

# TECHNOLOGY PRINTING OUR

How AI, blockchain, Internet of Things, 3-D printing and mixed reality are transforming businesses

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ALL it whatever you want—Digital Transformation or Digital Disruption—the fact remains that to stay relevant, organizations need to urgently reinvent their business models and growth strategies by putting digital first. They can do that with the help of newer technologies such as artificial intelligence (AI), robotics and automation, blockchain, the Internet of Things (IoT), 3-D printing, and mixed reality that combine virtual reality and augmented reality. These technologies are not only disrupting and transforming business models and the lives of individuals, but also ushering in the so-called gig economy.

## ARTIFICIAL INTELLIGENCE: THERE'S NO STOPPING IT

Almost two decades ago, the late Robin Williams starred in *Bicentennial Man* as an NDR-14 robot that was eventually declared a human by the courts. That remains science fiction. However, last October, Hong Kong-based Hanson Robotics' Sophia became the first AI-powered robot ever to get citizenship of a country—Saudi Arabia, even though Sophia pales in comparison to the humanoid-oid in *Bicentennial Man* or those in *Surrogates* (Closer home, 38-year-old Ranchi-based Rangli Srivastava has developed an Indian version of Sophia, christened *Broadi* (94 July 2024E&E).

AI is everywhere, as yet. However, broadly defined as the desire to replicate human intelligence in machines, AI is undoubtedly becoming smarter with every passing day on the back of advances in machine-learning and deep-learning algorithms, humongous amounts of Big Data on which these algorithms can be trained, and the phenomenon of self-improvement in computing power.

Such developments have, understandably, given rise to concerns about the fear that automation and AI will take away our jobs en masse. However, more intelligent than human beings, AI will take away our job even as it will create new jobs that we are not equipped to do. As predicted by the 2022, around 46% of new jobs that do not exist today, or will be deployed in jobs that have radically-changed skill sets.

A 2017 survey by Statista finds that 78% of firms globally are either using AI extensively or have plans for use in near future. However, adoption of AI in India has been slow and remains limited. Estimates indicate that only 22% of firms in India use AI in any capacity but things will improve as the Indian government has woken up to AI's potential.

As it aimed to thrust our world and India being the fastest-growing economy with the second-largest population in the world, has significant stake in AI revolution. NITI Aayog acknowledged this in

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June 2018 discussion paper titled 'National Strategy for Artificial Intelligence'. Arguing that India has the potential to position itself among leaders on the global AI map "with a unique blend of 'AI for All'". NITI Aayog has decided to focus on five sectors—healthcare, education, smart cities and infrastructure, and smart mobility and transportation. This is even as researchers in the country lack broad-based expertise in research and application of AI, and that there is a pressing need for per security, including lack of formal regulations around anonymization of data.

## BLOCKCHAIN: BUILDING A COMMONWEALTH

Early this month, the World Bank mandated the Commonwealth Bank of Australia to launch the world's first blockchain bond. The Kangaroo bond, targeted to foreign bonds issued in Australia, is a currency culture insurance chain named bond.1, according to 80 August CNBC report. Closer home, the Telangana State Information, Technology, Electronics and Communication department signed an agreement on 3 August, with private equity investor Tech Investor, provider Tech Mahindra to launch India's first Blockchain district in Telangana.

Blockchain, primarily known for cryptocurrency applications, is also being used for

## MINI-SHORT

### WHAT

New technologies, from 3-D printing to blockchain, have suddenly burst into the scene in the last couple of years, and are not only transforming businesses, but also ushering in the so-called gig economy.

### WHY

The distributed and low-cost nature of these technologies lends itself to small operations having a shot at reaping the big bucks. A start-up boom similar to the post World Wide Web years is likely to be in the work.

### WHEN

NITI Aayog has created a unit to focus on AI. Several state governments have also begun experimenting with blockchain for land records management. However, India is still several years behind global leaders.

ering cryptocurrencies like bitcoins, is a form of Distributed Ledger Technology (DLT). It promises to reduce costs and establish trust, but faces challenges like the speed of processing transactions. Its popularity lies in the fact that participants have a copy of the ledger that contains the most recent transaction changes, thus reducing the need to establish trust using traditional methods.

'Blockchain' is 'pulling us into a new era of openness, decentralization and global inclusion', states a June 2017 paper by the World Economic Forum (WEF). Large banking, financial services and insurance firms, manufacturing firms and governments in the world are already testing blockchain proofs of concept.

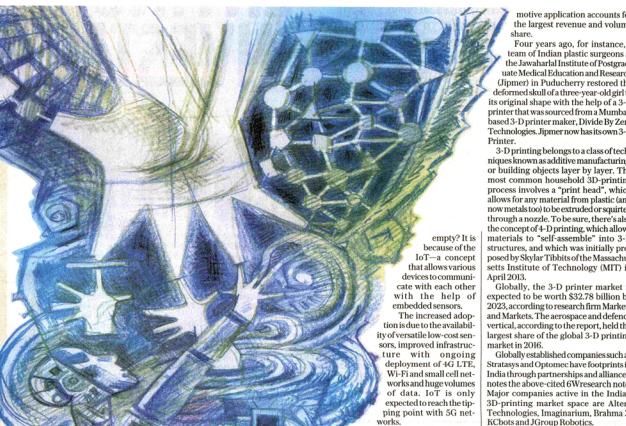
A blockchain network can either be public or private (permissioned), one based on who is authorized to participate. One may look to the difference between an intranet and the internet. Most pilots are being done with private blockchains.

In India, for instance, banks have formed 'Bank-Chain'—an alliance of banks formed in February 2017 to explore and build blockchain-based solutions. The Bank Chain community has 37 members, with representations from 28 Indian banks, including State Bank of India, ICICI Bank Ltd, Kotak Mahindra Bank Ltd, HDFC Bank Ltd and Yes Bank Ltd. Two years ago, for instance, the Mahindra Group and IBM announced the development of a cloud-based permissioned blockchain solution in a bid to re-engineer supply chain finance across India by enhancing security, transparency and operational process.

Blockchain technology can also disrupt public health by creating a secure and flexible ecosystem for exchanging electronic health records (EHRs). Student records, faculty records and institutional certificates can be maintained with the application of blockchain technology. Other notable applications include the use of blockchain technology to record and manage agricultural land records as well as land titles. Blockchain technology can also be deployed to create a marketplace for electric power supply.

## INTERNET OF THINGS: MAKING THE RIGHT CONNECTIONS

As we eye ever-evolution, how your Smart TV can communicate with your Smart refrigerator and order food or track your car's local geocenter when it is



move application accounts for the largest revenue and volume share.

Four years ago, for instance, a team of Indian plastic surgeons at the Jawahar Institute of Postgraduate Medical Education and Research (JIPMER) in Pondicherry helped the beleaguered skull of a three-year-old girl to its original shape with the help of a 3-D printer that was sourced from a Mumbai-based 3-D printer maker, Divide By Zero Technologies. Jipmer now has its own 3-D Printer.

3-D printing belongs to a class of techniques known as additive manufacturing, or building objects layer by layer. The most common involves a 'print head' which allows for any material from plastic (and now metals) too to be extruded or squirted through a nozzle. To be sure, there's also the concept of 4-D printing, which allows materials to 'self-assemble' into 3-D structures, and which was initially proposed by Shih Yik-Ting of the Massachusetts Institute of Technology (MIT) in April 2013.

Globally, the 3-D printer market is expected to be worth \$32.78 billion by 2023, according to research firm Markets and Markets. In the aerospace and defence vertical, according to the report, held the largest share of the global 3-D printing market in 2016.

Globally established companies such as Stratasys and Optomec have footprints in India through partnerships and investments. The above-cited eResearch note. Major companies active in the Indian 3-D printing market space are Atern Technologies, Imaginairium, Brahm3, KChoss and KGroup Brothers.

## MIXED REALITY: COMBINING AR AND VR

If you sit on Disney Research's Magic Leap, you may have an elephant with a trunk, or a tiny dumbo might saunter by and kick the bench. Similarly, scientists at the Worcester Polytechnic Institute (WPI) in Worcester, Massachusetts explore complex biological network in 3-D, creating a tool that may help find better ways to treat protein-protein interactions to disorders like cancer and diabetes. Both these examples highlight the melding of technologies like augmented reality (AR) and virtual reality (VR) with the real world to give users a blended world of the so-called 'mixed' reality (MR or 'blended' reality) concept.

While VR is all about a world created solely on computers or online, AR still deals with the real world and has elements of the virtual world built atop it. Skills to be learned by informatics, IT, government, finance and agriculture. Besides, senses inside of the body—vision constantly monitor the performance of gas turbines for damages as well as regulate the pressure of the oil below the ocean surface.

The complexity of the IoT system, however, requires essential rules on data management, security, liability and reliability issues. Besides, IoT will require AI as a companion since IoT will produce a treasure trove of big data that will need to be intelligently analysed with machine learning to draw meaningful insights for businesses.

## Investors believe that mixed reality—mix of both AR and VR—has the potential to become the next big computing platform

One goggles, ever. Yet, the company managed to raise investments of almost \$2 billion, notably from Google, Alibaba Group, Intel, and JP Morgan Investment Management.

This month, too, mixed reality has made headlines. Leap, finally announced that the Magic Leap One Creator Edition will be available in the US for \$2,299. Other major players in the global MR market include Intel Corp, Seiko Epson Corp, Microsoft Corp, Accenture PLC, Google Inc., Sony Corp, Samsung Electronics Co Ltd, Facebook Inc, and HTC Corp. In India, we have started up 'Imaginate' Tech, a startup that has already raised investments from investors which are increasingly betting on MR.

Imaginate Tech's CEO, Gurpreet Singh, predicts that by 2020, AR, VR and MR solutions will be evaluated and adopted in 20% of large-enterprise business processes.

The global MR market size is expected to reach \$2.8 billion by 2023, according to research firm Business Research. It believes that the rapid growth will come from increasing demand for innovative and smart products. The aerospace and defence sectors, it says, could use MR products for training purposes. The education can be leveraged in schools where it provides 3-D images, leading to an interactive learning experience, according to the report.