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# THE LIGHTHOUSE SIGNALS A DIGITAL DISRUPTION STORM

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Shubhendu Parth

# Startups gain in H1, **good news for hardware sector too**

The country may still be reeling under the impact of the second wave of COVID-19 and the word "caution" was recently reiterated by the Health Ministry and experts from Indian Council of Medical Research. And while a majority of businesses in India were trying to recover from the shock several startups in the country – specifically in the digital platform space – managed to raise massive investments from venture capitalists (VC) and private equity firms in the first six months this year.

Media reports quoting Venture Intelligence indicate that the total investment during H1 2021 has already overtaken the overall investments made in CY 2020 – up from USD11.1 billion from 764 deals for the full year ending 31 December 2020 to USD12.1 billion (Rs 90,278.22 crore) from 31 deals. The unhindered flow of funds also meant that the country has already produced 15 unicorns so far, up from a total of 11 unicorns in the year 2020.

According to available reports, while there were several USD100 million-plus funding rounds during the period, the leaders in the pack included edtech player Byju's that raised USD1 billion. Close on its heel were food delivery platforms Swiggy and Zomato, at USD800 million and UD576 million respectively. The ban on Chinese apps also led to a positive impact on the ecosystem in India with regional language social media app ShareChat raising USD502 million and fantasy gaming startup Dream11 garnering USD400 million in investments.

In another development that could have a major impact on the digital sector in India, the Ministry of Electronics and Information and Technology recently approved 14 companies under the Production Linked Incentive Scheme (PLI). Those in the approved list include Dell, Wistron, Flextronics, Rising Stars Hi-Tech (Foxconn), Lava International, Dixon Technologies, Infopower Technologies, and Micromax, among others. Of these, companies under the IT hardware category have proposed a total production of Rs 84,746 crore, while those under the domestic category have committed a production of Rs 76,007 crore. The scheme is expected to bring additional investment of Rs 2,517 crore in IT hardware manufacturing sector.

While the balance between software and hardware sector in India is still tilted in favour of the former, there certainly is a change in mindset as the industry is now ready to reap benefits of the present Y2K period of electronic hardware in the country. The PLI scheme also indicates the government's intent to create a very strong component ecosystem, something that had been missing so far – an extremely important first step to make India the manufacturing hub for the world.

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# THE LIGHTHOUSE SIGNALS A DIGITAL DISRUPTION STORM

The BFSI sector has been akin to the bellwether of technology's impact on business. What is it telling about the direction of winds next?

Banking, financial services and insurance (BFSI) is usually the first vertical to embrace the tremors and impact of any disruption caused by technology. It is the lighthouse that can see, prepare for, and signal a major technology storm much before its arrival.

But then, not all storms cause wreckage. Some end up rebuilding an industry to a new level of strength and innovation. In the BFSI lighthouse, some people peeping out of the windows feel that the gales of networking and communication technology are blowing in a new direction. They feel it's time for BFSI to brace for a new tide.

With BFSI, everything eventually boils down to 'money' and, hence, to data. And, thus, to security, cloud and intelligence. Let's walk this shoreline one step at a time.

**SECURITY ALARMS**

Data can be augmented with speed, precision and everything in between. But its compass test always lies in the aspect of security, more so when it is about financial data, customer trust and a highly-regulated industry like BFSI.

Vaibhav Tare, Chief Information Security Officer (CISO), Fulcrum Digital Inc cautions about the gravity of cybersecurity in this sector. "Financial system protection is important because it holds the organisation's financial data and analysis. Fraud incidents increased 130% in the past years, according to reports from Ponemon Institute. These incidents have disrupted operations and led to losses."

In BFSI, with remote working/collaboration and digital

5G'S GLOBAL PRESENCE HAS DELIVERED A NEW ERA OF CONNECTIVITY AND EFFICIENCY. HOWEVER, COMMUNICATION BETWEEN TWO DEVICES ON A 5G NETWORK CAN BRING NEW ATTACKS.

**— Vaibhav Tare,** Chief Information Security Officer (CISO), Fulcrum Digital Inc

THE NEED FOR EFFICIENCY, ON-THE-GO SERVICES, CUSTOMER EXPERIENCE AND BUSINESS CONTINUITY IN REMOTE OPERATIONS HAS ACCELERATED PUBLIC CLOUD ADOPTION IN BFSI.

— **Rajdeep Saha,** Managing Director, Financial Services – Technology Consulting Practice, Protiviti India

transactions, cybersecurity has become one of the main focus points during the COVID-19 pandemic, adds Rajdeep Saha, Managing Director, Financial Services – Technology Consulting Practice, Protiviti India. "In this context, secure access service edge (SASE) and Zero Trust model can help create a single cloud-native security service, coupled with other enablers."

Tare recommends a host of measures underlining the new role that artificial intelligence (AI) and analytics would be playing ahead. "Cyberattack insurance is now available from several organisations. A bundle like this is a must for all financial institutions. Security analytics, machine learning, and artificial intelligence are some of the cutting-edge technologies that are helping strengthen the cyber defence mechanism. Before threats assault your infrastructure, the finest protection mechanisms detect and neutralise risks."

Implementation of PCI-DSS compliance, card payment security, and others have reduced the impact of cyber threats in financial institutions, he adds.

**5G WAVE**

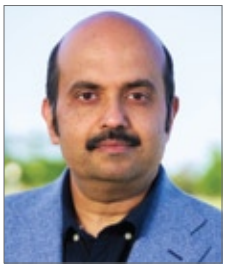
5G has turned out to be the V8 engine that many ships were waiting, and craving for, as they gathered dust in the BFSI harbour. Many cool and transformative ideas were stuck for the want of a high-speed, smooth and enriching pipe that could support their ambitions. Now that 5G is gaining momentum, BFSI, too, would gain from its turbocharged capabilities.

In addition to deployment of next-generation wireless networks, it's the 5G standard that is expected to disrupt mobile network and communication, opines Saha. "Two large local mobile operators have started 5G trials, and we should see early adoption in 2022. Also, for provision of internet in rural areas, Low Earth Orbit (LEO) satellites will gain traction."

Tare reminds that 5G would stir things up – on both sides of the table. "5G's global presence has delivered a new era of connectivity and efficiency. At the same time, communication between two devices on a 5G network can bring new attacks that organisations aren't aware of.

WITH MORE APPLICATIONS, CLOUD HOSTING, AND CENTRALISED OPERATIONS, THE NEED FOR BRANCH BANDWIDTH HAS RISEN WITH A MINIMUM OF 2 MBPS PER BRANCH AS A STANDARD.

— **Shivaji Chatterjee,** Senior Vice President, Enterprise and Government Business, Hughes Communications India



DISTRIBUTED LEDGER TECHNOLOGY IS GAINING MOMENTUM, WITH PROMINENT USE CASES SUCH AS CBDC AND ASSET TOKENISATION BEING PICKED UP IN MARKETS ACROSS THE GLOBE.

— **Sudhir Pai,** CTIO, Global Financial Services, Capgemini

Due to its nature, there can be loopholes that will require advanced research to make any system connected to the network secure from external attacks."

Saha expects a lot of change not just at the back-end and under thehood but also on the front-end of revenues and new products. "With 5G adoption, we will see high-speed internet and opportunities across many areas, such as micro-products in insurance, wealth management and advisory being rolled out, with fintech collaboration, via mobile apps."

**CLOUD MATTERS**

If anything has been truly radical and seismic for the BFSI players in the last few years, it's the possibility to be fast, without being expensive or inaccurate. That confidence has been enabled with the staggeringly perfect elasticity and scalability that cloud models have ushered in.

Shivaji Chatterjee, Senior Vice President, Enterprise and Government Business, Hughes Communications India Private Limited, dissects that traditional network architectures are lending way to SD-WAN with local breakout to the cloud in a secure, managed manner. "It also brings in broadband, LTE access technologies into the branch WAN as compared with incumbent MPLS and VSAT options. SD-WAN has evolved the router, network management, security, and network architecture in one go and made it more cloud-friendly, and kept the network elements aligned with user and banks' needs."

Saha notes that interactions and remote collaboration led by AI and internet of things (IoT) will result in increased public cloud adoption. "The need for efficiency, on-the-go services, customer experience and business continuity in remote operations has accelerated public cloud adoption in the BFSI sector."

Tare observes that many financial institutions are now increasingly using cloud services including banks, NBFCs, rating agencies, local governments, and credit card processing companies.

He adds some caution and explains that although the services are beneficial to organisations, they can expose them to the risk of data breaches when poorly secured. "Also, human errors such as disclosure of access details, connection to an exposed network service, or incomplete data deletion can cause data breaches."

Vivek Kulshrestha, Director – Technology at Synechron, brings in a different angle as he signals how organisations are increasingly transitioning towards adopting a cloud-agnostic system, by moving towards hybrid cloud services and largely trying to make their applications part of a cloud-neutral solution by spreading critical functionalities across cloud providers. "This primarily helps in mitigating the risk from outages on a particular cloud. It also allows flexibility in dealing with providers

MARKET FOR BFSI DIGITAL TRANSFORMATION TO TOUCH

**USD121.70 BN**

BY **2025** GLOBALLY.

– Adroit Market Research

BFSI BUSINESSES ARE MORE INTERESTED IN BUYING PLATFORMS, RATHER THAN BUILDING THEM, TO KEEP TECHNOLOGY DEBTS AND HIGH MAINTENANCE COSTS AT BAY.

— **Vivek Kulshrestha,** Director – Technology, Synechron

and the ability to switch business volumes across the cloud options."

**UBIQUITY IS A MUST**

In the COVID-19 era and new normal, a lot has changed for the financial services sector. As people were forced to stay indoors and yet continue life and work, there was an obvious need for the BFSI sector to run at double the pace, adding just the right service lane to the fast track of stay-at-home financial services.

Saha points towards the strong demand from customers and service providers around areas of internet access and work from anywhere. There is also an increasing demand for embedding AI and IoT in processes for connected ecosystem, efficiency and speed; touchless operations; secured data on-the-go through the 3Vs, and multi-channel unified experience.

"Tomorrow's networks can automatically secure and optimise workloads that are changing at an accelerating pace. Automation will get infused across endpoint management, SaaS platforms, self-service, and zero-touch provisioning," he explains.

The first thing that one needs here, and a lot of it, is bandwidth.

Despite limited working hours and attendance in the BFSI sector, there has been no significant let-up of the telecom bandwidth utilisation, informs Chatterjee. "With more applications, cloud hosting, and centralised operations, the need for branch bandwidth has gone up with a minimum of 2 Mbps per branch as a standard. Technologies such as broadband fiber and HTS VSATs providing speeds of 5-10 Mbps would begin replacing MPLS and RF links."

It is also important to note that autonomous networks and software-isation would play in adding frictionless experiences and speed to BFSI models. "AI and machine learning (ML) will be baked into network platforms. ML can make predictions based on network data, and AI can take intelligent actions based on those predictions and thereby evolve into validation mechanisms and the beginning of a self-operating network. To address the need to establish a variety of network connections consisting of assets in the cloud, data centres, and branch offices that function like a single, seamless system, SD-WAN will become mainstay and replace traditional hardware-based onsite networking approaches," Saha elaborates.

**AS THE STORM ROLLS IN**

With a broad swathe of capabilities and enablers by its side, the BFSI sector is once again ready to teach other verticals what to do and what not to do with technologies that can bend, and upend, traditional models.

Decentralisation and personalisation are becoming even more sharp and deep after the pandemic-spurred changes in the BFSI space. "Distributed ledger technology (DLT) is gaining momentum, with prominent usecases such as CBDC and asset tokenisation being picked up in multiple markets across the globe. Hyper-personalisation is gaining ground," notes Sudhir Pai, CTIO, Global Financial Services, Capgemini.

Networking and connectivity platforms can also have significant impact on AI- and biometric-led payments. In India, UPI has simplified the entire payment experience and created the railroads for innovation. Adopting biometric-led payments, such as "nod/smile to pay", in

BFSI will be possible in the near future through new-age communication platforms.

"Thereby, network and communication platforms will greatly enable the data and digital communications medium in BFSI,"highlights Saha.

And how would this infrastructure shape up?

Kulshrestha points out that BFSI businesses are more interested in buying platforms, rather than building them. "This is to keep technology debts and high maintenance costs at bay. These debts result in higher future costs due to adopting complex platforms today."

Financial institutions will continue to experiment and, in certain cases, win big with a different business model, with focus shifting to possible collaborations with BigTech, feels Pai. "This almost invariably implies that organisations will move to a more 'platform-driven' operating model enabling unconventional partnerships, as well as driving production and distribution layers. While customer-facing platforms are already omnipresent, more organisations are expected to build internal platforms as well, with greater collaboration between their business and technology functions."

But then, the BFSI sector would have to show how it is done by first fixing some innate challenges – around accessibility, democracy, costs and skills.

The internet accessibility in rural India is less than half of its urban peer, reminds Saha. "This digital divide prevents provision of digital financial services in rural India. The last mile connectivity for financial services dissemination is still an issue."

Chatterjee echoes that worry. "The challenge lies in providing a uniform quality of service on a pan-India basis for the BFSI sector. The sector resorts to a store-and-forward non-online mode of communication via business correspondence while for online communication, the VSAT technology provides the most secure and reliable connectivity services."

BFSI ACCOUNTED FOR **16%**
OF **USD219 BILLION**
GLOBAL CLOUD COMPUTING
MARKET IN 2020.

– Fortune Business Insights

The pandemic has exposed inefficiencies of current financial services processes while disruptors have been gaining ground as more and more financial services consumption is going digital, reminds Chatterjee. "To compete actively at the customer touch points, the BFSI industry, present in the brick-and-mortar form, has to enhance its telecom and networking infrastructure at the branch touch point level to provide a similar or better level of services."

Pai recommends that every enterprise should be on the path to become a tech company – digital to the core and agile in operations. "Without this vision, companies run the risk of becoming obsolete in the near future. Banks, insurers, and other financial institutions are striving to live up to their expectations through reimagined customer journeys and hyper-personalised products. For banks and insurers, this also implies significant investments in talent and new ways of working."

What is encouraging, and reassuring, is the wide embrace being given to fresh-from-the-oven technologies.

4G/LTE penetration has reached far and deep into the country. The networks have got augmented with much more spectrum allocation and hence bandwidth, cites Chatterjee. "These solutions have gained strong acceptance in several areas of the financial services sector." Chatterjee also talks about High Throughput Satellite (HTS) in that vein. "The HTS solutions provide the BFSI sector with very high bandwidth of 2/4/6/8/10 Mbps at a fraction of the cost of the conventional satellite solutions (VSAT) which are restrictive in providing bandwidth higher than 2 Mbps. This technology jump from VSAT to HTS is being ably supported by ISRO with several satellites having already been commissioned in the geostationary orbit (GEO) to offer these solutions. In addition, LEO satellites offer low latency and are available from internet majors such as Amazon, SpaceX and OneWeb."

With all these changes turning into the undercurrents of tomorrow, it would not be surprising to see the six-foot distance that many industries have with technology, due to diffidence, lack of tools, lack of the right, hesitation and skepticism, to be wiped away soon. At least, that's the signal that BFSI is giving from its unique vantage point, seated very close to the storms. Clearly, BFSI has transformed from a canary to a seagull. It takes the first blow. But also the first glimpse of the sunrise.

**Manish Misra**
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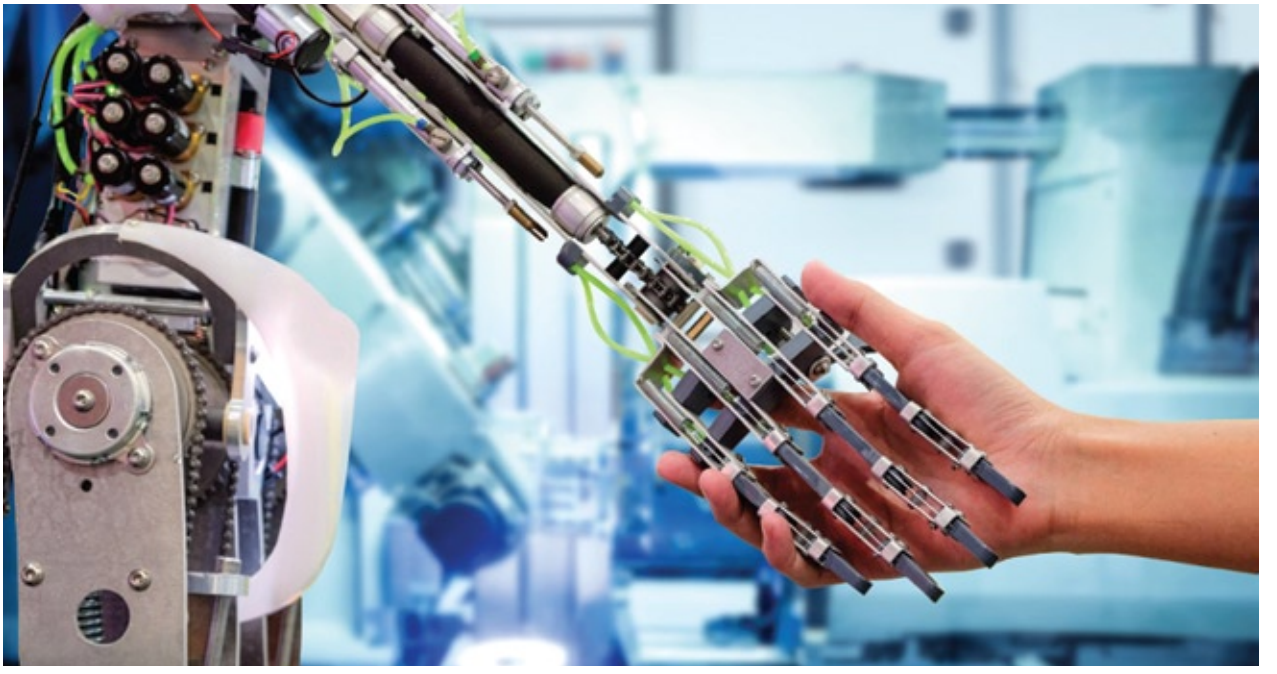
# Looking beyond **Industry 4.0**

## While Industry 4.0 is already popular in manufacturing, the concept of Society 5.0 offers untapped opportunities in blending technology with society



It's a busy, sultry Monday morning traffic. In a hurry to reach office, you forget to turn off your room's AC. You don't fret, insteadyou reach out for your smartphone, while sitting in your car, and turn the AC off. Also, while browsing through your factory operations app, you receive an alert about machine maintenance for your workshop supervisor and control room. This is a LIVE scenario where the internet of things (IoT), artificial intelligence (AI), machine learning (ML), robotics, and other new-age technologies have become part of our connected world – both at home and in industry – and are now catalysed further, by the pandemic.

Industry 4.0, a decade-old concept, was first introduced by the government in Germany. Today, it has become a regular phenomenon. It entails building 'intelligent factories' where machines monitor and take decentralised production and maintenance decisions. This concept has now evolved further to 'Society 5.0', which refers to a technology-based human-centered society. Society 5.0 was first conceptualised by Japan and aspires to go beyond industrial transformation and create a 'Super Smart Society', where people can resolve various social challenges by incorporating technologies such as IoT, AI/ML, robotics, and big data into society.

Society 5.0 looks at converging cyberspace (virtual space) and physical space (real space); Japanese companies such as Panasonic and Hitachi, to name a few, is already following this model. Overall, Society 5.0 can be categorised under three broad areas: mobility, home and business.

Mobility includes autonomous driving and fleet systems that use obstacle detection, external environment recognition, and energy-saving technologies including

> SOCIETY 5.0 ASPIRES TO CREATE A 'SUPER SMART SOCIETY', WHERE PEOPLE CAN RESOLVE SOCIAL CHALLENGES BY INCORPORATING IOT, AI/ML, BIG DATA, ETC. INTO SOCIETY.

next-generation power devices, lithium-ion battery systems, and contactless power supply systems.

Home includes home automation innovations such as smart appliances and lights, as well as sensing solutions such as facial recognition for entry control and detection of suspicious activities. It also includes technologies for lifestyle data analysis, and emotion recognition based on people's behaviour and activity information.

Lastly, business comprises solutions embedded with cutting-edge technologies, including IoT, AI/ML, cloud/edge computing, and blockchain. These are aimed at optimising enterprise activities across sectors.

For India to achieve the trillion-dollar digital economy, the country needs to leverage these new-age technologies. According to a Zinnov report, India had 200-250 million connected devices by the end of 2019. The report estimates this number to jump tenfold and touch two billion devices in 2021. This signals the possibility of an exponential market growth in the years to come. Presently, the IoT adoption among large enterprises stands at 35%, with Industry 4.0 or Smart Manufacturing and Connected Assets as the two most prominent categories cornering 20-25% of the total investments.

## THE IOT ECOSYSTEM

While adoption of digital technologies has been on the agenda for many organisations, the pandemic has accelerated its pace across sectors. Digital transformation and adoption have gained speed while security has emerged as another top priority. Furthermore, change in consumer behaviour has created a demand for automation (home and office), contactless technologies and connected/IoT-enabled appliances. As a result, there's a rise in demand for smart manufacturing, smart lifestyle and smart societies.

With the advent of 5G, the demand for connected solutions is expected to rise further. Our syndicated research conducted in 2020 corroborates that nearly 81% of the consumers are comfortable spending extra on IoT-enabled products. Consumers are looking for IoT-based solutions that can connect all appliances and devices in the house on one single platform – lights, switches, fans, smart doors, refrigerators, TVs, air conditioners, washing machines, etc. Home automation as a service will enable businesses to provide a holistic smart living experience – comfortable (safe), convenient and connected – to consumers.

Similarly, industrial automation opens new avenues of growth for enterprises. Data generated through these IoT-based platforms will help businesses recognise consumer patterns/behaviour and share relevant information regarding predictive maintenance and warranty, to name a few. This, in turn, will optimise the overall supply chain, lower total cost of ownership and, thus, create economies of scale.

## THE NEW DIGITAL NORMAL

Driven by the availability of enormous amount of data, rising smartphones adoption and connectivity, the country is well on its way towards 100% digitalisation, faster than many developed and emerging economies. Progressive factors advancing this trend include the robust Indian IT/ITeS talent, diverse start-up ecosystem, Government of India's strong intent towards digitalisation, development of digital infrastructure and IoT Centers of Excellence.

An integrated effort by the government and the industry will further play a critical role towards addressing the challenges of cybersecurity, standardisation for IoT devices, high-speed connectivity, and skilled workforce, among others. At the same time, it will help create a sustainable and connected ecosystem that will take India a step closer to Society 5.0.

*Misra is Chief Innovation Officer, Panasonic India*

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# DATA IS A KEY ASSET FOR MODERN-DAY ORGANISATIONS

*As the IT management division of Zoho Corporation, ManageEngine aims to provide flexible solutions that can work for businesses of all size and budget. From AI-assisted solutions that can map user behaviour to building innovative database solutions, the company is doing a lot of R&D to leverage emerging technologies for business growth. In an interaction with Dataquest, it's Director of Research* ***Ramprakash Ramamoorthy*** *talks about the focus on artificial intelligence (AI), the work being done by its R&D labs and the trends he foresees in the domain. Excerpts from the interview:*

**What are the key areas of focus that ManageEngine is leveraging AI for?**

We use AI-assisted user and entity behaviour analytics (UEBA) in our security information and event management (SIEM) stack, and we've built powerful forecasting and anomaly detection techniques in our monitoring stack to help IT managers predict events and trace the root cause of anomalous issues. We've also launched a plethora of natural language processing features in our service delivery stack including chatbots, smart agent assignment, and ticket topic detection to ensure maximum agent productivity.

**Apart from AI, what are the other technologies you guys are working on?**

We've been working on a slew of projects that enable IT teams to optimise processes and maximise productivity. We make sure to select and develop meaningful research projects that have the potential to see the light of day.

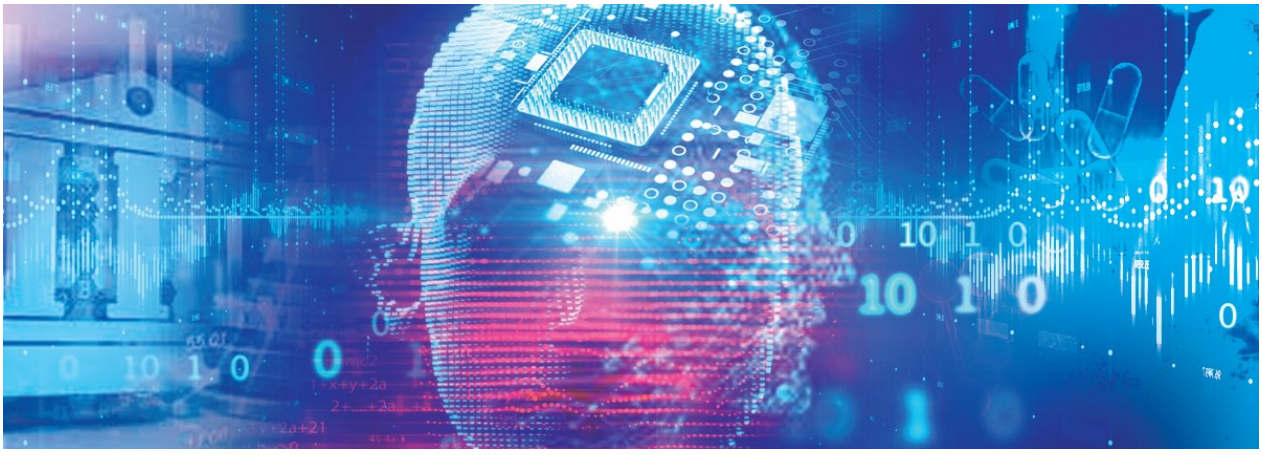
We have a dedicated, expert database research team building innovative database solutions to ensure our products operate at scale with a minimal footprint. Co-located with the AI and database teams is our hardware acceleration team, which works on putting application-specific integrated circuits (ASICs) like field programmable gate arrays (FPGAs) to use and ensures our AI models and databases make the most of the hardware underneath.

We also have a blockchain and cryptography research group that helps our customers stay on top of newer advancements in the world of decentralised computing and ensures our security products are up-to-date with the most recent trends in cryptography.

**With the rapid adoption of AI due to the pandemic, what kind of trends do you anticipate the industry to pick up?**

Digitisation has seen increased acceleration since the onset of the pandemic. In addition to the growth of

> IN ADDITION TO THE GROWTH OF NEW-AGE, DIGITAL-FIRST BUSINESSES, TRADITIONAL INDUSTRIES LIKE BANKING AND HEALTHCARE ARE ALSO HEAVILY INVESTING IN DIGITAL INFRASTRUCTURE.



new-age, digital-first businesses, traditional industries like banking and healthcare are also heavily investing in digital infrastructure. Naturally, as a result of this digitisation, organisations want to use the data they collect to their competitive advantage – this has led to an upward trend in AI adoption as well. IT is becoming a more critical aspect of business since a modern-day customer experience is heavily dependent on the quality of the IT infrastructure upkeep.

Today, AI is widely used in services like marketing, customer support and product positioning. As IT teams warm up to the idea of AI predictions in core system maintenance tasks and start using AI on a day-to-day basis, we'll see more adoption in IT infrastructure upkeep and use cases like threat detection, outage prediction, malware analysis and root cause analysis of incidents. We can also expect to see the use of AI in core services like lending in banking or report analysis in healthcare.

As for AI itself, the technology will move towards explainable predictions, which can help teams interpret decisions made by the AI model. AI is also evolving to work with smaller amounts of data, helping small and medium-sized businesses that don't have the luxury of huge data sets stay on par with bigger enterprises.

**How did AI-augmenting help customers address industry challenges?**

Data is a key asset for modern-day organisations – they build successful business models around data and leverage AI to put this data to better use. Today, it's not enough just being a digital-first brand; the key is how reliable your digital interface is.

AI capabilities of our products help customers secure their network and ensure uptime. We provide an extensive UEBA platform via Log360, our SIEM solution, to ensure security isn't compromised by malicious actors. Our network monitoring tools, OpManager and Site24x7, use AI features like anomaly detection and incident prediction to help better forecast network needs and mitigate outages. The service delivery tool, ServiceDesk Plus, utilises advanced natural language processing techniques to ensure faster resolution of incoming tickets by identifying the context of tickets and assigning them to the right technicians.

**Joshua Boonwei Lau**
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# Finding light **at the end of the tunnel**

Digital transformation and innovation have helped businesses across sectors deal with the pandemic, and in some cases even expand. It's time for others to take a cue

The COVID-19 pandemic has brought many SMEs and big businesses across the world to a standstill. SMEs are possibly the most affected, with many not being able to resume operations until things settle into whatever will become the 'new normal'.

In such circumstances, people generally look to their governments to take necessary measures and help them resolve their immediate cash flow problems. But in a pandemic like this, many governments are struggling to balance immediate public healthcare needs and long-term economic concerns. The impact of COVID-19 on the service sector is even more pronounced as it includes mostly SMEs that rely heavily on the human touch approach.

One viable method to address this problem is adopting innovative tools and resources to improve operational productivity. In the wake of the pandemic, digital transformation and innovation, involving multidimensional pivots, are expected to raise service productivity.

## MAJOR OUTCOMES OF DIGITAL TRANSFORMATION AND INNOVATION

In the current pandemic, many companies have managed to stay in business by adopting digital transformation and innovation. According to IDG Research, 32% of IT decision-makers noted that digital transformation had positively affected revenue, with a substantial rise of 23%. Moreover, with a high digital transformation level, revenue increased 1.5 times faster than the average, translating into lower costs and higher labour productivity.

This means that businesses could potentially enhance profit margins and increase productivity through digital innovation. Today, many companies are replacing manual processes with digital technologies for faster, smoother operations and expanding their markets to take advantage of the opportunities created by remote working. At the same time, a broader base of more satisfied customers, realised through digital innovation, can ultimately increase service productivity and long-term profitability.

In the ongoing pandemic, digital innovation is offering more flexibility and better staff engagement. Interestingly, it is also providing a greater range of business opportunities.

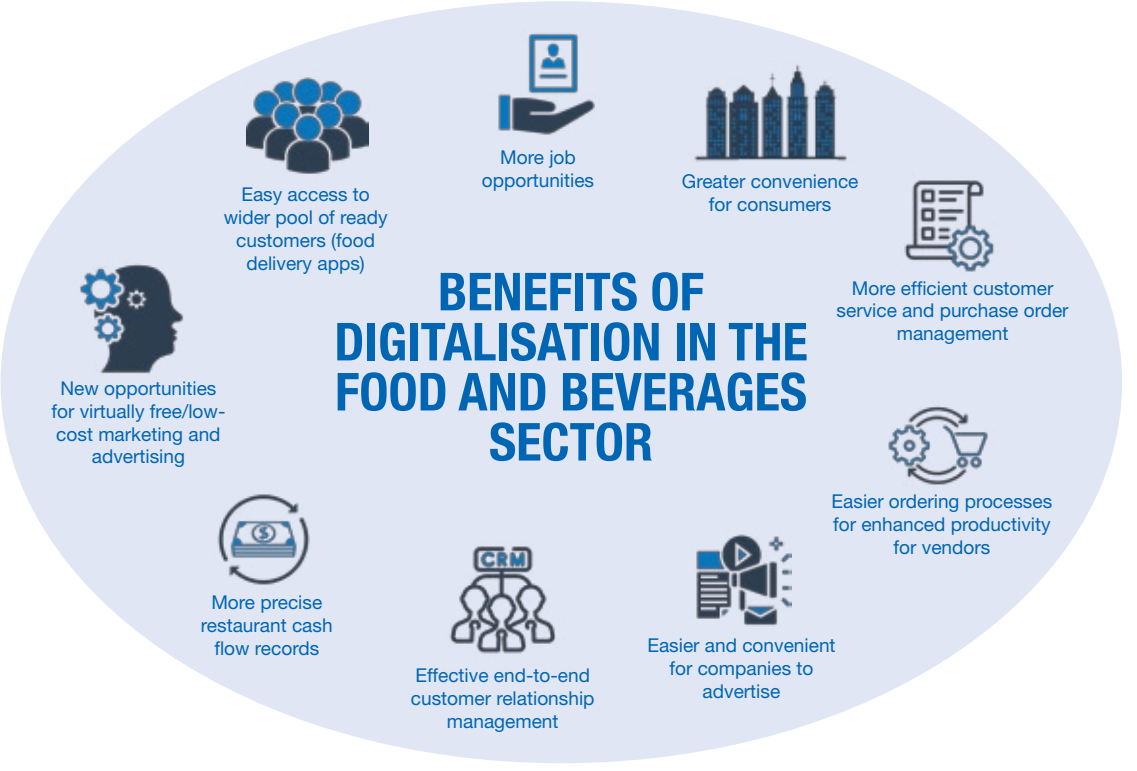
## RAISING PRODUCTIVITY WITH DIGITAL TRANSFORMATION

During the pandemic, digital transformation has helped industries diversify, expand, and raise productivity levels. It has become a key driver of financial stability and efficiency for businesses. By 2030, the global GDP is expected to receive a contribution of USD13 trillion courtesy AI, automation, and digitalisation. In fact, digitalisation has already profoundly impacted the pharmaceutical, media, food, and finance sectors as well as large industries, paving the way for new startups and expansion.

## IMPACT OF DIGITALISATION ON THE FOOD AND BEVERAGES SECTOR

During the waves of COVID-19, when the food and beverages sector faced severe challenges in terms of productivity and profitability, its saving grace was its rapid digitalisation which led to increased customer demand as people avoided visiting markets for daily necessities. To reduce touch points, more businesses now accept digital payments using QR codes and rely on food delivery platforms such as Zomato, Swiggy, GrabFood, Uber Eats, and Deliveroo, making it easier for customers to receive personalised orders quickly. With this development, food and beverage retailers can worry a little less about sales figures in the currently struggling economy. The

BY 2030, THE GLOBAL GDP IS EXPECTED TO RECEIVE A CONTRIBUTION OF USD13 TRILLION COURTESY AI, AUTOMATION, AND DIGITALISATION.




true potential of digitalisation is overwhelming in terms of revenue generation and will have similar positive effects on production processes and distribution channels.

Social media campaigns are also playing a vital role in the success of this sector. With only a little effort in establishing a social media presence and advertising services, food and beverage retailers can market themselves significantly. For example, a perfectly captured photo of a menu item with a compelling caption increases sales markedly – the proof is in the pudding. Numerous food businesses are promoting themselves on Facebook Live, Instagram, and other social media platforms as an innovative digital tactic. Follow-up in the form of reviews by customers adds to the transparency of the marketing process, attracts even more customers, and leads to higher profits.

There is also a vast range of suppliers in this sector, thus providing customers with several options to choose from. In addition, according to the latest trends, consumers are becoming even more attracted to online services. This shows the power of digitalisation today and bodes well for the future.

**ONLINE FOOD DELIVERY PLATFORMS AND APPS**

Food-related businesses launching delivery apps are staying strong on the ground and even expanding in these difficult times. People are more likely to use such digital services as trust in electronic payment systems is building up. Some of the food chains such as KFC, McDonald's, and Domino's Pizza have their own online platforms such as GrabFood, Deliveroo, and Uber Eats. Other companies,

> DIGITALISATION IN RETAIL HAS FREED STORE MANAGEMENT FROM TIME-INTENSIVE MANUAL INSPECTION. DATA CAN BE COLLECTED AND STORED EASILY, REQUIRING FEWER EMPLOYEES.

both small startups and established food chains, depend on third-party platforms for delivery to meet increasing consumer demand. Those third-party platforms also handle deliveries from restaurants that do not offer delivery services themselves. This leads to increased sales and productivity. This is the most efficient method of ensuring revenue to everyone involved, from restaurant owners and chefs to portal operators, to delivery personnel.

**DIGITALISATION IN THE RETAIL SECTOR**

In the retail sector, digitalisation has freed store management from time-intensive manual inspection. Huge amounts of data can be collected and stored easily, requiring fewer employees. When it comes to customer behaviour, online retailers are at an advantage in terms of understanding their preferences due to the placement of cookies in personal accounts. There is now greater demand to digitalise physical devices in the retail sector to manage time better and increase efficiency. Automation of physical devices is also contributing to higher service levels.

As retailers continue to introduce new tools and learn to apply different technologies to keep up with market trends, they rely more heavily on various types of sensors. Sensor technology is improving rapidly, low-cost systems are becoming widely available, and new digital technologies are ensuring that they are easy to use even for those not from programming backgrounds.

Gartner predicts a rise of 3.6% in tech retail spending worldwide, which could reach USD218.5 billion in 2021. Deloitte also predicts online retail spending in India to touch USD50 billion, with 70% of Indian customers preferring to use digital devices than taking help of human resources for various in-store activities. Digital portals or devices are now preferred to compare prices, know product specifications, check product availability, etc., which only goes to show the evolution of customer acceptance of digitalisation. Digitalisation in this sector helps create client-focused experiences as shoppers become more aware and vigilant in choosing products and services.

**DIGITALISATION IN THE HOSPITALITY SECTOR**

Before COVID-19, the hospitality sector used to be conservative in its approach to digitalisation and modernisation. Today, the norms have changed as hotel staff is minimising face-to-face interactions with guests, by providing them assistance through digital modes. Guests can check hotel services via online portals without talking to the management or staff in person. Most services can be ordered via phone, avoiding physical contact. Digitalisation has made it possible for every hotel employee to stay in touch with management. In addition, digitalisation of employee communication is playing a vital role in managing and saving time.

As in other service areas, digitalisation in the hospitality sector is allowing management to do more with less and continue business operations at high productivity levels even during the current pandemic.

**DIGITAL INNOVATION: A CRITICAL SUCCESS FACTOR IN THE NEW NORMAL**

The e-commerce market has shown increased growth in productivity as consumers/customers shift to online services. Digital transformation, along with digital innovation and creativity, has changed the global business scenario. In particular, digital innovation has been a critical success factor for enterprises in every sector. It has also helped to lower market entry thresholds, leading to a more rapid spread of innovative ideas. Service-sector businesses that were early adopters of digital innovation can now analyse millions of data points every day to gain new insights into consumer behaviour filtered through different engagement channels and act on those requiring immediate attention. When the COVID-19 pandemic eventually ends, these businesses will be the first to reap the rewards of enhanced service productivity.

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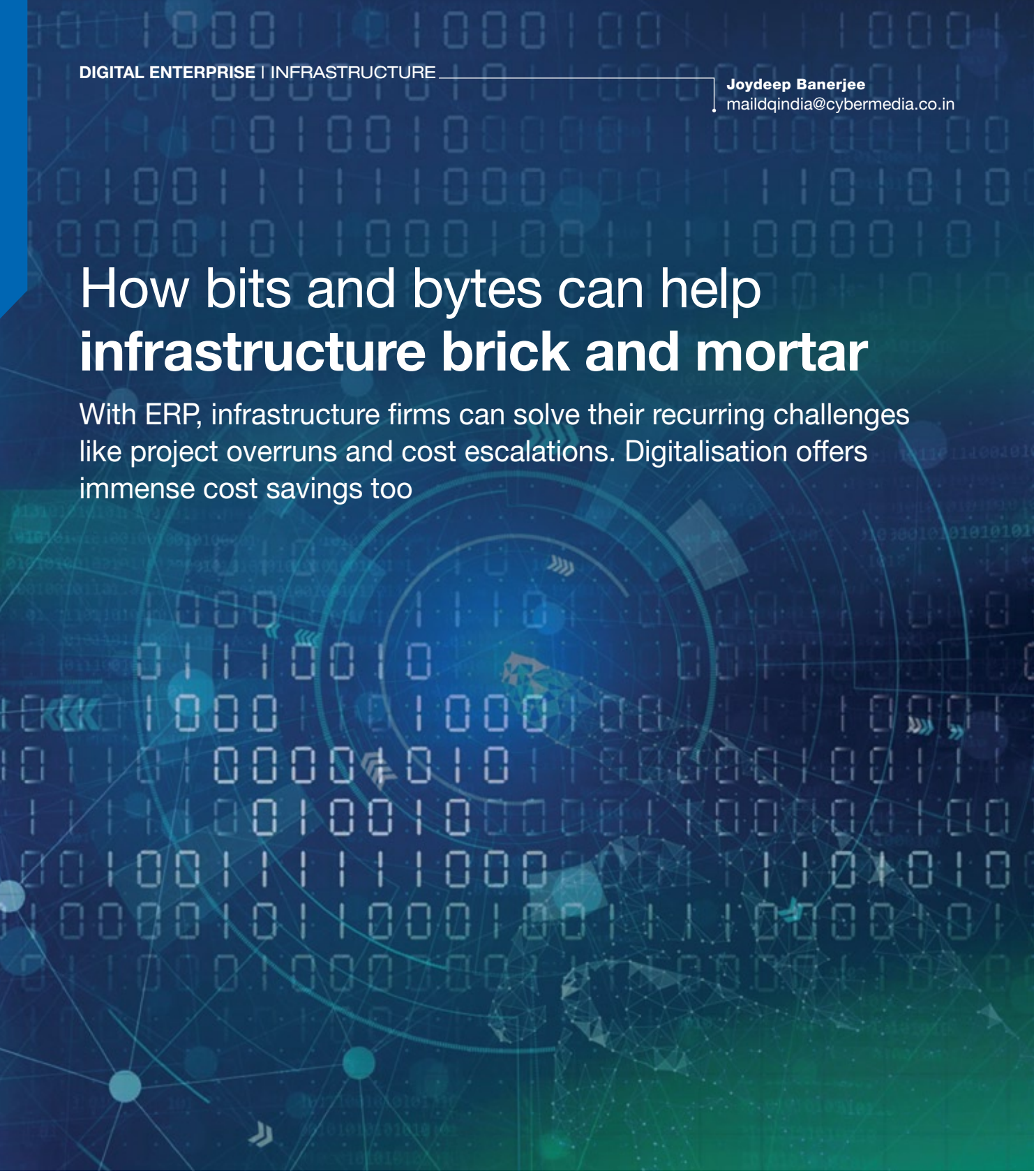
# How bits and bytes can help **infrastructure brick and mortar**

With ERP, infrastructure firms can solve their recurring challenges like project overruns and cost escalations. Digitalisation offers immense cost savings too



Infrastructure development plays an important role in the growth of any country. It has been linked with economic growth and many other aspects that contribute to the country's progress. This is one of the industry sectors which have made progress through trials and tribulations. But the limited technological utilisation within the sector, misinterpreted as a boon, has become a bane. Infrastructure firms regularly face cost overruns and project delays. Today, more than ever, they need to create a digital foundation for now

THE MAJOR CHALLENGE FACED BY MOST INFRASTRUCTURE FIRMS IS DISCONNECTED ISLANDS OF INFORMATION THAT ARE SCATTERED ACROSS MULTIPLE FUNCTIONS AND DEPARTMENTS.

and for the future. While every business has been affected by COVID-19, infrastructure projects have faced a huge setback. Lack of demand, labour shortage and supply chain interruptions such as raw material shortage have affected the viability of many projects. The message is loud and clear message: what is needed is digitalisation.

This will establish highly integrated efficient workflow, seamless data transfer and improve their risk management practices to ensure that they are profitable in these challenging times. To survive and succeed, infrastructure firms need a well-defined process for digital transformation. Deploying a proven ERP solution that has stood the test of time has helped enterprises become more competitive.

**ESTABLISHING A PROCESS-DRIVEN CULTURE**

Infrastructure projects can be broadly divided into two phases, firstly, construction, and then operations and maintenance. So, a technology platform that not only delivers for today but also supports a vision for embracing the future is highly required. Cloud ERP is an enterprise platform that enables infrastructure firms to embrace best practices while allowing flexibility for enhancements. For example, during the pre-construction phase, infrastructure firms can enable enterprise-wide visibility across different supply, production, and inventory functions. The major challenge faced by most infrastructure firms is disconnected islands of information that are scattered across multiple functions and departments. The solution will enable these organisations in macro and micromanagement of the end-to-end processes. Adopting an ERP will help these firms move to a single version of truth. A single platform that will connect each and every stakeholder, internal or external, and seamless data transfer will reduce significant operational errors.

**ENSURING PROJECTS ARE COMPLETED ON TIME**

Timely completion of the construction can be managed and monitored through the solution, and at the same time, cost overrun will be controlled through financial checks and validations. From planning for procurement of raw material to identifying and gauging resources that are required for the execution of the project – ERP can help firms plan appropriately. Similarly, project risks can be reduced by detailed planning for different scenarios. For example, during the COVID-19 crisis, infrastructure firms can identify and assess the impact of manpower disruptions, raw material disruptions, and vendors and subcontractors' potential bankruptcy. ERP will enable the decision-makers with ample information at a click of a button to prioritise and mitigate the risk.

VISIBILITY OF KEY FINANCIAL METRICS HELPS INFRASTRUCTURE FIRMS FORECAST PROJECTS' FINANCIAL HEALTH, IDENTIFY TRENDS AND MAKE ACCURATE DECISIONS COST-EFFECTIVELY.

> ERP DEPLOYMENT HAS BEEN INSTRUMENTAL IN INTEGRATION WITH OTHER EMERGING TECHNOLOGIES, INCLUDING MACHINE LEARNING, RPA, BLOCKCHAIN AND THE INTERNET OF THINGS.

**BETTER FINANCIAL PLANNING AND ANALYSIS**

Using ERP, infrastructure firms can centralise planning, analysis and execution in one system. This helps them to continuously review their financial data using a centralised database, accompanied by real-time reports and insights into key performance indicators. Visibility of key financial metrics helps infrastructure firms forecast their projects' financial health, identify trends, and make accurate decisions more cost-effectively. This is extremely important in the current environment, where the demand is uncertain, and infrastructure firms need to keep on analysing their financial health on a real-time basis.

**COST OPTIMISATION**

As mentioned above, the recurrent issues faced in the infrastructure sector are project delays and cost overrun. The key factors for cost overrun in the construction phase are poor schedule management, wrong estimation, poor design and drawing management. With the enhanced capabilities of ERP project management, each and every activity of the project, from concept to commissioning, can be linked with cost. Budget control and validation against the activities help in monitoring the cost.

The holistic view of the project through ERP provides the control on other cost affecting factors such as material management (inventory and reconciliation), sub-contract, manpower, and equipment management, all on one single platform. The system also can help in optimising various kinds of construction wastage. Procurement control, identification of non-moving stocks, material reconciliation, equipment performance monitoring and various checks and controls on subcontractor payments helps in real savings in money terms.

Similarly, in the operation and maintenance phase, effective and efficient maintenance practices and predictive maintenance can be achieved. The enterprise asset management functionality provides robust equipment performance monitoring and controls wastage of resources like manpower and materials.

**MANAGEMENT INFORMATION SYSTEM**

If we go by the definition, MIS is used for decision making, control, analysis and visualisation of information in an organisation. ERP analytics display the information through a dashboard and various online reports, which assist the decision-makers. The availability of a dashboard and reports just at a click of a button could make all the difference in the project's success or failure.

**PREPARING FOR THE FUTURE**

ERP deployment has been instrumental in integration with other emerging technologies, including machine learning, RPA, blockchain and the internet of things (IoT). Construction firms can reap exponential benefits in the future through these abilities. They can leverage the analytics capabilities to analyse data with what-if analysis and many other options. Building information management (BIM) and 'digital twins' have proved to be ground-breaking concepts, for which ERP can act as the core and drive the complete end-to-end process.

Construction firms can proactively monitor the health of equipment and predict a possible failure with IoT. With machine learning and artificial intelligence, monitoring of project completion based on multiple factors can be easily achieved. The mobile-friendly features available can help managers run the entire system on the go.

When the companies adopt digital transformation, unlimited capabilities will be unlocked. Only the sky is the limit.

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# Cross the barriers and win **actionable data insights**

There is no dearth of data today for gaining business insights. Yet, many organisations struggle to properly sift their data, rendering it worthless

According to NASSCOM, India has the second largest internet user base globally; a figure we continue to see accelerate post the pandemic's peak as consumers continue to move online and small businesses digitise. As of June 2020, India had an internet subscriber base of 749.1 million, which is expected to cross 1 billion by 2025. This has led to an increase in the amount of data generated and consumed. In 2019, Indians consumed the highest amount of data per month globally at ~12GB, which is expected to double over the next five years.

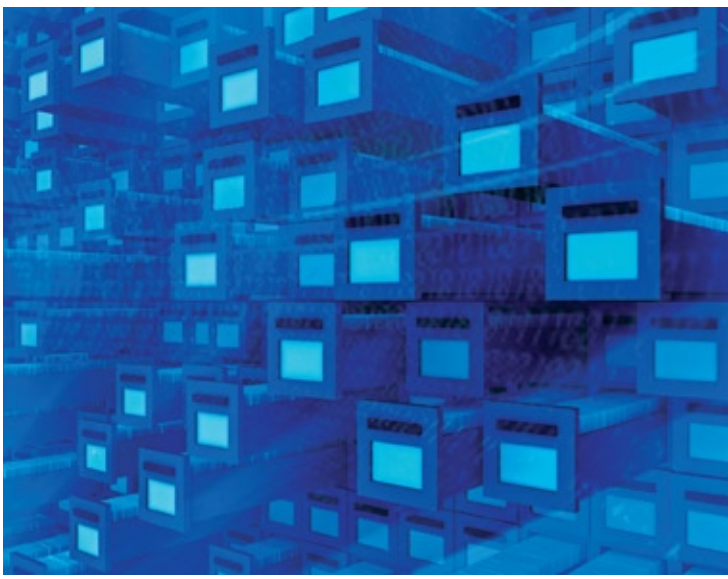
As data volume and variety increase and data sources proliferate, new opportunities will arise to deliver superior customer experiences, drive better business decisions and enable greater agility and resilience. New technologies and approaches – such as internet of things (IoT), cloud native development, artificial intelligence (AI), machine learning, and the modern data fabric – offer a path to this intelligent business vision.

Despite these opportunities and new approaches, businesses are struggling to manage data and generate meaningful analysis. They're weighed down by issues such as dirty data, misaligned data collection and governance policies. These companies risk falling behind competitors, who are using data intelligence to adapt to their customers' needs quickly and proactively. To gain actionable insights from data, one needs to address some common barriers. Let's take a look at each of them.

## #1

### DATA DISCOVERY CHALLENGES

Data discovery is difficult when you have unknown data sources, poor data quality, data silos and compliance restrictions. These issues can trace their origin to data used or generated by a specific application stored in a siloed data platform, typically found in an early 2000s web application architecture or in 1990s UNIX applications.



Additionally, incomplete views of customers and other business entities, duplicate data and a general lack of understanding around what data is available (for building new applications or updating existing ones) result in less-effective services, insights and customer experiences.

**Solution:** With a holistic view and understanding of your data estate, plus a modern data architecture that makes your data accessible, you can make data discovery and utilisation a more natural part of your DevOps processes and culture. DevOps drives speed and quick turnaround. And your data – if it's known and accessible and in a useful format – can be fully incorporated into your DevOps culture, development and deployment processes.

## #2

### EXCESSIVE COSTS

Costs can grow out of control if your infrastructure is not structured for utility and elasticity, your talent is

> INDIA HAS THE SECOND LARGEST INTERNET USER BASE GLOBALLY. AS OF JUNE 2020, THIS BASE COMPRISED 749.1 MILLION PEOPLE, AND IS EXPECTED TO CROSS 1 BILLION BY 2025.

expensive, and you face large, ongoing investments with no guaranteed returns.

Costs can also become excessive if you continue to rely on on-premises data solutions for your worst-case scenarios, when you're stuck with servicing older virtualised applications and data infrastructure and on-premises data platforms servicing cloud-based applications may incur higher-than-needed ingress/egress fees.

**Solution:** By moving data platforms to the right public and private clouds in a multicloud architecture, you get several benefits— including elasticity, self-service, optimised economics and cloud native services — using which you can develop modern applications and host a modern data architecture.

## #3

### COMPLEXITY

Choosing the right mix of technologies, identifying architectural best practices for deployment, and integrating cloud, on-premises and edge — these are all complex responsibilities. And they are made even more difficult if your data platform mix is not optimised.

For example, your data may have been forced into a traditional relational data management system, or worse, into unstructured files, even though that is not the optimal place for data use and analysis. This makes developing applications using this data more difficult and less effective.

IoT dramatically increases the data coming into your business. But it must be analysed and intelligently separated into data flows that support the business to the extent that your applications get the data they need and when they need it. Many organisations either do not leverage IoT or do so in a manner that overly restricts their data being used from IoT. While these approaches prevent data from flooding with reliability, security and availability issues, they eliminate the benefits of using all of the appropriate data in the organisations' business ecosystem.

**Solution:** Dealing with the explosion of data variety, velocity and volume is complex. However, by putting this data into the right data platforms and in the right clouds configured into a modern data architecture, your data can be more readily used, be more cost effective and set the foundation for modern analytics and superior business insights.

## #4

### SKILLS GAP

Most organisations do not have the necessary in-house skills to optimise their data architecture for modern AI/ML use cases and cloud native applications. To create a modern dat a fabric, you need specialised education, training and experience, which are not organically available in typical IT teams. This skills gap results in data integration architecture that is scattered and opportunistic, which prevents applications from getting the right data at the right time and leads to less-than-optimal experiences, results and insights.

**Solution:** Work with a partner whose team has the right skills, career paths and continuous work experience, particularly the one that is always busy solving problems and building expertise across many different industries and use cases. This helps ensure that it is able to attract and retain the best data people.

### ACHIEVING ACTIONABLE DATA INSIGHTS

With modern data architecture, your data can help drive better business processes, experiences and decisions. And with a fully integrated data environment supported by DataOps and MLOps, your business and IT teams can make intelligent business and IT decisions that will drive maximum value to your customers and have a huge impact on your business's bottom line.

*Bhargava is Managing Director, Asia Pacific &Japan, Rackspace Technology*

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# With pandemic push, **the future is already here and now**

COVID-induced digitalisation is accelerating the transformation of urban living, as new technologies merge the physical and virtual worlds

Many crises cause societies to explore new opportunities, and the pandemic followed by switch to the work-from-home (WFH) model is no exception. It is likely to accelerate underlying trends in urban living and enhance the quality of life for city-dwellers. Even though the pandemic isn't over and no one really knows for sure what will come next, we have already been observing some emerging trends – how our living environment is set to change following the influence of teleworking; how the physical world will interact with the virtual; what technologies will empower these shifts; and what can be done to make this process safer.

**HOMES: FANTASTIC INFO-WORKERS AND WHERE TO FIND THEM**

Never before have so many people found themselves in such similar conditions at the same time, making the pandemic experience truly global. For the second year running, we are witnessing remote working taking place 'enmasse', and how different sectors of the economy have actually been boosted by the change. One of them is obviously e-commerce, with the process of visiting bricks-and-mortar stores more complicated. Pandemic measures worldwide have led to higher online parcel volumes, which has also been evidenced in a rise in delivery services. People are getting used to spending more time at home, so dark stores, food deliveries, and overall digitalisation of the commerce experience will continue to grow, making contactless payments the new norm.

Urban life varies greatly depending on the patterns of work, leisure, and consumption of citizens. With most of us living and working at home, COVID-19 has become a catalyst for the acceleration of intelligent buildings and smart home technologies that were already being implemented into the real estate industry. Today, things like keyless entry, voice-activated elevators, digital room service, remote notarisations, and valet parking are getting even more valuable, as consumers embrace this trend for hands-off technology to be brought into every home. This seamless fusion of the digital and physical worlds can be secured through technologies that take a 'cyber immune' approach.

In terms of the personal security of smart homes, certain secure elements are essential – like correctly configuring home Wi-Fi networks or protecting devices and control panels with a strong unique password. That way, an attacker will not be able to simply brute force the 'key' to users' homes.

As digital penetration grows, consumers are implementing new habits and precautions daily. According to a recent research, 48% of online users protect a Wi-Fi network with a password, 58% are currently using internet security software (excluding built-in software) and the majority (65%) agree that antivirus software is required for good 'digital hygiene' – just like washing your hands before eating.

**OFFICES: WHAT THE WORKPLACE OF THE FUTURE WILL LOOK LIKE**

Millions of white-collar employees who have been enjoying the opportunity to work from anywhere have encountered the need to create a virtual office at home, where they can fully concentrate. And, as the world starts to consider the hybrid work model, most workers will be likely heading to the office just two or three days a week. This all affects commercial real estate with new open office layouts with meeting rooms, small private offices, hot desks, and co-working spaces.

Workers can gain a number of benefits from this hybrid work concept, like rent savings, lower overheads, a made-to-order work environment, and no more long daily

RECENT RESEARCH SHOWS 65% ONLINE USERS AGREE THAT ANTIVIRUS SOFTWARE IS REQUIRED FOR GOOD 'DIGITAL HYGIENE' – JUST LIKE WASHING YOUR HANDS BEFORE EATING.

> COVID-19 HAS BECOME A CATALYST FOR THE ACCELERATION OF INTELLIGENT BUILDINGS AND SMART HOME TECHNOLOGIES THAT WERE ALREADY BEING IMPLEMENTED.

commute. With this 'pop-up' workspace paradigm, virtual work will be available to anyone who wants it. However, the necessity to organise IT support adds a burden on employees as well. One simple piece of advice: turn on a VPN – no matter whether you are working at home or on a public Wi-Fi network – to protect data, hide your IP address and ensure online actions aren't intercepted.

**CITIES: HOW THE LIVING ENVIRONMENT WILL CHANGE**

The 'death of the suburbs' narrative has been trotted out many times by demographers and sociologists, but due to COVID-19, we are now observing re-urbanisation and a return to suburban life, as millions of people have started changing their apartments in dense downtown neighbourhoods in favour of green distant locations, with less human contact. Meanwhile, 'Zoom towns' are gaining traction in the media, with vacation destinations turning into real-estate hotspots as workers escape densely packed cities to work from their ideal location.

However, the other conclusion this pandemic has taught us is that we want to meet face-to-face, because it's human nature to communicate and live together. People want to go to bars and restaurants, they need eye-contact at meetings and to feel connected to other teammates to be productive – and that's why big cities will always be desirable.

The look of our future cities is not written in stone but some urban trends were triggered last year. For example, the concept of 15-minute cities became a reality, where citizens can access daily needs within a short walk or get fresh air in the context of teleworking. Huge malls have made way for local grocery stores, and instead of needing to drive or use public transport to reach them, they are only a bike ride away. Finally, people can spend more time in their neighbourhoods and prioritise their lifestyle needs based on affordability, commercial infrastructure, leisure capacities, parks, or whatever they value most.

These are all long-lasting urban tendencies, and post-pandemic habits will likely shape the look of future neighbourhoods to provide for people who enjoy city-living but in a family-friendly environment. This includes mixed-use real estate developments, which pair residential housing with offices, green roofs and balconies, large courtyards and playgrounds, restaurants, and retail.

When planning a living environment, developers need to provide people with infrastructure, create opportunities for communication and leisure, enhance a sense of community and invest in human development and health. The technologies that sanitise public spaces, make contactless entry possible, or transform tourism during stay-at-home orders with the help of VR and AR tours will likely bring us closer to a future of smart homes and smart cities.

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# Is your cyber fortress **as strong as you think it is?**

When cyber attacks are on the rise, organisations need to check if their defences are secure. Automated and quantified risk assessment makes that task easy

In the game of Tetris, players assemble pieces of various shapes, called tetrominoes, to form complete lines. Once completed, the line disappears, and the player can proceed to populate the emptied spaces. Repeat ad infinitum till the screen is filled and no more pieces can descend! When puzzle-loving software engineer Alexey Pajitnov created Tetris, little did he know the impact it would have on the gaming industry, let alone it's parallel to cybersecurity.

Much like Tetris, in cybersecurity, errors pile up while the accomplishments disappear quickly! Unless remedies are appropriately placed, vulnerabilities accumulate and clog the screen, leaving the enterprise paralysed. Without real-time monitoring, the security team is overwhelmed with several small, oddly shaped, and unaccounted pieces of the cybersecurity strategy. Tetris requires you to see the big-picture before every move, and so does cybersecurity.

If the last year is to be taken as the worst year history in terms of cyberattacks, businesses need to roll up their socks and brace for a worse 2021, unless they take concrete measures. There are four pillars upon which cybersecurity of every company stands: employees, policies, technology, and the third party. However, when the WEF Global Risk Report 2021, PwC's 24th CEO risk report, and more surveys across the world rank cybersecurity as one of the most significant threats to the global economy, one has to ask where businesses are drawing the short stick.

Despite the technological advancements in allied fields such as artificial intelligence and supervised machine learning available to simplify cybersecurity, it remains complicated, jargon-rich, and uninviting to employees who are not from the security team. Today, even after investing considerable funds to build a robust enterprise cybersecurity strategy, businesses fall prey to cyberattacks across vectors. Currently, enterprises leverage anywhere between 15 and 50 cybersecurity products/services to ensure that their four pillars remain intact. Still, they fail to collate the data to see a holistic enterprise-wide picture.

Enterprises need to simplify cybersecurity by viewing it as a whole rather than in a piecemeal fashion. Viewing

> ENTERPRISES LEVERAGE 15 TO 50 CYBERSECURITY PRODUCTS/ SERVICES. STILL, THEY FAIL TO COLLATE THE DATA TO SEE A HOLISTIC ENTERPRISE-WIDE PICTURE.

security without relating it to the technology risk or ensuring GRC compliance without real-time third-party assessment provides a false sense of security. This siloed and complex approach to cybersecurity costs billions. Cybersecurity Ventures predicts that in 2021 cybercrime will cost the world USD11.4 million each minute, reaching USD10.5 trillion annually by 2025.

**LET US THINK OF THE SOLUTION**

To know how the cybersecurity services, tools, XDRs, EDRs and outside-in or inside-out security solutions improve your cybersecurity posture, you need to know your cyber risk status before and after implementing these solutions. Here is where automated and quantified risk assessment is changing the game. For instance, our risk quantification product SAFE does so by accumulating billions of data points from each cybersecurity service and product, and feeds them as inputs to a supervised ML-based AI-enabled quantification engine. The engine then assesses the breach-likelihood in various situations involving one or more pillars.

**MAKING THE RISK QUANTIFICATION ENGINE WORK**

Every vertical within the cybersecurity framework of an organisation can be granulated to depict its real-time security status. For instance, each employee's individual 'breach score' is influenced by parameters such as their level of cyber-awareness, device configuration and previous employment history that help determine the likelihood of malicious insider threats. The other parameters include current employment status, whether they're serving notice or due for a promotion, their family background and verification, financial factors like recent loans or investments and the organisation's policies around UEBA, CASB, and DLP to check suspicious employee behaviour in real-time, and more.

Similarly, every line of business, cloud instance, application, data centre, device, IP address, the third party and 'crown jewels' can be mapped. API feeds from cloud-native scanners and cybersecurity tools are gathered across the enterprise, and signals from outside-in and inside-out scanners are collated and aligned with the existing cybersecurity policies and regulatory compliances. These are all considered input, which, when analysed with inherent risk factors such as geography, industry and size, generates threat intel as an 'output'. This helps correlate the threat quotient of a gap to the likelihood of its exploitation.

The process of monitoring, measuring, and mitigating risks in real-time with the help of automated risk assessment is possible in a myriad ways, one of which is through a Bayesian Network. It is defined as a method for taking an event that has occurred and predicting the likelihood that one of the several possible known causes was a contributing factor. The beauty of the Bayesian network is that it generates a result even with a single input. However, its 'confidence metric' is directly proportional to the number of input parameters. In other words, an increase in the number of signals fed into the network directly influences the accuracy of the generated breach-likelihood.

The objective of having a robust cybersecurity strategy is to consistently and precisely answer one question: how secure is the organisation? This objective is continually mislabeled due to the lack of simplicity, despite the availability of means to do so! Cybersecurity needs to be easy, understandable, and simple – much like the game of Tetris – and automation, with the help of AI and ML, can help you predict the shape of the troublesome tetrominoes! Therefore, an organisation can confidently plan its Enterprise Cybersecurity Strategy through data-driven mitigation techniques with the power of prediction.

*Bajoria is VP- Product Management and Customer Success, Safe Security*

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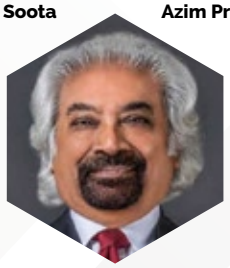

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**MAI-LAN BUKOVEC**
Global Vice President,
Block & Object Storage, AWS

# MOVE TO DATA – NOW. THAT'S THE NEXT BIG PARADIGM.

*How about having a storage area that is less of a dank-creepy basement and more of a colourful-modular wardrobe? Better still, less of a boring museum and more of a Disneyland; less of concrete and more of Lego; or less of rigid storage and more of S3? Well, that's exactly what a team at AWS might have aimed for. This year S3 celebrates its 15th birthday. In an interview with Dataquest,* ***Mai-Lan Bukovec****, Global Vice President, Block and Object Storage, AWS, talks about redundancy, consistency, data movement, and also how much S3 has evolved and what keeps it still young.*

**It's been 15 years for Amazon Simple Storage Service (Amazon S3). What highlights stay in your mind – even today?**

I can recall the first press release very vividly, even today. It was not the typical press statement. We actively put our core principles in it. The release read: "Amazon used the following principles of distributed system design to meet Amazon S3 requirements." In fact, before writing a line of code, the team developed a set of design principles that created a backbone. These, mainly, were: Decentralisation, asynchrony, autonomy, controlled concurrency, failure tolerance, and controlled parallelism, decomposability into small, well-understood blocks, symmetry and simplicity. Interestingly, S3 was described internally as being "feature poor". The reason was that it was engineered to do one thing and do it well – highly scalable, reliable, and low-cost storage for customers.

**Were all of these core principles well-preserved? Did they work?**

They worked. S3 was scalable, reliable, and fast – all at very low costs. Over these years, AWS has introduced numerous new storage classes and features to help customers get more value out of S3 – and also driven down the cost of storage. We started with Microservices. We captured the fundamentals of distributed, secure and cost-effective storage. We believed in these fundamentals. Fast forward to today – and these core principles are still

WHEN AWS ARCHITECTED S3, WE DESIGNED IT TO HOLD 20 BILLION OBJECTS. WITH 100 TRILLION OBJECTS STORED IN S3, WE STILL REMAIN TRUE TO THE CORE.

> IN INDIA, I SEE SO MUCH INNOVATION THAT IT'S EXCITING TO WATCH APPLICATIONS THAT CHANGE THE WORLD. THAT SPIRIT CANNOT BLOSSOM WITHOUT DATA INNOVATIONS.

intact and alive. When AWS architected S3, we designed it to hold 20 billion objects. With 100 trillion objects stored in S3, we still remain true to the core. That's why our growth has been great over all these years. No matter how much elasticity you need, no matter whether you use machine learning (ML) or artificial intelligence (AI), they have to be fitted out of data strengths. That's what S3 brings – with terabytes and exabytes of storage.

**Redundancy is the core strength for S3. How much does it matter and is there a flip side to it?**

I would say that S3's distributed, decentralised design principles have stood the test of time. From day 1, the availability and durability of our customers' data was crucial for us. AWS began by building fault tolerance into S3. Hence, we built redundancy on top of redundancy to make it work seamlessly for customers, operating on the assumption that hardware components can, and will, fail. The goal was, and is, to make sure that you do not have a trade-off for redundancy. Customers want security of data but no trade-offs when it comes to costs or access. It is important that scaling of architecture does not lead to over-provisioning. S3 has helped many customers with business ups and downs and with scaling of data very easily. Some companies need deep redundancy which is not practical in a typical data centre. But we ensure that our redundancy advantage is also more cost-effective than traditional storage. So, the answer is that we make sure we avoid any trade-offs.

**Tell us something about consistency – the promise and the challenges around it? Does it have any conflicts with latency or availability, especially as one aims for eventual consistency?**

When S3 was first launched it had an eventual consistency model. The metadata would take some time to show up in rare cases. It worked fine in most cases of back-up because customers needed the data to just be there. As the needs of business changed, a lot of real-time processing of data emerged with complex analytics and ML models. When we saw this trend pick up, we started to realise that the consistency model has to be updated. Customers had started exploring solutions through their own application code. We started thinking about strong consistency but we didn't want to make any of the cost or performance trade-offs. We set a higher bar. We figured how to build consistency with no additional compromise.

**Was it easy?**

Our core pillars – as mentioned in the very first press release – of performance and security had to be kept intact. We started aiming for it through making metadata

MODERNA WAS ABLE TO DEVELOP THEIR COVID-19 VACCINE VERY QUICKLY BECAUSE THEY RUN THEIR DRUG DESIGN STUDIO ON AWS'S COMPUTE AND STORAGE INFRASTRUCTURE.

cache strongly consistent, by injecting new witness component and new replication logic. Consistency also had to be executed correctly – we did not want any scope of edge cases that break consistency. We achieved this through rigorous testing and verification techniques. Now everything in S3 is strongly consistent. This is because we stayed true to our core principles. We used all our engineering expertise and evolved well in the last 15 years. The way we engineer it makes sure that there are no conflicts of latency or availability. So there is no compromise on our core principles of cost and performance today – as was intended since the first day.

**How does distributed and cloud nature of storage work where compliance and regulatory constraints can limit the movement of data?**

In the USA, for instance, we have many customers and align to all apt regulations. We are aware of regulatory requirements. Many customers use S3 in a successful way without any impact on compliance needs.

**How relevant is cloud-based storage for today's scenarios?**

S3 was built as evolvable system architecture. We didn't have preconceived notions of what existing legacy hardware or what data centre infrastructure ought to look like. We weren't constrained by inflexible on-premises appliances either. Today, we are in the world of modern data architecture. Companies that are evolving fast are building next-generation applications which need a data model so that they can take advantage of a shared model. If data is in silos, then they would not be able to tap the same level of advantages.

**What role can the expansion of availability zones play in the data strategy that enterprises need today?**

It is one of our core badges for S3. S3 has been architected to build three or more availability zones; and with S3 we are using a certain region's capabilities at the best possible levels. S3 is ultimately an architecture that can withstand the loss of a data centre and this resilience is strengthened with availability zones.

**What are you most proud of when you look at S3's evolution?**

S3 is the foundation of the business and growth goals of many of our customers. This is visible all over the world. We are proud of the growth trajectories of these customers.

**Can you share information on the Moderna project?**

We are happy we contributed to the acceleration of the vaccine. Moderna Therapeutics focuses on using messenger RNA (mRNA) science to create novel medicines like the Moderna COVID vaccine. Moderna was able to develop their COVID-19 vaccine very quickly because they run their Drug Design Studio on AWS's compute and storage infrastructure. That helped Moderna quickly design mRNA sequences for protein targets, and then use analytics and ML on their data lake on S3 to optimise those sequences for production so that the company's automated manufacturing platform can successfully convert them into physical mRNA for testing.

**Keeping in view the fast-changing technology, what advice will you give to the customers?**

I would say 'Move to Data – Now.' That's the next big paradigm. You may not be using ML today, but soon you will. The same trends would be seen with predictive analytics or AI. The core of all these shifts is data. When you start moving this data to S3, you are not merely sharpening and simplifying your data strategy but are also laying the ground for predictive analytics and ML. In India, I see so much innovation and entrepreneurship that it's exciting to watch applications that change the world. That spirit cannot blossom without data innovations.

**Aanchal Ghatak**
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**SRIDHAR PINNAPUREDDY**
Founder & CEO, CtrlS Datacenters Ltd

# WE ARE DOUBLING THE DATA CENTER INDUSTRY CAPACITY IN INDIA

*With digitalisation steering the change in the post-COVID, cloud and everything-as-a-service is fast becoming the new normal. This has led to a massive demand for data centers. To keep up with the user demand and the increasing expectation of the enterprise users, data center companies have been evolving too, offering newer, better, and innovative offerings.* ***Sridhar Pinnapureddy,*** *Founder and CEO, CtrlS Datacenters Ltd shares more on how the pandemic has impacted data center business and the technology triggers. Excerpts:*

**COVID-19 has impacted the world in many ways. How has it affected the data center business?**

COVID-19 has accelerated work from home and compelled businesses to re-look at their business continuity strategies. Also, consumers have switched from conventional media entertainment to over-the-top (OTT) platforms, schools and colleges have transitioned from physical classrooms to digital classrooms, and people have started using online services for shopping, banking, buying groceries, and medicines, etc. due to a combination of lockdowns and fear of contracting the infection. In the healthcare industry, telemedicine has replaced physical consulting, and there has been an increase in utilisation of cloud-based collaboration and conferencing facilities. Several businesses have moved their applications and infrastructure in either third-party colocation data centers or cloud ecosystems. The COVID-19-led change in consumer behaviour, increased adoption of online technologies, and changing business landscape comprising virtual classes and online delivery of both essential and non-essential items have fuelled the growth of the data center business.

**Where does the Indian data center market stand vis-à-vis global markets?**

The Indian data center industry, which is currently estimated to be anywhere between USD2 billion and USD3.5 billion, is likely to cross USD8 billion by 2026. The third-party data center footprint in the country stands at approximately six million square feet today, and is pegged to cross 30 million square feet by 2026. We expect to increase our current footprint of 1.5 million square feet to 6 million square feet by 2024, powered by 600 MW of power. In a way, we are doubling the industry capacity.

**We see the emergence of edge computing in addition to cloud deploymentsto support mission-critical activities that require minimal delay in processing. How is the demand and adoption shaping up in India, and elsewhere?**

It is important to understand the Indian demographic advantage. 60% of the Indian rural population comprises youth below the age of 40 years. About 830 million smartphone users are from rural areas, and deployment of the current 4G and upcoming 5G technology will drive digital consumption in rural India. Digital delivery of entertainment, healthcare, education, and goods, combined with smart cars, digital farming, smart homes and rapid deployment of IoT and cloud-based services by SMEs in rural areas will give rise to edge data centers across tier-2, tier-3 and tier-4 cities in the country. These data centers will store content at the edge, while minimising latency and enhancing quality of experience. India will require about 25,000 edge data centers (large,

THE INDIAN DATA CENTER INDUSTRY IS CURRENTLY ESTIMATED TO BE ANYWHERE BETWEEN USD2 BILLION AND USD3.5 BILLION, AND IS LIKELY TO CROSS USD8 BILLION BY 2026.

small and micro) in the near future. We are planning to roll out 1,000+ data centers in varied phases in tier-2 and tier-3 cities.

**SMEs today are finding it difficult to createa balance between dealing with the lockdown-driven crisis, ensuring business continuity, and pushing for digital transformation. How do you look at this situation?**
India is home to 64 million SMEs, which is close to 20% of the world base of small and medium enterprises. Over the last five decades, SMEs have emerged as a highly vibrant sector of the Indian economy.

Today, majority of the SMEs are adopting cloud technologies in varied forms – SaaS, IaaS, and PaaS based on their current and future business needs. A few of them are modernising their legacy applications, while others are embarking on an end-to-end transformation. The cloud penetration is very low (under single digits), while only about one-third of SMEs are reported to own a website, of which 4% are said to be actively engaged in ecommerce. If 75% of the SMEs are digitalised and engage in e-commerce with Indian and overseas customers, they will have the potential to double the Indian GDP. This digitalisation will also lead to growth of technologies such as cloud computing, edge computing, IoT, AI/ML, and analytics in rural and semi-urban India.

**5G is expected to bring in unprecedented changes in business operations and propel Industry 4.0. With IoT and billions of devices getting connected over the cloud, do you see the role of data centers changing?**
5G will revolutionise the way internet is consumed across India, especially in areas where we do not have optic fibre cable (OFC) deployment. It will increase the use of mobile broadband and help smart factories connect and transact business, as well as enable development of new-age applications. Besides, it will foster the usage of connected cars, connected healthcare, smart cities, smart retail, real-time banking and insurance, augmented and virtual reality, and large-scale deployment of connected devices (IoT). India will witness growth of at least 20 billion IoT devices in the next five years, post COVID-19. This will lead to high growth of data across the country and data centers will be required to power the storage and make it available round the clock.

**What about micro data centers? Is there a market for them?**
Yes, micro data centers will basically be a subset of edge data centers requiring not more than 6KW of power. They will power applications at the edge with lower latency and energy utilisation. It is estimated that 30% of all edge data centers in India will be micro data centers, and the numbers will continue to vary depending on the adoption of technologies over the next decade.

**It is aptly said that 'right' technology is crucial to stay operational in the virtual world. How does one decide what is right and how can CtrlS help?**
It would be appropriate to say that technology is the foundation of the virtual world. It enables online banking, digital classrooms, virtual office meetings through online collaboration tools, online entertainment in the form of OTTs, telemedicine, e-commerce, cloud (SaaS/IaaS/PaaS), and online gaming, among a host of other applications. At CtrlS and our group company Cloud4C, we have been helping 60 of the Fortune 500 multinationals to embark on a digital transformation journey through our colocation, cloud, digital transformation and robotic process automation services across 25 countries and 50 locations. We stay committed to helping businesses embrace technology to evolve their strategies, address changing business models and gain competitive advantage in the market.

DATAQUEST T SCHOOL 2021

# RANKING OF TOP 100 ENGINEERING COLLEGES

## EMPLOYABILITY INDEX

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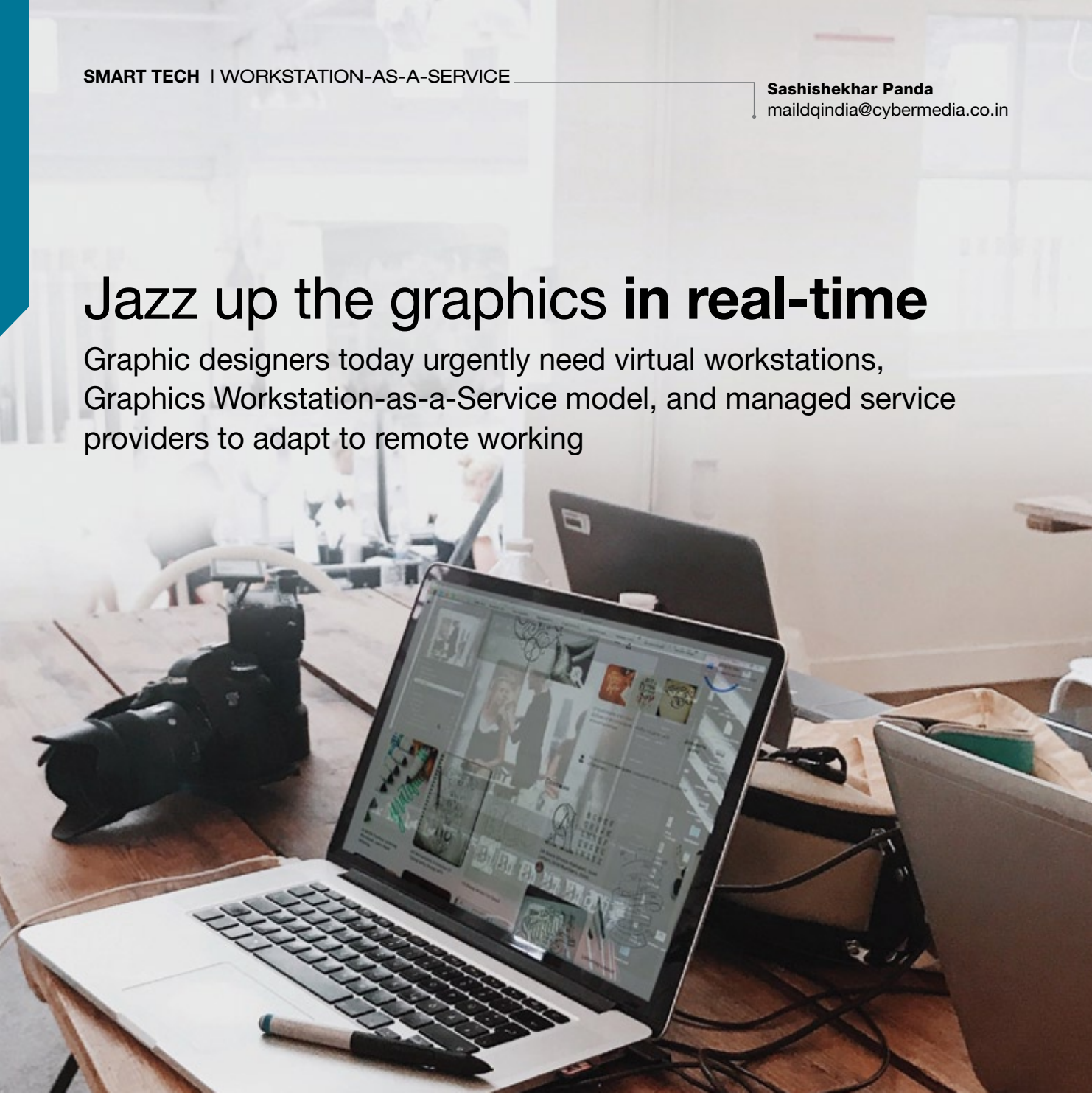
# Jazz up the graphics **in real-time**

## Graphic designers today urgently need virtual workstations, Graphics Workstation-as-a-Service model, and managed service providers to adapt to remote working



While most of the world has quickly adapted to a remote working model based on the cloud, professionals in the field of creative, design and graphicswork are yet to make the transition, as they are still tied to their high-end workstations with specialised graphics cards for rendering and creating complex images or videos. In this 'work from anywhere' scenario, graphic design professionals strongly require the facility of collaborating in real-time on large or complex projects. However, this is very difficult in the current setup, as user files are typically stored locally on workstations.

Graphics workstations are extremely expensive to operate as they require specialised hardware. For example, graphic design software is usually graphics processing unit (GPU) intensive and hence, one would need workstations that have faster processors. One also needs huge amounts of RAM, to run graphics-intensive tools smoothly. Scaling up this infrastructure is not easy, as it is costly and complex requiring hardware to be configured right from the processor speed, screen resolution and even hard disk speed.

As image or video files are mostly large in size, uploading and downloading them to a common repository is a major

VIRTUAL WORKSTATIONS ARE EQUIPPED WITH REMOTE DISPLAY TECHNOLOGIES TO FACILITATE THE DELIVERY OF RENDERED, ENCRYPTED PIXELS FROM DATA CENTER TO REMOTE CLIENT.

challenge. Performing such a task consumes not only huge amounts of time but also a lot of network bandwidth, often resulting in projects being delayed. Also, many a time, users are unable to access applications and files from aremote site or home, which negatively impacts productivity. Interrupted workflows associated with network latency and lengthy cycle time for remote file access or editing are the typical issues encountered by graphic designers, especially in a situation where multiple users work on the same project file on a central storage. From an infrastructure perspective, the constant cycle of hardware upgrades due to evolving technology makes existing hardware obsolete within a short period of time. There is also an additional risk of theft of an intellectual property design that is left unsecured on an individual's workstation.

**THE PROMISE OF VIRTUAL WORKSTATIONS**

Virtual workstations can address the challenges discussed above by providing access and computing power from the data center. These workstations are powered by GPUs that enhance user experience by offloading tasks from the CPU. Virtual workstations can include many cores, with the GPU memory going up to 256GB, starting from 16GB. Each workstation can be shared among multiple users or a pool can be created to deploy identical applications to specific group of users and automate workstation provisioning. As the software applications run on servers inside the data center, including real-time 3D graphics rendering, the client device does not need to be very powerful. It can run on any operating system and users can access their software applications and content on low-cost PCs, laptops, zero clients, tablets and even smartphones using standard browsers and a normal internet connection.

These workstations are also equipped with remote display technologies to facilitate the delivery of rendered, encrypted pixels from the data center to the remote client. The graphics commands of each virtual machine are passed directly to the GPU, without translation by the hypervisor. This allows the GPU hardware to be allocated to each user to deliver the ultimate virtualised graphics performance. Moreover, actual data never leaves the controlled environment of the data center. This ensures that the company's sensitive data cannot fall into the wrong hands through misplaced or insecure laptops. Data remains in the data center and cannot be copied to laptops or USB drives.

While this is an exciting technology, not every organisation is equipped to efficiently tap the potential of virtual workstations. Like any other technology, there are the usual challenges of cost of deployment, management, and capacity upgrades. When more apps or services are added, many organisations face difficulty in delivering a consistent user experience. As the number of users increase, organisations experience scalability issues in maintaining the quality of service.

TODAY, GRAPHIC DESIGN PROFESSIONALS NEED WORLD-CLASS GRAPHICS WORKSTATIONS IN A PAY-PER-USE CONSUMPTION-BASED MODEL, EQUIPPED WITH RELIABLE SUPPORT.

> GRAPHICS WORKSTATION-AS-A-SERVICE MODEL HAS MANY BENEFITS: ENHANCED PRODUCTIVITY, REMOTE COLLABORATION, INTELLECTUAL PROPERTY PROTECTION, AND COST SAVINGS.

**GRAPHICS WORKSTATION-AS-A-SERVICE MODEL**

Today, more than ever, graphic design professionals need world-class graphics workstations in a pay-per-use consumption-based model, equipped with reliable support. A managed service provider can ensure the expected performance and resolve issues quickly by delivering a consistent user experience on any device while protecting user application and content.

If this is offered in a Graphics Workstation-as-a-Service model, users can experience a physical workstation-like visual using any device in a cost-effective manner. This opens up a host of possibilities, from the use of intensive 3D CAD software to a design project where multiple engineers across different remote locations work on the same design file simultaneously.

Managed service providers also enable users to choosethe devices that are right forthem and their work style with a universal client who works natively on the broadest range of desktops, laptops, thin clients, tablets, and smartphones. The service can be accessed from any browser or device supporting remote visualisation.

Today, graphic designers can choose from a variety of GPU-supported applications. Some of the popular ones include Adobe After Effects CC that supports motion graphics and effects; Autodesk AutoCAD for 2D and 3D CAD design, drafting, modelling, and architectural drawings; NVIDIA Iray that offers photorealistic rendering solutions; and Autodesk Maya, the 3D modelling, animation and rendering tool.

**THE ROLE OF MANAGED SERVICE PROVIDERS**

As managed service providers work with the latest technologies, they are best equipped to provide the optimum price-performance ratio. For example, they use the adaptive H.265-based Deep Compression Technology, which enables optimal performance on WAN and wireless networks, while giving access to sharp, responsive 3D graphics applications from anywhere. Similarly, HDX 3D Pro can offer a CPU-based lossless codec to support applications where pixel-perfect graphics are required.

The Graphics Workstation-as-a-Service model can provide a range of benefits.

- **Enhanced productivity** is achieved due to the ability to deliver superior graphics performance with the same responsive experience as a physical workstation.
- **Collaboration from anywhere** is possible as professionals can use the device of their choice to access fully 3D-capable virtual workstations from anywhere.
- **Protection of intellectual property** is ensured as new employees and contractors can be onboarded while ensuring the security of protected files in the data center.
- **Lower TCO** is incurred as organisations can opt for OPEX-based plans instead of committing capital upfront.
- **Quicker provisioning** is realised as managed service providers can quickly provide the required infrastructure on demand.
- **Organisations save on hardware refresh costs** as all infrastructure is provided by the managed service provider.

Other benefits include improved disaster recovery and business continuity; fewer IT helpdesk calls; reduction in unplanned downtime; and better user experience, productivity, and management.

Undoubtedly, Graphics Workstation-as-a-Service is now a necessity. Looking at the impact of the COVID-19 pandemic, and the huge changes in the way we work, it is high time that organisations start leveraging the significant benefits of virtual workstations and unleash the imagination of creative professionals by unfastening them from the traditional IT infrastructure.

*Panda is Head of Products & Services, Yotta*

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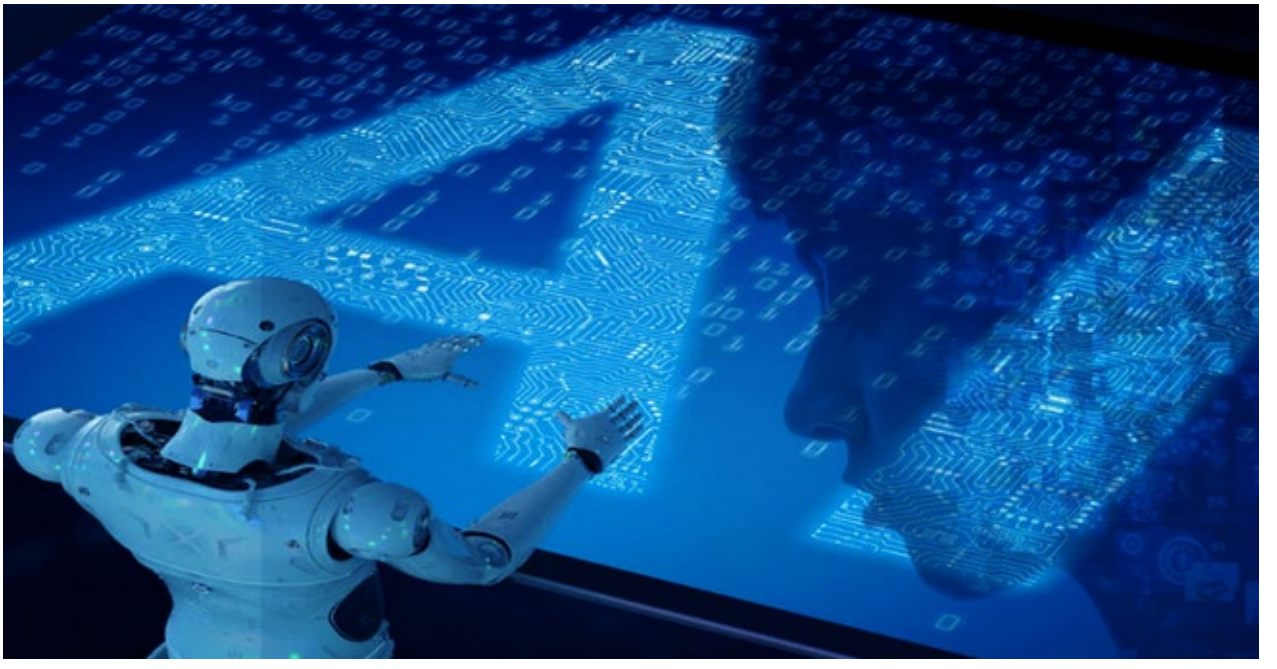
# Essential lessons for **tomorrow's business**

As AI and robotics are shaping the future of business, B-schools are making space for them in their curriculum to equip tomorrow's managers and entrepreneurs



For sometime it was just artificial intelligence (AI) or, more specifically, data sciences which had made their way into every field including in B-schools in India and abroad. Now it's not just AI but also robotics, internet of things (IoT), blockchain and big data analytics which along with AI are finding its way into the B-school curriculum. AI and robotics can make businesses more efficient and we are witnessing it in our daily tasks. Now is the age of AI and robotics, which have been made possible because of the past

> BUSINESS MODELS THAT INTEGRATE MARKETS AND TECHNOLOGY SUCH AS AI AND ROBOTICS ARE EMERGING AS NEW FACTORS IN ENTERPRISE LEVEL INNOVATIONS.

> SOME WELL-KNOWN B-SCHOOLS INCLUDING THE IIMS, APART FROM THE IITS, DO OFFER COURSES IN AI AND ROBOTICS AND MANY MORE ARE JOINING THE RACE.

and present research in this field. AI and robotics have taken a boost and there are various reasons behind their success, such as availability of high computation power, advances in statistical models and also the endless availability of data storage which finally results in an ocean of data which we all know by the term 'big data'.

The field of AI and robotics is very dynamic; new updates and developments happen each day. The aspiring managers and engineers or so-called millennials have seen this trend growing; so have academicians of B-schools. As a result, according to experts, the trend of introducing 'AI along with robotics' in the B-school curriculum is only going to increase. On the other hand, existing managers and engineers too foresee that their current skills would get outdated in near future, which means job losses. B-schools will also see tough competition among themselves.

The way ahead for aspiring managers, engineers and B-schools is the same: Darwin's theory of 'survival of the fittest'. This is the age of innovation and change, or from business perspective, this is the age of startups. New startups do and should bring some innovation in their products and services so that they survive for longer. There are such examples in India that have inspired many but very few could succeed. Taking such inspiration, aspiring managers in AI and robotics do think beyond campus placements to become successful entrepreneurs. They do have some innovative ideas which they dream to implement in the real world but would require business skills as well as technical skills.

The research has revealed that AI and robotics develop innovation based on three elements: technology, business model and market for characterising the knowledge-based economy and innovation. Business models that integrate markets and technology such as AI and robotics are emerging as new factors in enterprise level innovations.

Some well-known B-schools including the IIMs, apart from the IITs, do offer courses in AI and robotics and many more are joining the race. These institutes believe that together AI and robotics will offer new opportunities in future and will lead to notable change in businesses and commerce. This means at the business level these B-schools will produce managers who should be skilled enough to perform different tasks, for instance, developing, customising and using AI bots, unveiling the patterns of data which gets produced with every action of the end user, advance data analytics and so on. This will mean improved services to the customer, improved product design, delivering meticulous insights and much more.

Some elite B-schools in India and abroad have keenly observed how disruptive technologies such as AI, IoT, big data analytics, blockchain and robotics have changed the ways businesses operate. Out of all these technologies, AI has seen the biggest boom and that is reflected in the curriculum of these B-schools all these years. At this stage and in future AI and robotics hold immense potential for pharma companies, healthcare, agriculture, logistics and digital marketing. Academicians of the B-schools are trying to figure out the best fit of such technologies in their course curriculum. It is expected that the young managers who graduate out of these B-schools would have the updated skills of AI and robotics. This will be highly important in becoming a successful entrepreneur with AI business innovations, innovative leader or change manager in the futuristic companies.

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# Let's take the game **to the next level**

In these stay-at-home days, gaming has emerged as a popular choice for entertainment. With a right policy environment, the sector is set for spectacular

The workforce of this country is looking for new entertainment options as the conventional entertainments such as movie, concerts and theatres are getting limited and alternative mediums such as TV and OTT are clearly struggling to create new content. As the only media sector where both creation and consumption are peaking, gaming has come out as a clear favourite. Even before the pandemic, online gaming was on the growth path driven by India's evolving socio-economic and demographic factors,

> AS PER DELOITTE INDIA'S TMT PREDICTIONS 2021, THE ONLINE GAMING SECTOR IS EXPECTED TO GROW TO USD2.8 BILLION BY 2022 AT A CAGR OF 40%.

> CLOUD GAMING IS A GROWING TREND AS GAMERS ARE FREED FROM THE NEED OF HAVING HIGH-END HARDWARE WITH EASY ACCESSIBILITY FROM ANYWHERE WITH ANY MOBILE DEVICE.

improving disposable income, affordable smartphones, increased adoption of micropayment solutions, and a large internet user base. The pandemic has given a boost to the gaming industry in India.

There is a steady flow of both local and foreign investments with around USD450 million pumped in to around 400-odd startups between 2014 and 2020. As per Deloitte India's TMT predictions 2021, the online gaming sector is expected to grow from USD1.1 billion in 2019 to USD2.8 billion by 2022 at a CAGR of 40%, strengthening the sector's share of total media and entertainment industry by 4-5%.

Cloud gaming is a growing trend as gamers are freed from the need of having high-end hardware with easy accessibility from anywhere with any mobile device. Technologies such as 3D graphics, voice recognition, gesture controls, artificial intelligence, high-definition displays, virtual reality, augmented reality and wearable gaming devices is enhancing the overall gaming experience. Technology has helped create trust and a secure gaming experience by keeping their information secure from any cyber breaches. Data analytics is also extensively used in gaining insights which in turn will improve customer retention, inside-app purchases and enhance over all experience.

Gaming players have embraced a combination of revenue models based on target customers. In addition to upfront payment models, there are models with a low initial cost and have a premium charged as the gamer progress through levels in the Freemium, shareware and in-app purchase models. Other revenue models include subscription-based and advertising-based ones. Options to work on a revenue-sharing model with other industries such as apparel (interms of in-store branding) or telecom players (with customised data plans) are also being considered.

India does not have one single law for the gaming but have state-wise laws mostly based on a guiding principle of whether the game is of skill or of chance with a very thin line separating them. One needs to tread very carefully when it comes to games of chance. The last thing any gaming company would want is to be implicated for attracting teenagers when it comes to games of chance. Equally important would be to consider privacy concerns of the gamers. Some steps were taken in the right direction in terms of regulating this industry.

The NITI Aayog has called for a self-regulatory body to standardise regulations for the skill gaming industry. The recently announced draft of a national animation, visual effects, gaming and comics (AVGC) policy is also one such example. Expectations from the industry, highlighted by the All India Gaming Federation (AIGF), include countrywide standardised regulations for the skilled gaming industry. This will not only help in removing the threat from illegal operators but also help the government with more tax inflows. Also, with the advent of multiple sports leagues for cricket, football, kabaddi and badminton,there is a steady increase in popularity for Fantasy Sports in this country which are considered more a game of skill than a game of chance.

With the vaccination drive catching up and the economy on the recovery sprint, the gaming industry will have to capitalise on the boost received from the pandemic to create newer revenue models by using state-of-the-art technologies to provide a secure and enhanced gaming experience. Besides pure entertainment, a few areas gaining popularity relate to team building using social media, edutainment and marketing services.

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**MATHEW CHANDY**
Managing Director,
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# IF YOU REALLY WANT TO USE TECHNOLOGY, USE IT WELL

*Technology is both a muscle and a layer of foam. To find strength and comfort, one needs to use it often and use it the right way.* ***Mathew Chandy****, MD, DuroflexPvt. Ltd, flips the way enterprises think of technology. Chandy is a law graduate from the National Law School, has had entrepreneurial stints in the restaurant space, and is working passionately on sleep-health as a sleep evangelist. He believes that the responsibility of technology impact should be shared by both sides of the bed – IT and business teams alike. He shares insight into how technology is redefining the company's factories, customer channels and offices. Excerpts from his interview:*

**What has the last year been like for your business? Has it created more room for technology?**

We are at a unique intersection of health and lifestyle now. People are spending on their homes because they are spending so much time there. Sleep has also shifted into a new connotation now – it is a de-stressor and a health-enhancer. We are, hence, perceived as a health-enhancing product. We have gained a good traction in the last few months. Some of it was pent-up demand but a lot of it was also a new surge of demand due to rise in health-awareness. We have created smart marketing and relevant products around hygiene and health. The industry is getting slightly more organised than before. That is why technology is helping a lot on this new growth curve.

**How? What major pieces constitute your technology stack so far?**

We have certainly been investing in technology over all these years. Like digitisation of supply chains, the SAP ERP implementation (which completes about three years now), DMS software, Salesforce solutions, order-booking and e-commerce solutions, Tableau for BI, analytics and dashboards, among others.

**Is anything new being considered? Are you conducting any experiments?**

We are evaluating technologies for supply chains and demand forecasting. The industry has been hit with a lot of unprecedented demand fluctuations and that is a major pain-point in this sector (that has seen similar challenges time and again from demonetisation to GST to COVID-

> TECHNOLOGY HAS TO UNDERSTAND BUSINESS AND OPERATIONS – AND VICE VERSA. IF YOU TRY TO IMPLEMENT TECHNOLOGY IN A SILO, THAT'S A BAD IDEA.

19 phases). We are also looking into logistics-based optimisation tools because the products in this industry are bulky and heavy so there is a lot of scope to cut costs through transport-level optimisation. We are also dabbling in data science and streamlining different parts of our business (yield management, route optimisation, contingency planning etc.). We aim to make the mattresses more personalised and we have a R&D team for that.

**What about the customer-facing parts? You have pioneered some notable experience stores in the industry.**

Yes. We are using some solutions for digital marketing. We also use analytics and e-commerce pieces. But at our experience stores, the emphasis is on experience. The touch-and-feel part has to be rich, meaningful and value-adding. After that, we support the flow with video elements or interactive features. Some day we will also bring in Augmented Reality (AR). But we believe in phygital instead of purely-digital experiences.

**Don't some of these investments bring huge costs and uncertainty to begin with?**

Yes. Some technologies do. Like personalisation. But that's why we have R&D to support us. Areas like AI have to be at a given scale to actually create a positive effect on costs but till they reach maturity they would be niche technologies. Technology is always a little disproportional to returns – initially. But it is still worth it.

**Anything on de-densification of factories and offices?**

Yes, we are using RFID and contactless solutions in most of our plants.

**What have you learnt, so far, from all these decisions and experiences with technology?**

A lot of lessons come to my mind. But the main one is that if you really want to use technology, use it well. Get business and operations people to really embrace technology. Get people to 'want to' use a tool. Your technology has to understand business and operations – and vice versa. If you try to implement technology in a silo, that's a bad idea. That kind of investment always tends to fail. And that is not a failure of technology. We have also seen some failed experiments but we have bounced well with successful implementations.

**How did you crack the barriers?**

The dilemma is always 'should technology follow the business or vice versa'. Most organisations try to customise a solution, which is unnecessary, at times. For instance, why customise SAP? Especially in an industry like ours where processes are immature, non-standardised and fragile? So choose the right technology if you are weak on the process parts. That's when your business should adapt to a robust technology template. We find that it is more important to optimise processes to the technology. Technology here is a good way to introspect about your strengths and weak spots. For us, learning in a constant way, and in an objective manner, is paramount. That's why we have created Meta teams. These teams understand the business with an inside view, but they zoom out and look at it with an outside view. That helps a lot during technology adoption.

**Are you excited about Industry 4.0?**

It is both exciting and challenging. We are from a space that is not standardised – a lot of our industry is still unorganised. That makes industry 4.0 a little inapt or early. We are excited because organised and smart players can actually pull it off. The challenge is that it will not be easy. In fact, Industry 5.0 would be more about personalisation instead of mass automation. That will be very different from 4.0. It would have a pronounced level of localisation, individual approach and 3D printing etc. That would be apt and exciting.

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# IBM Watson to explore **how AI can mitigate advertising bias**

The research aims to understand factors of bias in advertising and how AI can help in creating better messaging, and improving campaign impact


The advertising industry is undergoing a major transformation, with changes to privacy regulations and increased demand for transparency. This has fueled the emergence of AI as the industry's new technology backbone, so much so that IBM Watson Advertising has decided to conduct a research that will apply its open-source AI technology.

The initiative is aimed to better understand how prevalent unwanted bias is in advertising, while simultaneously laying the foundation for its potential mitigation. "The work aligns with IBM Watson Advertising's overarching mission to make AI the catalyst for improving solutions, services and trust in the advertising ecosystem," the company said in a press release.

The advertising industry is undergoing a major transformation, with changes to privacy regulations and increased demand for transparency fueling the emergence of AI as the industry's new technology backbone. As brands rebuild amidst this transformation, the timing is ideal to address the persistent problem of unwanted bias in advertising. A study conducted by the Geena Davis Institute on Gender in Media found that male characters appeared in advertisements 12% more than females even though women-led and gender-balanced videos yielded 30% more views than other videos, revealing a demand for more inclusive content.

"We find ourselves at a moment in history where a discourse on socioeconomic inequalities is dominating the national agenda and compelling action," said Bob Lord, Senior Vice President, Worldwide Ecosystems at IBM. "Our hope is that AI can be the catalyst for reducing unwanted bias in advertising," he added.

Unwanted bias in advertising has the potential to negatively impact consumers who may miss out on economic opportunity or feel targeted based on stereotypes, while also negatively impacting brands that may experience poor campaign performance. "The aim of the IBM Watson Advertising research is to drive a deeper understanding of the factors leading to unwanted bias in advertising and how AI can help in spanning audience segmentation, creative messaging, performance optimisation and campaign impact," the company stated.

Armed with this information, marketers and IT vendors may be able to develop a roadmap for the responsible use of AI to reduce unwanted bias to create and execute campaigns effectively.

According to the company, IBM Watson Advertising will work with researchers from IBM Research to conduct this study in partnership with the Ad Council and potentially other leaders across industry. "Collective bias has been prevalent in our industry for far too long, and the need to study its origins and impact is critical so that we can effectively work together to create progress," said Lisa Sherman, President and CEO at the Ad Council.

IBM also revealed that data from the Ad Council's "It's Up to You" COVID-19 Vaccine Education initiative will be used for this initial research phase. The AI Fairness 360 toolkit will be used to examine the data and determine whether there are ways AI can be useful to help mitigate discrimination and bias.

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# From stress test to tech test: **Pandemic lessons learnt**

While the COVID-19 pandemic created several problems for businesses, it also compelled consumer goods and services companies to get ready for the digital future

Was the pandemic all bad news? Or was it that much-needed stress test or push for businesses to develop a sharp technology focus? And now that the world is trying to recover from the crisis, how can we get ready for the new future, which is on the horizon and quite different from what it expected? And when will there be no room left for enterprises that cling to the past?

A prominent think tank discussed some of these questions at a webinar organised by Dataquest in association with Accenture on 'Technology Vision for Consumer Goods and Services'. It turns out that the recent few months have not only been tough but also a stress test, a catalyst and an accelerator of sorts for businesses.

Anil Chopra, VP, Research and Consulting, CMR opened the discussion with questions around the real triggers and impact areas of digital transformation. The panel shared a number of lessons and outlook points – all of which were hands-on and quite a compass for business leaders who want to stay ahead of the curve.

**WHAT'S NEW, WHAT'S CHANGING?**

"Ninety-nine percent of the executives report that the COVID-19 pandemic created an unprecedented stress test for their organisations," said Manish Gupta, MD and Client Group Lead - Products, Accenture in India. Citing an Accenture survey report, he added that for 63% of the executives, the pace of digital transformation is accelerating. In addition, 53% have scaled up cloud technologies in response to the COVID-19 crisis. Gupta illustrated the case of enterprises that have deployed creative solutions to tackle the pandemic-induced challenges. The survey results also show a similar trend where 40% of the enterprises use digital twins for product innovation, and 63% feel that data management will become more transparent with blockchain enablers.

Another point worth noting is that 'remote work' is not seen as an accommodation but an advantage. "Almost 80% of CGS executives agree that a remote workforce opens up the market for difficult-to-find talent and also expands the competition."

ALMOST 80% OF CGS EXECUTIVES AGREE THAT A REMOTE WORKFORCE OPENS UP THE MARKET FOR DIFFICULT-TO-FIND TALENT AND ALSO EXPANDS THE COMPETITION.

— **Manish Gupta,** MD & Client Group Lead - Products, Accenture, India

TECHNOLOGY BARRIERS FOR ADOPTION OF NEW TECHNOLOGIES CANNOT BE IGNORED. JUST LIKE PROCESS CHANGE, GETTING USED TO A TECHNOLOGY INTERFACE HAS ALWAYS BEEN CHALLENGING.

— **Narendra Agrawal,** Global CIO, Dabur India Ltd

DIGITAL IS ALSO BEING SEEN AS A SAFE AND FAST ALTERNATIVE. THE LINE BETWEEN PERSONAL AND BUSINESS/ RETAILER EXPERIENCE IS CHANGING TOO.

— **Vaidyanath Subbaraman,** Director, Global Head, Technology, Unilever

IT IS THE MAIN CHANGE THAT THE PANDEMIC HAS ENFORCED. LOGISTICS HAS BEEN DISRUPTED A LOT DURING THIS TIME AND THAT HAS LED TO NEW FORCES. WE TRY TO MANUFACTURE AT THE POINT-OF-USE NOW.

— **R N Mohanty,** President Technology, Pidilte Industries-Parekh Group of Companies

There is no fundamental change in behaviour but the pandemic has pushed the changes that were already being introduced, such as consumer focus on health and sustainable brands. "How consumers receive communication has changed as we see new digital mediums and OTT platforms becoming mainstream. There is little attention span and an expectation for personalisation." reasoned Narendra Agrawal, Global CIO, Dabur India Ltd.

Vaidyanath Subbaraman, Director, Global Head, Technology, Unilever, underlined the digital element of expanding consumer reach. "Digital is also being seen as a safe and fast alternative. The line between personal and business/retailer experience is changing too."

All of our habits as B2C customers are trickling into the B2B space, echoed Suhas Devaraju, MD-Consumer Goods & Services, Accenture. "The operating models that exist today are also changing. The traditional distributor model is evolving into four different archetypes – especially hyper-local models."

R N Mohanty, President, Pidilite Industries, also accentuated the aspect of localisation. "It is the main change that the pandemic has enforced. Logistics has been disrupted a lot during this time and that has led to new forces. We try to manufacture at the point-of-use now. This is another form of localisation so that we can address a number of distribution issues. We have to depend on local resources, so the shift from global to local is another strong change because of the pandemic."

**SHOULD IT BE TAKING NOTES?**

It is important to understand that while IT will lead the change, the entire organisation needs to rally through to enable it. Democratic data platforms, micro services, investments in skills and security, collaboration, data protection, and right architectures that do not restrict but facilitate growth can all be used to catalyse the progress in order to execute the digital transformation plans in a gainful way.

ALL OF OUR HABITS AS B2C CUSTOMERS ARE TRICKLING INTO THE B2B SPACE. THE OPERATING MODELS THAT EXIST TODAY ARE ALSO CHANGING.

— **Suhas Devaraju,** MD, Consumer Goods & Services, Accenture

Agrawal from Dabur India talked about reducing tech dependencies. "Technology barriers for adoption of new technologies is another area that cannot be ignored. Just like process change, getting used to a technology interface has always been challenging."

As to barriers, Subbaraman chimed in and explained that change management at the grassroot level should be leveraged well. "Mindset change is also important. Doing something well for decades is not an excuse for not being in rhythm with the future. Another thing to pay attention is the fact that technology was always built in a permanent beta phase. Now we need to build for scale and value. Standardisation – seen in new technologies – is an encouraging part. We need that too."

Moderating the session, Chopra spurred the panel towards an interesting food for thought: what will stay permanent?

Gupta responded to this question by talking about ongoing innovation. "Everything will change. Businesses should keep in mind that change and disruption would be a constant factor now." Other panellists also chipped in and mentioned the need for agility, strategy and resilience as an ongoing imperative.

**ARE WE READY?**

One of the most significant results of the survey is that 91% of the executives feel that capturing tomorrow's market will require their organisation to define it first. Accenture's insights into the moods and fears of business leaders do provoke a lot of questions. The results reveal that companies have learnt that leaders do not wait for a 'new normal', rather they build it themselves. Big changes today require bold leadership and prioritisation of tech, says the survey report. And it's not just about fixing the business but upending convention and creating a new vision for the future.

Accenture's Technology Vision 2021 outlines that 77% of the executives surveyed from the consumer goods and services industry say that their organisations have faced a moderate to complete supply chain disruption. Thus, implementing multiparty systems is no longer seen as an ambitious undertaking but an urgently needed solution. Remarkably, multiparty systems can allow organisations to offer transparency and accountability to their customers, create new value, and make ecosystems resilient and adaptable. Additionally, where enabled by blockchain, 63% of the executives agree that multiparty systems will make data management more transparent.

Looks like, as we move into the future, financial success will only be one measure of leadership. Accenture contends that it is a unique moment to rebuild the world better than it was before the pandemic.

The overall sentiment at the panel aligned with Accenture's prognosis that the past year has poked holes in long-standing norms on how companies operate and how people live. Indeed, the year 2020 has ushered in the need for a different path to light.

A major distillation from the panel's conversation was how digital transformation is not just the IT department's responsibility but the business team's responsibility as well. This iterates the need for businesses to continue to have a clear-eyed perspective and sharp focus on their expedited digital transformation. Only then can they master the art of adapting to change and become the new leaders. After all, as Accenture's insights stress, there is no leadership without technology leadership.

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# Rise of SaaS in the **Indian tech journey**

Industry experts discuss how organisations can leverage SaaS in the post-pandemic world presenting operational challenges as well as innovation opportunities

While technology has always disrupted markets and business models, the pandemic has ushered in an unprecedented level of change, including the way businesses are run and services delivered. As we see an increasing push towards accessing everything as a service, Dataquest along with BMC Software organised a webinar on 'Rise and Rise of SaaS' and discussed in detail the technology trends and opportunities. The webinar saw industry experts deliberate on how organisations can accelerate their tech journey to become an autonomous digital enterprise using intelligent Software-as-a-service-(SaaS) based solutions.

BMC is a global leader in software solutions for IT businesses. Deepak Singla, Director Sales – India, BMC Software, shared some of the reasons why organisations are migrating to SaaS. "Scalability, reduced costs, faster innovation, security and compliance managed by SaaS vendors, access and flexibility are the major factors. Moreover, as every traditional organisation depends on data centers, SaaS has helped them in expanding data center capacity and reducing overheads and resources. Now, they can focus on innovating services. SaaS has also helped organisations enable their employees to work from anywhere, with better accessibility and ability to drive adoption."

In its adoption of SaaS, BMC introduced an Artificial intelligence- (AI) based platform, BMC Helix, which is a convergence of IT service management and IT operations management experiences. The platform allows continuous automation and provides consumer-grade experience to over 1,600 companies globally.

The shift towards SaaS has largely been driven by the COVID-19 pandemic with organisations facing the pressure to adapt to the new reality at a rapid pace. Manjeet Singh, Senior VP, RAH Infotech, said, "Last year, we were not ready to accept COVID-19. The number of casualties kept rising, but not around us.

EARLIER, WE USED TO ASK FOR WFH. NOW, IT IS WORK FROM ANYWHERE. THAT HAS CHANGED THE GAME AND WE HAVE TO DELIVER BETTER SERVICES TO CUSTOMERS AND PARTNERS.

— **Raju MS,** CTO, Shriram Life Insurance

PUBLIC CLOUDS PROVIDE HUGE RESOURCES TO PROTECT AGAINST THREATS. ALMOST USD20 BILLION OF THE HIGHLY-REGULATED BANKING INDUSTRY MONEY IS ON CLOUD.

— **Sunil Thakur,** Country Director – India, BMC Software

SaaS NEEDS TO BE IMPLEMENTED IN A PHASED MANNER. A PROPER PLAN SHOULD BE IN PLACE TO INTEGRATE THE CLOUD, AND SECURITY SHOULD BE ADDED AS REQUIRED.

— **Srikanth Subbu,** CISO, TVS Motor Company

LAST YEAR, WE WERE NOT READY TO ACCEPT COVID-19. BUT TODAY, WE ARE FEELING THE SCARINESS. SAME IS THE SITUATION IN DATA CENTERS, AS ATTACKS HAVE BEEN REGULAR.

— **Manjeet Singh,** Senior VP, RAH Infotech

Today, we are feeling the scariness as this is happening everywhere around us. Same is the situation in our data centers, as attacks have been regular. To address such cyber security issues, RAH offers end-to-end solutions wherein the user has to bypass gateway, geofencing, firewall, ADC, etc. on the data center. However, cyber security involves various layers, such as storing data and then backing it up. Therefore, you need to perform asset monitoring across all the layers."

**SEAMLESS USER EXPERIENCE**

Sunil Thakur, Country Director – India, BMC Software, stressed on the importance of delivering a seamless user experience in today's world. "Besides technology, it is also about scalability and elasticity. IT organisations have understood this and shifted their focus to app management." In this endeavour, Thakur said that organisations are using private cloud solutions that have become cheaper. He, however, noted that moving data outside the organisation calls for security. Thus, risk mitigation is important.

Raju MS, CTO, Shriram Life Insurance, added that when companies move to cloud, they wonder whether they will get the comfort as before. "People are still experimenting small, as they are scared about putting the entire app on the cloud. We are working on hybrid cloud, and looking to move some of our apps there. Critical apps will, however, remain local."

Reiterating on the aspect of security and SaaS, Thakur said, "Public clouds provide huge resources to protect against threats. Almost USD20 billion of the highly-regulated banking industry money is on cloud. There is compliance as well, especially by third parties, owing to GDPR, etc."

Srikanth Subbu, CISO, TVS Motor Company, further explained these security aspects. "Visibility and tracking of cloud is required, especially as attacks have increased in recent times. Privileged access is another area that

> SaaS HAS HELPED ORGANISATIONS IN EXPANDING THEIR DATA CENTER CAPACITY AND REDUCING OVERHEADS, AND RESOURCES. NOW, THEY CAN FOCUS ON INNOVATING SERVICES.
>
> — **Deepak Singla,** Director Sales – India, BMC Software

needs better security solutions. There should be proper controls in place along with regular assessment."

Thakur pointed that organisations need to look at the planning stage. "We conducted a study on RoI for BMC Helix, and the findings were amazing. If SaaS is implemented properly, RoI can be 354%. A lot of things get regulated when you move to SaaS, including increase in efficiency."

**ENTERPRISE AND SaaS**

Should enterprises adopt SaaS in their mission-critical list? Subbu explained that mission-critical operations are required in production and manufacturing, where time and productivity should be managed well. This can help in reducing troubleshooting.

SaaS has started to take over the cloud computing market and is constantly growing. "For every organisation, digital transformation is important. New versions and technologies are coming into the pay-and-use SaaS model, which will bring greater customer satisfaction. All organisations may follow this trend in one or two years," said Raju.

Does SaaS require a big-bang rollout or a phased approach? According to Subbu, it needs to be implemented in a phased manner. "A proper plan should be in place to integrate the cloud, and security should be added as required. Optimising the multi-cloud capacity is also important." Raju agreed that the phased approach is preferable for organisations. "It provides confidence to the developers and management. Else, there can be some challenges." Thakur also supported this approach. "Some organisations may still use ERP. Moreover, cost consideration has to be kept in mind, as it can be difficult for organisations to move their investments from IT to another area."

Regarding a hybrid approach, Thakur said organisations are moving from an infrastructure to an application point of view. "Multi-cloud is very popular these days. The hybrid approach is more about how the customer is managing the organisation." Thakur added that by 2025, majority of the workforce will be served anywhere, anytime. "We should take advantage of the new-age technologies that are coming in to serve customers and employees."

Raju also acknowledged the challenges and opportunities of the new normal. "It is difficult to migrate to any new system. Earlier, we used to ask for WFH. Now, it is work from anywhere. That has changed the game and we have to upgrade and deliver better services to customers and partners."

Subbu agreed that organisations are moving to the future and everything is WFH. "A lot of areas are now digitalised. There are several connected vehicles as well. Technology is improving and so is computing. The SaaS model is expected to evolve in 5-10 years." Raju also noted that the SaaS model will move towards security, AI, machine learning (ML), and digital transformation, etc., for faster delivery of services. "Once there is clarity, all organisations will move to SaaS. Data privacy is also being addressed in this regard."

Thakur said that agility, customer centricity, and reliance on data are the three key factors for any organisation to be successful in the current times. "Today, transforming the organisation and being ready for the future is on top of the CEO's agenda. The reliance on technology is now extremely high, due to which most organisations are going to be technologically-driven in the near future."

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# IIT Kanpur, SGPGI Lucknow to set up **healthcare robotics CoE**

IIT Kanpur has signed an MoU with SGPGI, Lucknow to accessible healthcare through indigenous solutions. The institutes will set up a Centre of Excellence (CoE) in telemedicine and healthcare robotics. The two organizations have also agreed to establish an R&D centre for promoting telemedicine aided by ICT and 5G, and point-of-care testing and diagnostics, the institute stated in a press release.

As part of the MoU, IIT Kanpur and SGPGI, Lucknow will also be setting up an integrated network of mobile health vans in rural areas and smart kiosks in urban locales to ensure last-mile connectivity and ascertain availability of emergency healthcare services.

Commenting on the initiative SGPGI, Lucknow Director Prof. RK Dhiman said, "We will jointly launch courses in various fields of digital health which is not available in any educational institutions in the country. Current Corona pandemic has made telemedicine a very useful tool to bridge the gap between care providers and citizens. This will promote entrepreneurship and develop a rural health system which can be deployed far and wide to strengthen the health system."

Highlighting the role of IIT Kanpur, the press release said that it will be developing portable IoT-enabled health care systems along with point-of-care testing and diagnostics. The institute will also be designing customised mobile vans and kiosks equipped with AI-based diagnostics and integrating multi-lingual avatars with systems to give patients the feel of the presence of a doctor or a care giver. The avatars would especially be essential for patients with mental health disorders and elderly care.

# Akamai unveils ML-driven **API protection platform**

Akamai Technologies has announced platform security enhancements to strengthen protection for web applications, APIs, and user accounts. The new platform security enhancements includes Adaptive Security Engine for its web application and API protection (WAAP) solutions. It also includes Kona Site Defender and Web Application Protector that automatically adapts protection against attacks, while reducing the effort to maintain and tune policies.

The company stated that it had added Audience Hijacking Protection to Akamai Page Integrity Manager. This enables detection and blocking of malicious activity from client-side attacks using JavaScript, advertiser networks, browser plug-ins, and extensions that target web clients. "Our latest platform release is intended to help resolve the tension between security and ease of use, with key capabilities around automation and machine learning specifically designed to intelligently augment human decision-making," said Aparna Rayasam, Senior Vice President and General Manager, Application Security, Akamai.

Besides, Bot Score and JavaScript Obfuscation have also been added to its bot manager, laying the foundation for ongoing innovations in adversarial bot management, including the ability to take action against bots aligned with corporate risk tolerance. "Akamai Account Protector is a new solution designed toidentify and block human fraudulent activity like account takeover attacks," the company stated in a press release.

# Google offer cloud migration support **for VMware**

To support enterprises migrate their VMware environments to cloud, Google Cloud has announced the availability of Google Cloud VMware Engine in India. The service delivers a fully managed VMware Cloud Foundation stack for cloud migration on Google Cloud's infrastructure. "Organisations can migrate their on-premises workloads to Google Cloud by connecting to a dedicated VMware environment directly through the Google Cloud Console," the company stated in a press release.

Google Cloud VMware Engine provides a hyper-converged architecture that enables organiations to run and scale their infrastructureto power enterprise workloads that would traditionally be managed on-premises. Enterprises can also modernise existing IT investments and leverage on-demand self-service provisioning of VMware private clouds with integrated connectivity to Google Cloud services such as BigQuery, and Cloud Operations, etc.

"This partnership to bring Google Cloud VMware engine to Indian enterprises will enable them to unleash the true potential of adopting a cloud first strategy," said Bikram Bedi, Managing Director, Google Cloud India.

The service provides a native VMware platform, where one can continue to use tools like disaster recovery, backup, monitoring, security etc. with no changes. It also provides privileged escalation that allows IT to modify and customise VMs for a limited time. This simplifies the migration process by allowing IT to continue to run the same applications in the cloud as they do on premises.

"With this partnership our customers can deploy Google Cloud VMware Engine and seamlessly migrate their existing VMware-based applications to Google Cloud," said Pradeep Nair, Vice President and Managing Director, VMware India.

# Toyota logs on to Nutanix cloud **to build it VDI environment**

Nutanix has announced that Toyota Motor Corp has adopted its cloud platform to build a virtual desktop infrastructure (VDI) environment that can run 3D CAD software, enabling its Engineering Design Group to work from anywhere.

The company that had introduced work-from-home program was facing varying degrees of adoption among different departments and its Engineering Design Group was not able to support a remote-work model for all employees. Team members had to work from their physical workstations in the office whenever working on design projects using 3D CAD software. In addition, the DX Promotion Division was facing challenges with workstation maintenance and procurement costs.

To solve the problem, Toyota decided to adopt hyper-converged infrastructure (HCI) and build a VDI environment that could support high-performance applications and run 3D CAD software. The Nutanix cloud platform had the ability to support Virtual Graphics Processing Unit (vGPU) functions required to render 3D graphics in HCI virtual environments. Nutanix's flexibility and scalability were important factors that helped the teamrespond to changing business demands.

The Nutanix cloud platform enabled a VDI environment for approximately 1,000 devices. Employees in the Engineering Design Group also said the move enabled them to work in a new way when they were forced to work from home due to the spread of COVID-19.

"Moving forward, our plan is to roll out similar systems not only to Toyota Motor but also to Toyota group companies," said the DX Promotion Division's Masanobu Takahisa. "We hope to also support CAE software on the VDI environment to continue promoting work-style reform in the Engineering Design Group."

# Ambuja Cements, ACC announce **Industry 4.0 initiative**

Holcim Group's India companies, Ambuja Cements Ltd and ACC Ltd, have announced investments in Industry 4.0 under its 'Plants of Tomorrow' program. This program aims to make their manufacturing more efficient through better plant optimization and higher plant availability. The initiative is part of Holcim's 'Building for Growth' strategy that the group had launched in 2019.

The four-year programme implemented by Holcim aims to create a global network of over 270 integrated cement plants and grinding stations in more than 50 countries by applying automation technologies and robotics, artificial intelligence, predictive maintenance and digital twin technologies to the entire production processes.

Sharing details of the India plan, Neeraj Akhoury, CEO India Holcim, and Managing Director and CEO of Ambuja Cements said: "The project will lead to transformative outcomes in terms of operational and financial gains and also make cement manufacturing here environmentally sustainable and create a safe work environment."

A "Plants of Tomorrow" certified operation promises 15-20% more operational efficiency compared to a


conventional cement plant. The other part of its initiative is Performance and Collaboration Tool, which focuses on operational decisions based on data about weekly operations, monthly performances, projects and actions. Besides, it also has remote troubleshooting that uses Smart Glass Technology, a two-way tool that ensures timely and expert support to plants. Digital Eye is another technology utilised by both companies to monitor factory and plant operations using drones and video analytics to operate effectively and increase safety.

# AJNIFM, Microsoft to build **AI and emerging technologies CoE**

The Arun Jaitley National Institute of Financial Management (AJNIFM) and Microsoft have announced a partnership to build an artificial intelligence (AI) and emerging technologies Center of Excellence (CoE). The collaboration seeks to explore the role of cloud, AI,and emerging technologies for transforming and shaping the future of public finance management in India.

The CoE to be set up at AJNIFM will serve as a central body for research, AI scenario envisioning, and technology-led innovation. The two organisations will jointly explore cases of emerging technologies in finance and related areas across central and state ministries and public sector enterprises. According to a Microsoft press release, the company will work closely with AJNIFM to define the future of public finance management in India, providing the technology, tools, and resources to build a strong ecosystem of partners, upskill government officials and build thought leadership.

The two organisations will also work on a capacity building programme for senior government officials in associated ministries, departments, and financial institutions. "As part of this skilling effort, public sector officials will be trained on the application of emerging technologies in finance management to address potential risks like money laundering, use of machine learning models for decision making, and the role of responsible tech in finance," the company stated.

Speaking about the kind of research that the partnership will help AJNIFM undertake, Prabhat Ranjan Acharya, Director, AJNIFM, said: "The ambit of research studies will seek to address key challenges in public financial management, particularly expenditure management, revenue leakages, and use of emerging technologies in preventing money laundering. It will also help study existing DBT system and potential of application of emerging technologies including machine learning models in decision making."

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