasion.



circle of dancers and started to sway to the throbbing beat of drums and the sweet strains of flutes. Then, as suddenly as he had materialised, seemingly from nowhere, he disappeared. We had no idea if he was part of the act or an intrusion that the dance troupe chose to ignore.

We figured we had seen enough and were about to move on when a local resident stopped us. What we had witnessed, he said, was a group rehearsing for the main event that would take place at the pagoda-roofed temple in the centre of the town. We were hooked. The trek could wait: if what we had seen was a trailer then we had to catch the main show.

A celebration of colour and festivity greeted us once we stepped through the carved wooden doors. The entire village, it seemed, save a few, filled the courtyard

and they were decked in traditional and ceremonial finery. Every head, male and female, was covered with a green-band Kinnauri headgear; many sporting floral tassels. Our cameras, however, started to zoom in on the chunky silver jewellery that adorned the foreheads of young women. We were particularly fascinated by the large ornaments that hung over their faces. How on earth could they see where they were going? Judging from the way the dancers who had taken centre stage swayed and gyrated to the music without tripping over their own feet or bumping into each other, they managed very well.

An appreciative audience cheered as the performance came to an end and members of the troupe celebrated by hugging each other. The audience cheered once more as the next group of dancers and

Dancers performing at the summer festival (top); intricate silver jewellery takes the centre stage in the elaborate costumes.



Musicians with traditional instruments complement the dancers (above); almost the entire village turns up to watch this spectacular show.

CHITKUL'S MAIN ATTRACTION is that it is the highest village in the Baspa River Valley in Kinnaur district and the last inhabited place on that side of the Indo-China border.

musicians stepped into the limelight. Their music and routine were not very different from the one that preceded it till a couple broke free from the chain of dancers and started to whirl in the middle of the circle that formed around them. And the crowd expressed its approval with cheers and laughter.

The next act included two musicians carrying enormous brass horns which reminded us of the alpine fog horns of Switzerland. When they blew on those over-sized instruments, we imagined that it was what elephants might sound like, trumpeting love songs to each other!

On that note, we set off in search of nourishment and found a small rooftop café whose existence betrayed the fact that remote as Chitkul may be, it still figures on the tourist map. Its main attraction is that it is the highest village (altitude 11,320 ft) in the Baspa River Valley in Kinnaur district and the last inhabited place on that side of the Indo-China border. The actual border is about 90 km away but entry to this region is restricted as it is controlled by the Indian Armed Forces. The owner of the eatery took it upon himself to explain the significance of the festivities we had stumbled upon as we tucked into bowls of Maggi Noodles which for some reason taste better in the mountains. It could be the air, water, altitude...



According to him, what we saw was part of the annual summer festival. It is essentially a celebration of summer which takes place in June-July in the region. The festivities start with young lads climbing up to the higher reaches of the surrounding mountains to collect exotic flowers like the *Brahma Kamal*, found above 10,000 ft and said to be the first flower of *shrishti* or the universe. The flowers are then offered to the local deity. This is followed by two days of celebrations when musicians and dancers from the surrounding villages congregate to showcase their skills.

We strolled through the little settlement of around 1,000 souls who were largely Buddhist, a fact affirmed by the pagoda-roof Kagyupa temple that rose like a benediction over the village. Among the many deities and treasures enshrined in the temple were the highly revered image of the Shakyamuni Buddha and a colourful Wheel of Life mural. The village houses that clustered around the shrine sported traditional slate roofs made of stone and wood.

Dotting the outskirts of the village were log cabin storerooms perched on stilts, each one secured by antique padlocks and accessible by wooden ladders. These cabins are the lifeline of Chitkul during winter

when heavy snow fall often cuts the village off from the rest of the world for days.

The fields around Chitkul that greeted us that summer day were green with the promise of a rich harvest (potato is the prized crop) with winter, a distant memory etched in white on the snow-tipped peaks of the surrounding mountains.

We briefly considered setting off on our planned trek but dismissed the option almost immediately and drove back to our cosy resort, a haven on the Baspa river which sang a siren song as it flowed just beyond our log hut. Early next morning, as the mist trailed its fingers on the tops of saw-toothed mountains, framed in the windows of our room, we set off on the promised trek: forded glacier-fed rivers; slaked our thirst with water from a mountain stream; picnicked at the foot of a waterfall; stepped gingerly over logs that served as a bridge over gushing waters; walked down narrow trails that traced the lip of vertical cliffs; strode through a valley of flowers...

That night, back at the resort, one of us had a pleasant dream of being decked up in traditional Himachali garb and dancing at the base of a waterfall that tumbled into a river flowing through a mysterious forest. ■



FACT FILE

Shimla is the closest airport and railway station. However, Chandigarh has far better frequencies and connections in terms of flights and trains. Sangla, the base for Chitkul, is a 10 to 11-hour drive across spectacular terrain. One could break journey at Shimla, from where Sangla is an eight-hour drive. By way of accommodation, there are a number of options. However, it is best to avoid hotels in cluttered Sangla town. A better option is to look at retreats and camps outside the town. One may also consider budget lodges in Chitkul and the neighbouring village of Rakcham.

Tales on a wall



Photos courtesy: Dinodia

Kerala's murals captivate even the most uninitiated, with their irresistible blends of epics and myths in vibrant colours.

ARUNA CHANDARAJU

The instinct to create some kind of art is almost as old as mankind itself. Even in pre-historic times, simple motifs or scenes from everyday life were painted on the walls of caves. Also, stones and various metals were fashioned into different shapes to create simple objects of art.

Rock paintings date back thousands of years and have been discovered by archaeologists, across India. Then came mural paintings which were more evolved. Also known as frescoes, they were painted on the walls and ceilings of palaces, temples and churches, and houses too.

The art of mural painting flourished in India, especially in Kerala. In this southern state, one can find murals that are several centuries old. Though it found expression over a long historical time span, historians hold that it was between the 9th and 12th centuries that this art flourished the most, with royal patronage giving it a boost. Richly detailed, multi-hued, and highly aesthetic, they are a heritage to be proud of; one can also see a wide range of fascinating themes—playful Krishna surrounded by *gopikas*, fiery goddess Kali, a scene of the Last Supper, *apsaras* and *devas* (celestial beings), and so on. These paintings reveal a high degree of artistic excellence and a rich diversity of techniques and elements.

According to art historians and priests of ancient temples, the origins of this art can be traced to the tradition of painting on walls. Prehistoric rock paintings found in the Anjanad valley of Idukki district in Kerala are considered the precursor of this art, in the state. It is believed that these belong to different periods, from the upper Paleolithic to the early historic. Rock engravings of the Mesolithic period too have been found at Perumkadavila in Thiruvananthapuram district and Edakkal in Wyanad district. The paintings of Thirunanthikarai Cave Temple (now in Kanyakumari district of Tamil Nadu) and Thiruvanchikulam are considered some of the earliest examples of Kerala mural art.

STORIES FROM THE PAST

The themes of old murals were drawn from the epics, *Ramayana* and *Mahabharata*, and sacred texts such as *Bhagavatham* as well as other puranas. Hindu gods and goddesses, characters from epics, and celestial beings figure in these paintings.

These murals use natural pigments and vegetable colours. Generally, white is derived from lime, blue

IT IS BELIEVED THAT *SILPARATNA*, a 16th-century Sanskrit book by Srikumara on painting and allied topics, would have provided information to many a mural artist.



Photos courtesy: Dimodia

from indigo, black from charcoal, red-ochre from red laterite, yellow-ochre from yellow laterite, plain yellow from the gum of the bark of *Garcinia morella*. Saffron is another popular colour.

It is believed that *Silparatna*, a 16th-century Sanskrit book by Srikumara on painting and allied topics, would

16th century Nataraja mural at the Ettumanoor Siva temple (facing page), and 17th century mural in Thodeekkalam Shiva temple at Kanavam near Thalassery, in Kerala.



A painting depicting Krishna at Pundareekapuram temple near Thalayolapparambu in Kottayam district.

Photos courtesy: Dinodia

IT IS NOT ONLY temples and palaces in Kerala but churches too where you find exquisite mural art—the figures depicted are generally of Jesus, Mother Mary, the apostles, and angels.

have provided information and inspiration to many an artist. Even today, it is considered a classic and helps understand mural-art history.

MUST-SEE

Among the finest examples of mural art in Kerala are those found at the Shiva-Parvathi temple in Ettumanoor; the Gajendra Moksham mural painting at Krishnapuram Palace near Kayamkulam; and the splendid Ramayana murals at the Mattancherry Palace. The Padmanabhapuram Palace also has superb paintings. Spectacular drawings also adorn the walls of temples at Vaikom, Trikodithanam, Kumaranalloor, Pundarikapuram, Udayanapuram, Aymanam, and Triprangode. Also not to be missed are the ones at Kannur's Thodekkalam temple, Thrissur's Vadukkanathan temple, and the Panayannurkavu temple near Mannar.

The stunning Ananthashayana Vishnu (reclining posture of Lord Vishnu) painting in Pallikurup Mahavishnu Temple, in Mannarkkad Palakkad, will take your breath away.

Also renowned are paintings at the famous Sri Padmanabhaswamy temple in Thiruvananthapuram. They are located in the sanctum sanctorum and evoke awe with their artistic beauty and masterly attention to detail. The other popular-pilgrim destination of Kerala, namely Guruvayoor Sri Krishna temple, also boasts beautiful mural paintings.

It is not only temples and palaces in Kerala but churches too where you find exquisite mural art—the figures depicted are generally of Jesus, Mother

Mary, the apostles, angels, while some of the scenes recreate The Last Supper, the Resurrection, and The Last Judgement.

The murals at Alappuzha as well as Paliyakkara, Cheppad, Angamaly, and Akapparambu are large and vibrantly coloured. Among these, the panels at Thiruvalla and the St Antony's Forane Church in Ollur (18th century) are noteworthy.

In a recent trend, commercial establishments too are increasingly opting to adorn their premises with murals. One can now find these in hotels, restaurants, and offices in Kochi, Thiruvananthapuram, and a few other tourist destinations.

Interestingly, such paintings are also being commissioned by connoisseurs to adorn the walls of homes. In a more recent development, the murals are finding expression on canvas, clothes, and paper. They also find place on saris and shirts, and bags and desktop accessories.

Though this art had received attention earlier too from historians and connoisseurs, in recent times there has been a revival of academic interest. Murals are being discussed more than ever before—at workshops and exhibitions by contemporary artists—and the study of this art is being made part of arts courses at several academic institutions.

Now, there are even dedicated institutions for teaching mural painting. The prominent ones in the state are the Institute of Mural Painting run by the Guruvayur Devaswom (Guruvayur temple management), and Sree Sankaracharya University of Sanskrit at Kalady. ■

WHAT'S NEW @IBEF

ASEAN-India Business and Investment Meet & Expo, New Delhi

The Ministry of Commerce and Industry and the Ministry of External Affairs, Government of India organised the ASEAN-India Business and Investment Meet and Expo during January 22-23, 2018. It was inaugurated by the Hon'ble Minister for Commerce and Industry Mr. Suresh Prabhu with ASEAN ministers and Gen (Dr) (Retd) V K Singh, Hon'ble Minister of State for External Affairs, India. IBEF's primary role was to incorporate a uniform fascia design highlighting India and ASEAN countries' presence at the exhibition area and develop creatives to cover strategic positions at the venue and outdoors.



Heimtextil, Germany

Heimtextil, the biggest international trade fair for home and contract textiles, was held in Frankfurt, Germany during January 9-12, 2018. The total participation was close to 2,965 exhibitors from over 141 countries. India had the second largest participation with over 350 exhibitors from various EPCs like Handloom Export Promotion Council. IBEF executed various branding elements to support India's participation in the show. The Indian pavilion was inaugurated by the Hon'ble Minister of Textiles Ms. Smriti Zubin Irani.



WHAT'S NEW @IBEF

Expo Riva Schuh, Italy

Expo Riva Schuh is one of the largest footwear expos in Riva Del Garda, Italy, covering more than 32,000 plus square metres of exhibition space. It is a leading international exhibition for volume footwear at mid-range price point. It is Europe's most important event for this market segment, with pavilions of several countries such as Brazil, China, Turkey, and India. Council for Leather Exports participated with 100 plus exhibitors and IBEF handled the entire brand campaign for it. The branding elements were primarily venue branding at prominent sites such as main lobby escalators, hall entrance digital screens, and reception screens.



Arab Health, Dubai

India showcased its strengths in the healthcare and medical devices sector at Arab Health 2018, held during January 29-February 1, 2018 in Dubai. EEPC India and Pharmaceutical Export Promotion Council of India (Pharmexcil) led the contingent of around 100 Indian companies, which were located in one exclusive hall. IBEF was the branding partner for India's participation, with branding at key strategic points at the venue and media coverage in event publications as well as leading national daily *Khaleej Times*.



INDIA NEWS ALERT

DAILY BUSINESS HEADLINES

India Brand Equity Foundation

FACT OF THE DAY

India has climbed 21 spots to rank 87th in 2016 in the Global Gender Gap Index (GGI) among 144 countries of the world: Global Gender Gap Report 2016 by World Economic Forum

CONVERSATIONS ON INDIA



FOLLOW US

Government waives up to Rs. 2,000 in a New Delhi: The Government has charged on payments upto Rs 2,000 (-US\$ 25) and encourage me payments.

SECI to Launch Government Solar New Delhi: Solar launch tender for solar power for which is one of

Duty drawn Mumbai: The facility on all increased rates comp

Govt and time air New Delhi: The joined the (DST) to and any netw of India.

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INDIA NOW

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DCXIX

January 07, 2017

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Dear Mr Bahri,

India has overtaken UK in terms of GDP to emerge as the fifth largest economy in the world by the end of 2016, the same year when it overtook China to emerge as the world's fastest growing major economy. Interestingly, India has achieved this feat well before 2020, the year that was projected (for India to overtake UK) by the economic think-tank Centre for Economics and Business Research (CEBR) in 2011. India's GDP by the end of 2016 reached US\$ 2.3 trillion while UK's GDP was projected at US\$ 2.29 trillion. This has been made possible due to India's rapid growth in recent years and the issues being faced by the UK post-Brexit.

In addition, India's growth rate at 6-8% per annum till 2020 is much higher than UK's projected growth rate of 1-2%, which means this gap is only expected to widen further in the coming years.

Warm regards

Anu P Mathai, IES
Chief Executive Officer (CEO)
India Brand Equity Foundation (IBEF)

WHAT'S NEW@IBEF

Brand India Engineering at The Big 5, Dubai

IBEF led the Brand India Engineering campaign at The Big 5 2016, Dubai that was held from November 21-24, 2016. Do visit to follow the branding activities undertaken by IBEF.

[More >>](#)



POLL

CONVERSATIONS ON INDIA

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A single window to the latest and in-depth information on Indian business, industry and economy. The website also offers daily business news updates and email alert services.

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AN EMERGING GIANT

India's digital payments sector is expected to be worth US\$ 500 billion by 2020



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