

**Top 5 Fantasy Gaming
Apps Of 2020**



**Covid Sees Breaking Of Theatrical Window
With Direct-To-Digital Film Releases**

₹125

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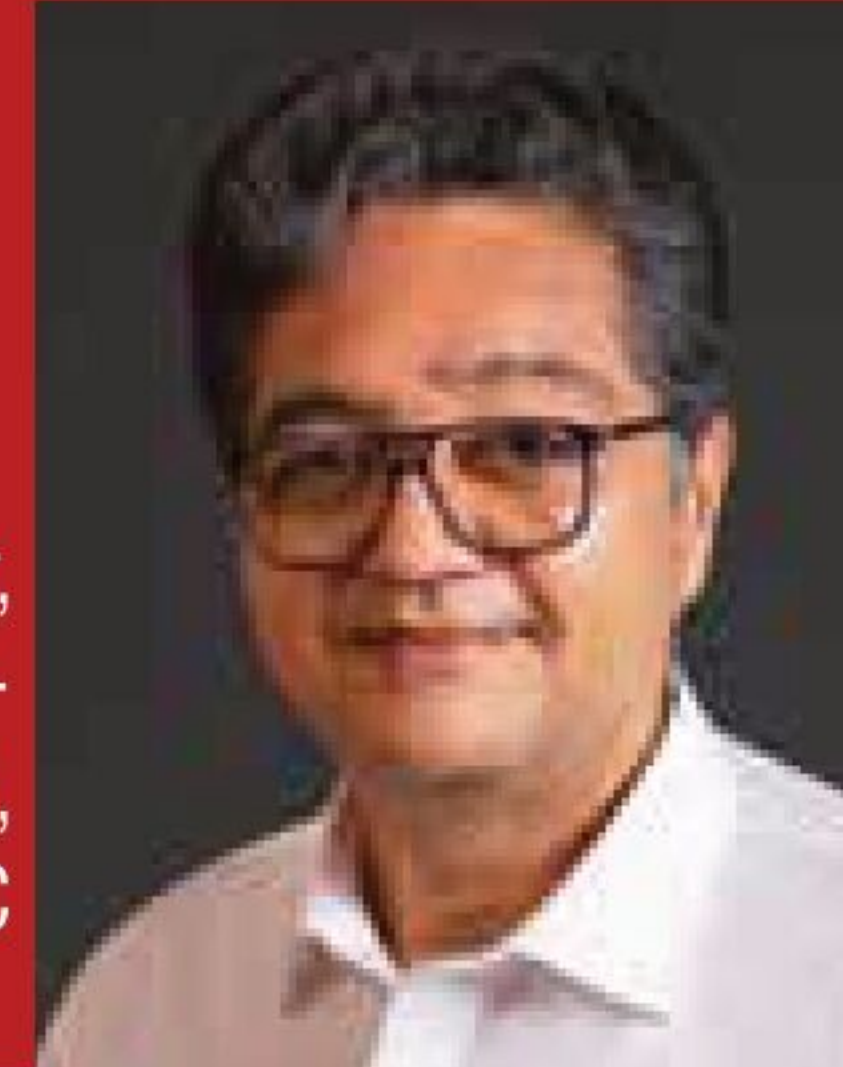
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— Sudhir Nayar,
Managing Director -
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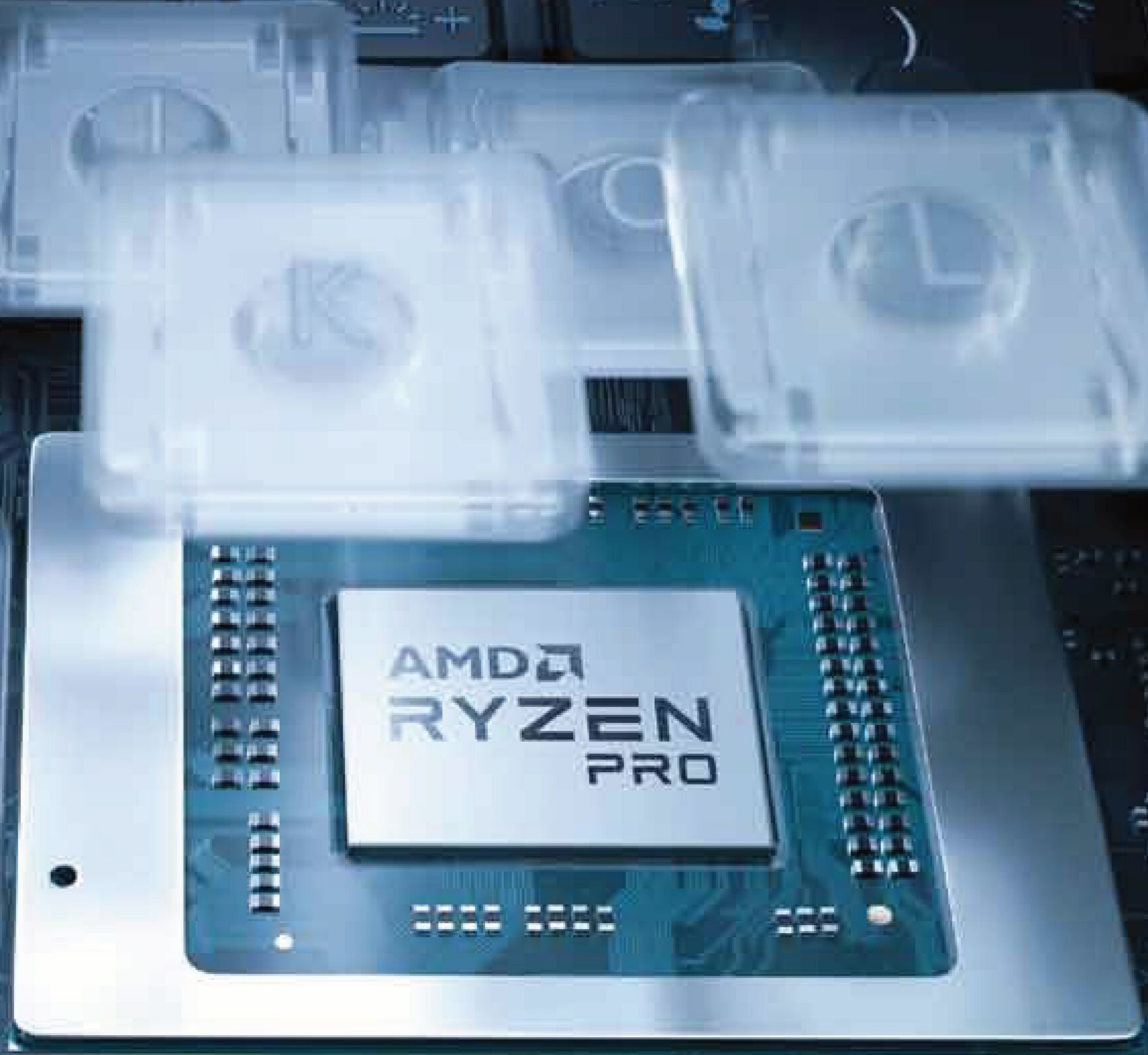
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Technology booths | Networking Lounge

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- Future of telecom: Regulatory challenges, competition and the evolving customer needs
- Atma Nirbhar Telecom: Where we are, what is missing, and what India needs to do?
- Enabling the OTT ecosystem (including the impact of notification bringing OTT under I&B)
- Building 5G infrastructure: What India should do to sort out its ROW and red tape issues?
- Preparing data centres and networks for the Next Normal
- 5G edge and network slicing ecosystem: How enterprises and hyper scalers can benefit?
- How to cope up with the new cloud-native era: Mobile cloud architectures and models
- SD-WAN, SASE, and intelligent automation: Where is enterprise networking technology headed?

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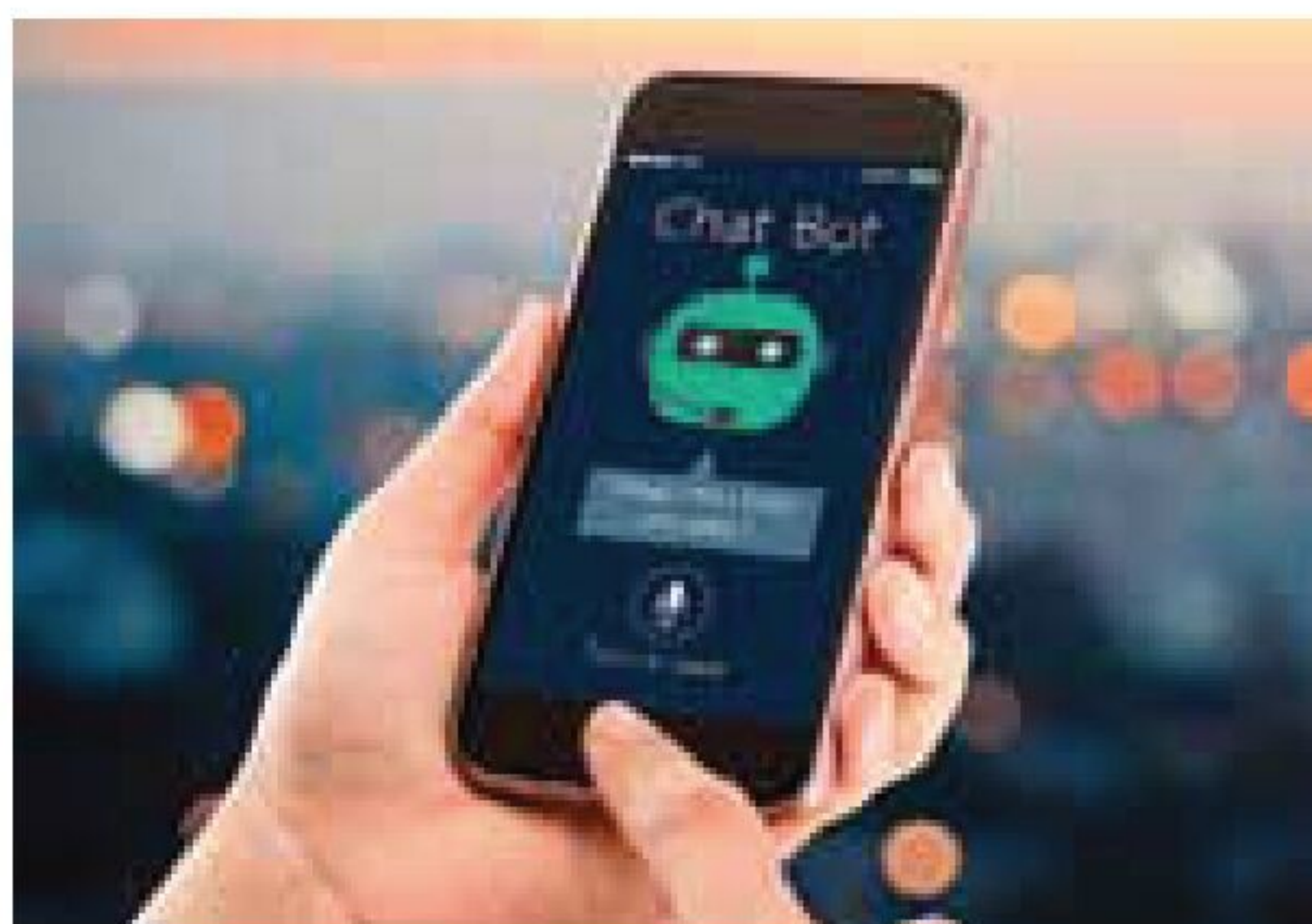
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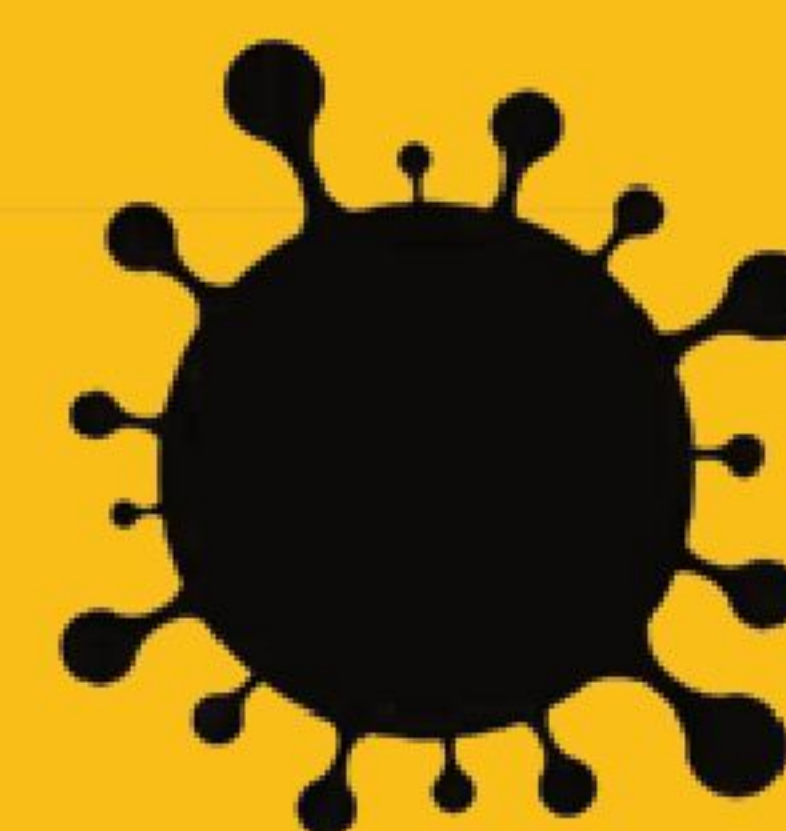
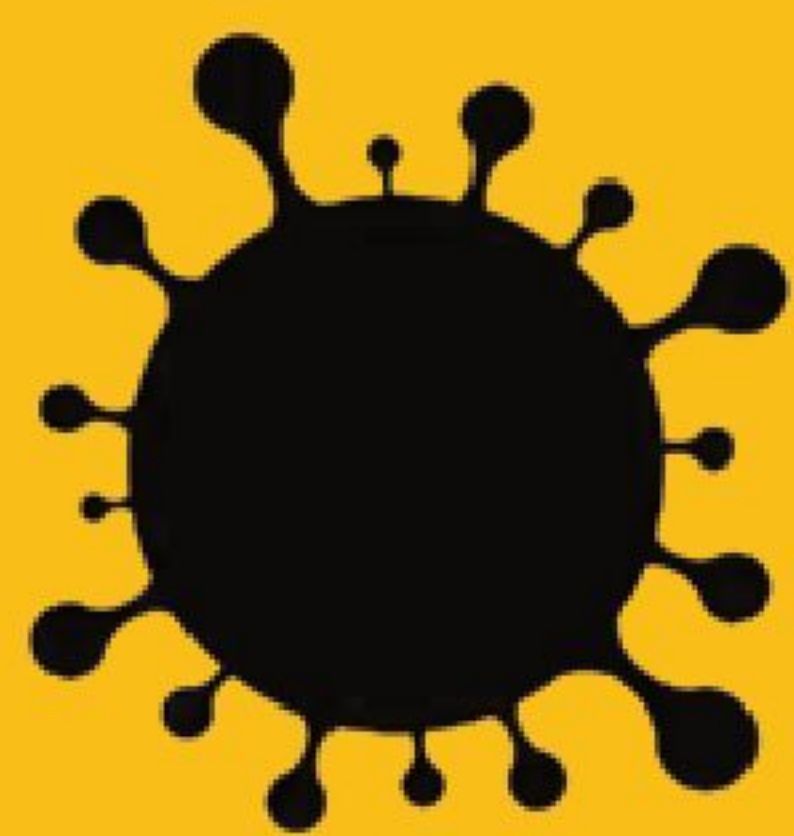


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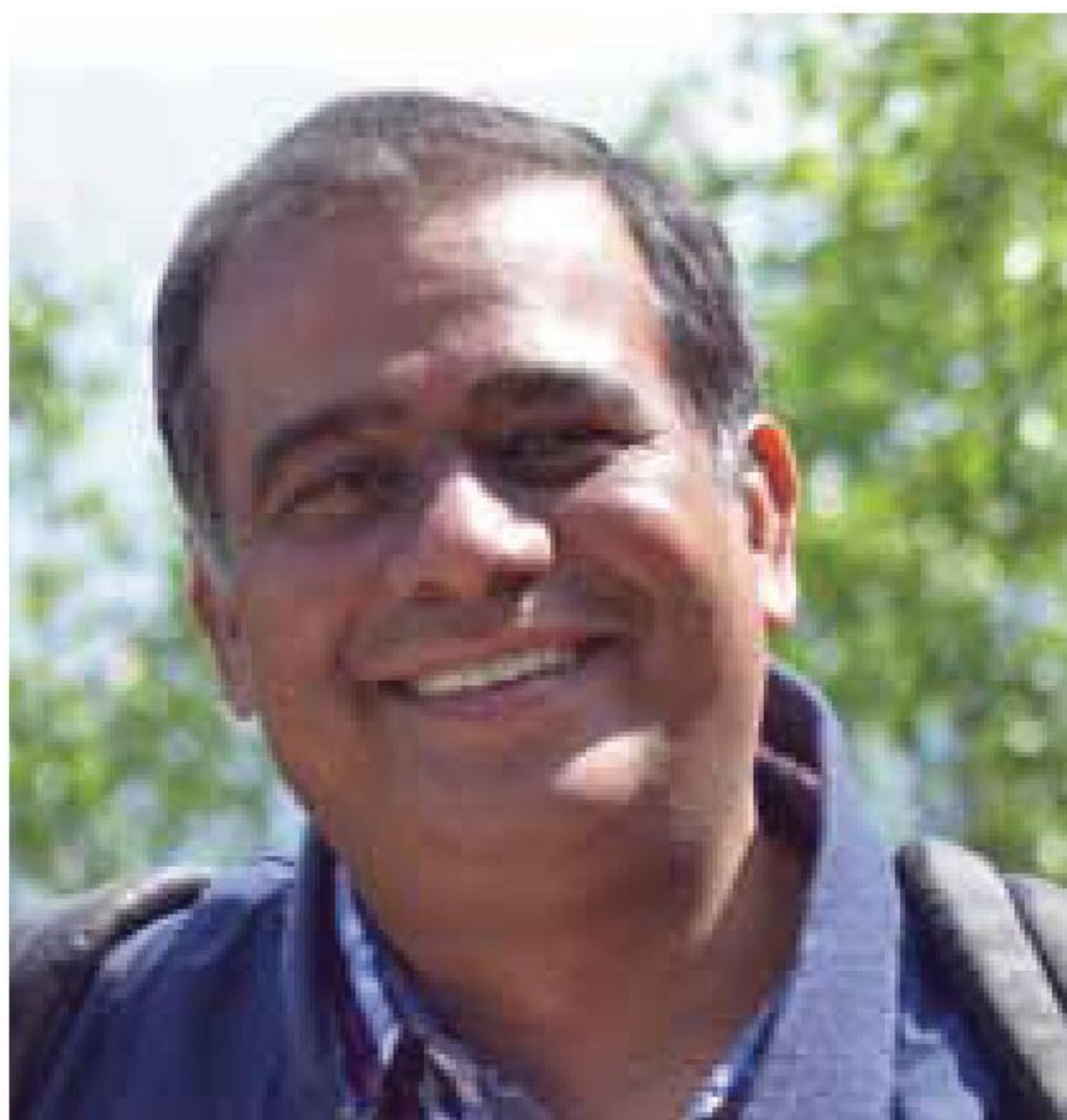
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Harinder Singh, Associate Vice President - Online Expert, harinders@cybermedia.co.in



Sunil Rajguru, Editor
sunilr@cybermedia.co.in

The Year of the Vaccine

If 2020 was the Year of the Virus, then 2021 is probably heading toward the Year of the Vaccine. Never in the history of the world has a virus which appeared in such a short time created such mayhem and never has a vaccine for the same been developed in such a short period of time. From centuries to decades to years to finally months, the Covid-19 vaccine is a tale of a lightning fast solutions in a fast paced world.

The messenger RNA virus is a first and it was designed on the computer and replicated on the machine. It is a clear break from the past and the future of the healthcare industry depends on it. If successful, not only will it put the world back on track with its newly tech upgraded avatar, but mRNA vaccine development will start taking place for almost every disease you can think of and maybe even some medical conditions that you cannot think of.

Hundreds of vaccines were under development, dozens reached the trial stage and many have now entered mass production. Billions will be vaccinated this year and it's possible that the entire human race will be covered in a few years. Who would have thought of such a thing? A future scenario—Year 0: Virus arrives. Year 1: Vaccine developed. Years 2-3: Entire globe vaccinated. All this has been made thanks to technology.

Every country will follow a different schedule and a different combination of vaccines. The results are bound to be different. We will have detailed data about billions of citizens coupled with dozens of vaccines. Analyze that data, use powerful analytical tools and Artificial Intelligence. You will soon know how to tweak the usage of a particular vaccine to make it more effective. It would be handy for future viruses and vaccines too.

The entire healthcare industry is on the verge of a tech upgrade. Robotic assistants in hospitals along with robotic workers and cleaners could take off big time. On a higher level, robotic surgeries could gain wider acceptance. The use of AI in analyzing and predicting diseases and optimizing treatments could rise. The use of XR (Extended Reality) for medical training and remote classes could rise.

Many first times doctors have been pushed into telemedicine with growing broadband power and a surfeit of access devices. This is great for an initial diagnosis to take the load off busy hospitals; ideal for remote locations and far away emergency situations.

But what if the vaccine doesn't succeed? That would be a grade one disaster and the global healthcare industry would be in the doldrums. Either way, the Covid vaccine could well make or break 2021.

Sunil Rajguru

“
**Billions will be
vaccinated this
year**
”



DIGITAL INDEX: RANKING OF INDIA'S TOP ENGINEERING COLLEGES LAUNCHED: DECEMBER 2020

Top 100 Tech-enabled T-Schools

| INSTITUTE NAME | CITY | RANK |
|--|------------|------|
| Birla Institute of Technology | Pilani | 1 |
| International Institute of Information Technology, Hyderabad | Hyderabad | 2 |
| College of Engineering Pune | Pune | 3 |
| Dr B R Ambedkar National Institute of Technology | Jalandhar | 4 |
| Maulana Abul Kalam Azad University of Technology | Haringhata | 5 |
| Indraprastha Institute of Information Technology | New Delhi | 6* |
| International Institute of Information Technology, Naya Raipur | Raipur | 6* |
| National Institute of Technology Silchar | Silchar | 7 |
| Chitkara University Institute of Engineering & Technology | Rajpura | 8 |
| R.M.K. Engineering College | Chennai | 9 |
| Reva University | Bangalore | 10 |
| DIT University | Dehradun | 11 |
| Koneru Lakshminiah Education Foundation | Vellore | 12 |
| Galgotias University | Meerut | 13 |
| Maharaja Agrasen Institute of Technology | Delhi | 14 |

Top 10 Zone Wise Institutes

| NAME OF INSTITUTE | CITY | RANK |
|--|---------------|------|
| Maulana Abul Kalam Azad University of Technology | Haringhata | 1 |
| International Institute of Information Technology, Naya Raipur | Raipur | 2 |
| National Institute of Technology, Silchar | Silchar | 3 |
| Gandhi Institute for Technological Advancement, (GITAP) | Visakhapatnam | 4 |
| Anand School of Engineering & Technology, Anand | Anand | 5 |
| Kellogg Institute of Industrial Technology | Delhi | 6 |
| Talent Academy of Technology | Delhi | 7 |
| School of Engineering, (S.O.E) | Delhi | 8 |
| Delhi College of Engineering | Delhi | 9 |
| Delhi College of Engineering | Delhi | 10 |

Top 10 Government Institutes

| NAME OF INSTITUTE | CITY | RANK |
|--|------------|------|
| International Institute of Information Technology, Hyderabad | Hyderabad | 1 |
| College of Engineering Pune | Pune | 2 |
| Dr B R Ambedkar National Institute of Technology | Jalandhar | 3 |
| Maulana Abul Kalam Azad University of Technology | Haringhata | 4 |
| Indraprastha Institute of Information Technology | New Delhi | 5 |
| International Institute of Information Technology, Naya Raipur | Raipur | 6 |
| National Institute of Technology, Silchar | Silchar | 7 |
| National Institute of Technology, Hamirpur | Hamirpur | 8 |
| Tripurasagar College of Engineering | Agartala | 9 |
| Delhi College of Engineering | Delhi | 10 |

Top 10 Private Institutes

| NAME OF INSTITUTE | CITY | RANK |
|---|-----------|------|
| Birla Institute of Technology | Pilani | 1 |
| Chitkara University Institute of Engineering & Technology | Rajpura | 2 |
| R.M.K. Engineering College | Chennai | 3 |
| Reva University | Bangalore | 4 |
| DIT University | Dehradun | 5 |
| Koneru Lakshminiah Education Foundation | Vellore | 6 |
| Galgotias University | Meerut | 7 |
| Maharaja Agrasen Institute of Technology | Delhi | 8 |
| Delhi College of Engineering | Delhi | 9 |
| Delhi College of Engineering | Delhi | 10 |

AT A GLANCE

- Ranking of Top 100 tech enabled engineering colleges
- Top 10 Zone wise engineering colleges, • Top 10 Government colleges
- Top 10 private colleges, • Profiling of Top 20 tech enabled engineering colleges
- 20+ Views & opinions of leading Industry Leaders, • Circulated to leading corporates
- Circulated to the engineering colleges pan India

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BRAVING THE POST-COVID UNCERTAINTIES

The impact of the pandemic is likely to reverberate in 2021, but technology will continue to aid the recovery. We get leading technology and industry leaders to tell you about the megatrends that are shaping the world of technology and how organizations can leverage those trends to brave the post-COVID uncertainties and get back to normal again

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Rise in On-Demand Cloud services adoption

The pandemic has put us all into an Innovative mode. Businesses which were earlier reluctant to try out new technologies and work arrangements, have now started to rethink their strategy to innovate. They have realized the importance of investing in cloud services during current times and have expedited their adoption process, which would have otherwise taken many years to accomplish. As we transition into a mode of recovery, we can expect a rise in the adoption of On-demand cloud services. Through this, organizations will be able to receive the benefits of cloud computing that will allow them to develop, manage and deliver applications while giving them control over their IT spending. We will also witness hybrid cloud computing taking the center stage and providing consistent operations and infrastructure across multiple cloud environments. To conclude, we expect businesses to venture out and combine the services of IoT, Big Data and cloud computing to help make their business processes simpler, improve the quality of their outcome and maintain business continuity.



*Srinivas Rao, Sr. Director- System Engineering,
Dell Technologies India*

Containerization and cloud-native apps adoption

Here are three big trends that will continue to amp up the cloud computing market in 2021:

Organizations need to relook at and invest on three key pillars to thrive in the new world order-resilience, adaptability, and agility. And these three pillars are going to be built on the strong foundation of cloud, which allows businesses to operate during disruption, scale up rapidly when volumes peak and stay flexible as the



market demand fluctuates.

The year of cloud-native

The changing market dynamics and the need to stay agile and adaptable will further drive the adoption of containerization and cloud-native apps in 2021. IDC predicts that over 500 million Digital apps and services will be developed and deployed using Cloud-native approaches. Kubernetes in production is expected to go mainstream in 2021 as enterprises strive to roll out applications and services in record time. This also means that cloud-native security will take center stage in 2021 as more threats will be directed at compromising app data. Subsequently we will see the importance of DevSecOp going up significantly in 2021.

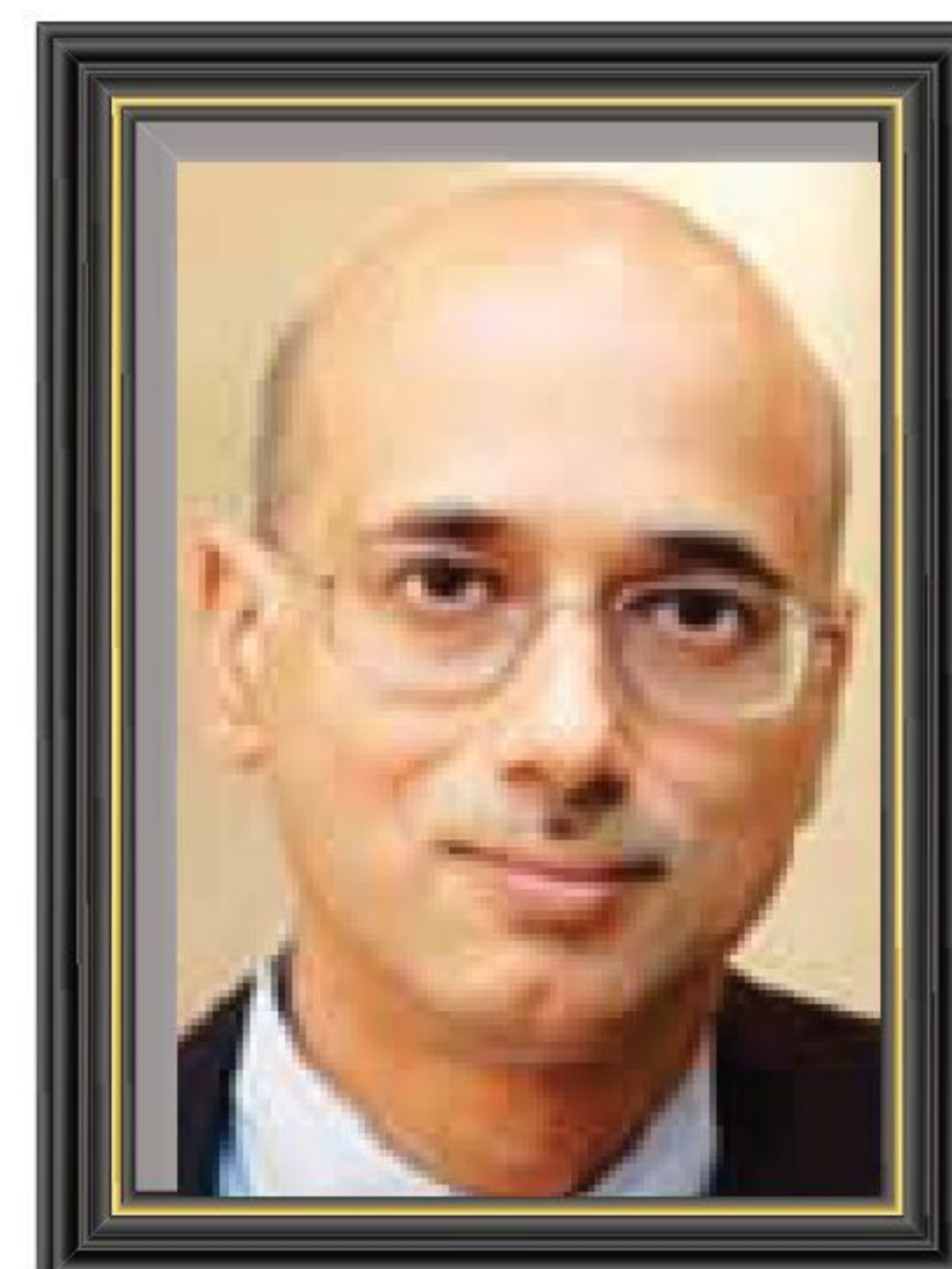
'Edge' over data center

Edge computing market is predicted to boom in 2021, owing to the proliferation of private 5G networks and the increasing need for ultra-low latent intelligent edge applications. Personalized content and service delivery, increasing IoT use cases, smart factories, etc. will clearly push up the need for edge infrastructure. Many industry experts however believe that edge will likely eat into cloud computing spending. In reality, 2021 will see both these technologies complementing and co-existing to deliver true real-time experience to customers.

*Amit Gupta, Founder & CEO,
Rapyder Cloud Solutions*

DaaS adoption by organizations of all sizes

2020 was an extremely challenging year for organisations where we witnessed a lot of strategic changes – in terms of activating business continuity plans, introducing new workplace models, etc. With companies being pushed to adopt remote working for most of their employees, it bolstered the demand for cloud services across industries, including SMBs. Gartner's recent report highlighted that spending on public cloud services in India is expected to grow 29.4% to \$4.1 billion in 2021 from \$3.1 billion in 2020. In 2021, Desktop as a Service (DaaS) is expected to be a major driver of this growth. We expect to see



huge adoption of DaaS solutions by organizations of all sizes to increase productivity and maximize ROI, while keeping the employee safety and convenience at the core. Moreover, with the gig economy booming in the country, companies will start to depend more and more on staff working in freelancing/contract-based models, and this will need solutions like DaaS to enable these workers access business applications reliably and securely. Ultimately, it's all about adapting to the changes in the post pandemic world that will be critical for both employees and employers to remain relevant and competitive in the coming years.

Ananda Mukerji, Founder & Chairman, Anunta Tech



Faster Cloud adoption among SMBs

The pandemic has driven cloud adoption among startups and SMBs allowing them to embrace the change even faster than before. Because they don't have the same red tape and on-prem legacy systems large enterprises have, startups and SMBs can build cloud-native businesses right off the bat. Because of this, I expect startups and SMBs will adopt the cloud at a faster pace than large enterprises in 2021- and cloud vendors will need to begin paying more attention to this underserved market to keep up.

Kwasi Asare, Senior Manager- Startups & Channel Marketing, DigitalOcean



more complex, mission-critical tasks.

There will be a growing demand for a unified digital automation platform that can help organizations bridge functional silos. 2021 will see the emergence of hybrid operating models, with organizations blending remote and in-person operations to create a functional digital workplace.

Additionally, organizations will opt for hyper automation by implementing technologies like AI, RPA, and business process management, to bring context and intelligence into their processes.

Consider banking, for instance. Video-KYC will eliminate the need for physical meetings required for KYC via biometric authentication. Furthermore, chatbots will facilitate straight-through processing for common banking requirements.

2021 will see an increased focus on cybersecurity and data encryption. Business leaders must leverage technologies, such as cloud and SaaS platforms, for maintaining privacy and data security. Blockchain's distributed ledger technology will also be instrumental to ensure security and transparency. In 2021 and beyond, solving for customer experience and their journeys will be a competitive differentiation.

Virender Jeet, SVP- Sales & Marketing / Products, Newgen Software



Intelligent Automation is here

The centuries-old quest of businesses to bring down operational costs and be able to accurately predict the future is about to come true. Intelligent Automation (IA) is here and it is ready to turn that quest into reality. Not surprisingly, a recent KPMG study found that 30% of the enterprises surveyed were already investing upwards of \$50 million in IA technologies. Those investments will show fast results. The reason is that the key ingredients for successful IA are converging: IoT is finding massive adoption leading to an explosion of real time data while advanced computational techniques can manage these huge volumes of data assisted by AI and ML.

The key is to scale IA to an enterprise level by establishing CoEs that assist in infusing the technology into platforms of customer engagement,



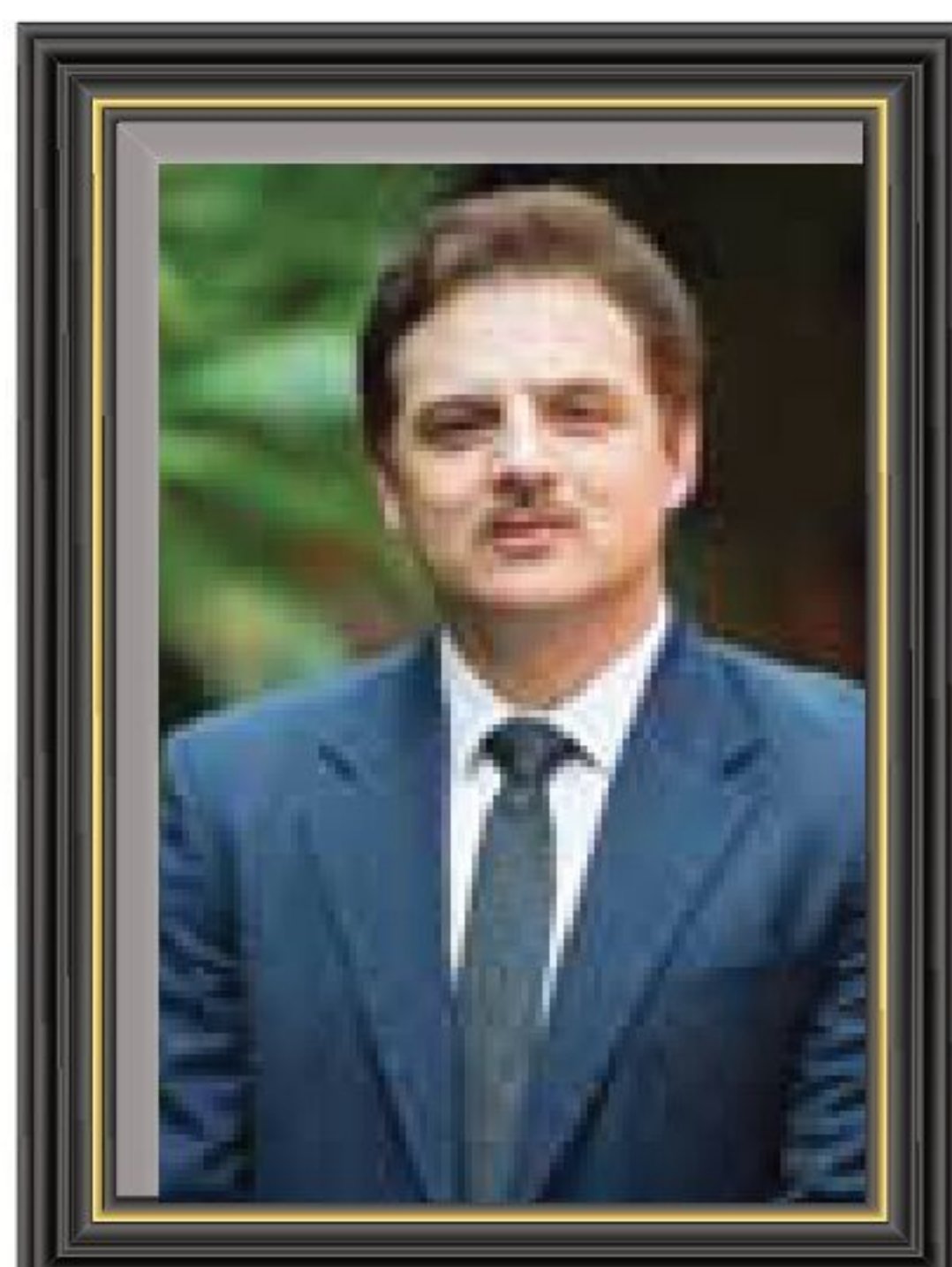
SECTION

AUTOMATION



Demand for unified digital automation platforms

If 2020 has taught us anything, it is that enterprises need to respond fast to changing market conditions. Rapid application development will help organizations with operational agility. Enterprises will enable citizen development with low code platforms, allowing IT developers to spend time on



personalization, Manufacturing Execution Systems, etc., to impact experience, efficiency and effectiveness. The process-centric view of IA will be centerstage in 2021, because bringing down costs and improving efficiency remains all-important. But don't take your eyes off the enterprises that are building a people-centric view to IA in a bid to amplify human potential. These enterprises will create a hybrid workforce—humans collaborating with bots—forever altering employee engagement, productivity and business resilience.

Sandeep Kumar, SVP & Head Global Consulting, ITC Infotech



SECTION

DIGITALIZATION



Prioritizing people-centric technologies at workspaces

The transition from traditional work models to more flexible ones took place at a scale nobody would have ever imagined a year back. But this is just the beginning of the digital transformation journey enterprises would have had to undertake sooner than later. Going into 2021, even once people go back to offices, enterprises will look to prioritize more people-centric technologies. The once 'real work cannot be done outside of office' will see the much-needed overhaul into more employee friendly policies, given the positive impact it can have on overall employee engagement and productivity.



Companies will look to leverage digital workspaces and collaborative technologies at a much larger scale than ever before. The digital thrust will also empower businesses to self-serve and deliver solutions quicker, through IT.

Data analytics will play a major role in transforming customer experiences, the value of which will depend on the data they are fed. A major lesson most will take from 2020 into the next will be that every business needs to also be a digital business, the future of which will be automated and autonomous, yet employee-focused.

Ravindra Kelkar, Area VP, Indian Subcontinent, Citrix



Providing a seamless CX journey for customers

2020 has been a challenging year for businesses and customers alike. Customer experience (CX) teams across the globe had to rapidly adapt amid ticket spikes, customer cancellations, market volatility, and increased uncertainty. However, as the world moved forward, one week at a time, the global service requests eventually stabilized and new expectations and trends began to set in.



Customers now expect businesses to be more digital, accessible and empathetic. More than ever, they want and expect to connect with businesses the way they do with friends and family - effortlessly, especially over popular messaging apps like WhatsApp, Instagram or Facebook. Businesses are working on merging values from a pre-COVID era with the ever-changing demands of a post-COVID world. While this may seem to be an overwhelming task, the pandemic has highlighted the importance of the basics, such as keeping your customers and their needs at the center of everything that you do. Businesses are, therefore, re-emphasising the need for a people-first approach and working hard to retain a human connection.

People around the globe are eagerly awaiting 2021 and the many promises that it brings. Looking ahead, we anticipate that CX will continue to remain a catalyst to business success as businesses reorganise their priorities to incorporate a seamless CX journey for customers. On the other hand, digital transformation will definitely take precedence in the coming year to accommodate more omnichannel services, better IT security, agile technology and collaborative tools. Businesses will also take steps to be more people-centric, not just toward their customers, but also toward their employees. Employee experience and engagement will be a major area where we will see a change as businesses rethink their digital workplace.

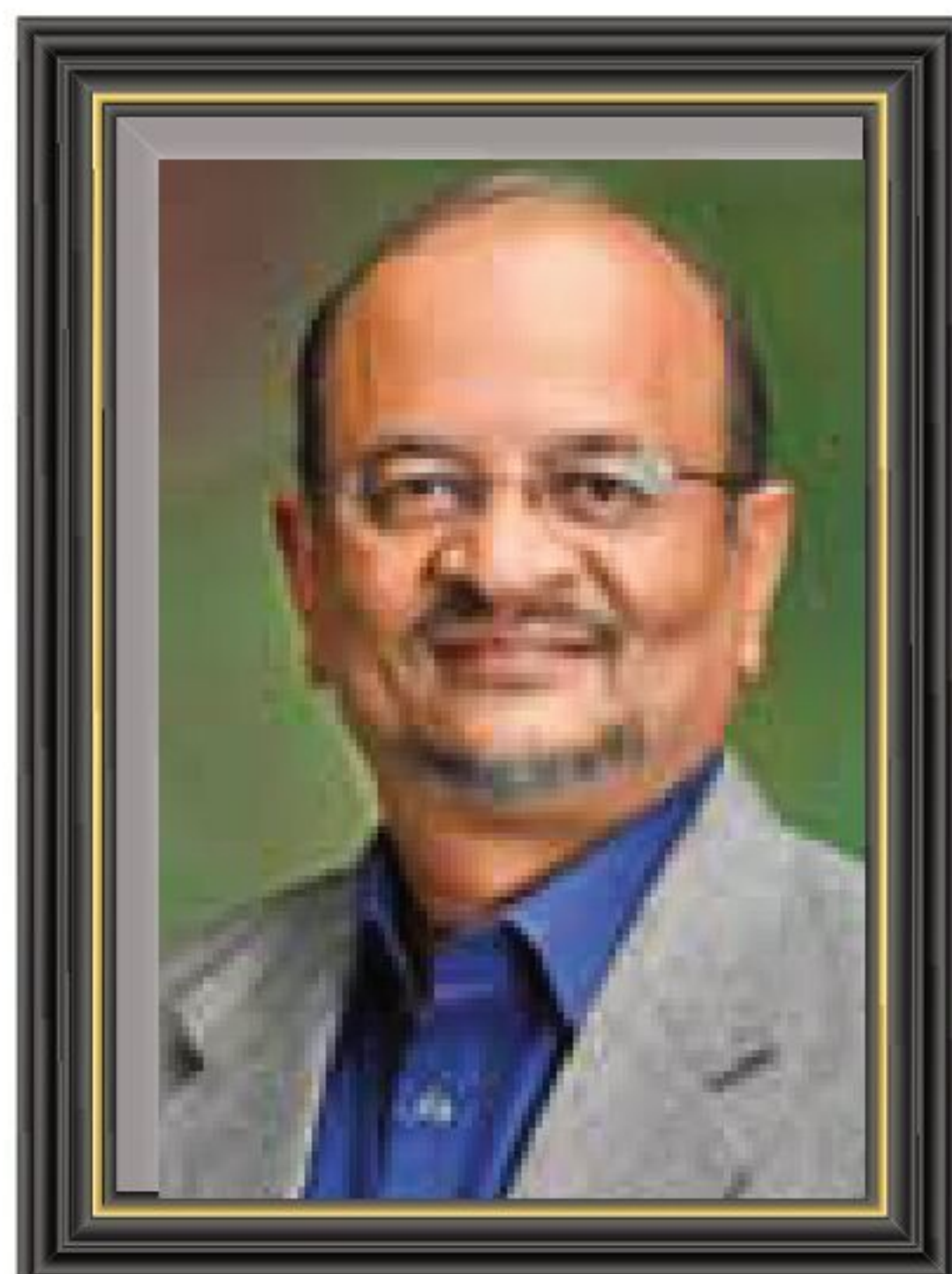
KT Prasad, MD & RVP, India & SAARC, Zendesk



Intensified focus on digital twins in healthcare

With the underlying computational models getting better, digital twins will be used to make medicine more precise and personalized. Patient avatar models, which are virtual representations of patients' physical bodies' shape and structure, will be

used to enhance procedure planning and improve patient experience. Organ models, which simulate the structure, mechanics, and functions of organs, will be used to virtually evaluate therapy options. Disease models, which represent some or all of the pathological processes observed in an actual disease, will be used to treat conditions better. Predictive models, which help predict outcomes, will be used to diagnose conditions.



Digital twins will also be used by healthcare enterprises to enhance and streamline processes, improve patient experience, lower operating costs, and deliver higher value care. Insights gained from simulations using digital twins of physical spaces and processes will help optimize operating parameters.

Data privacy will gain importance

Collection, storage, and processing of highly-sensitive healthcare data will continue to be critical for the digital transformation of healthcare. There is a huge amount of data generated through healthcare and it is extremely important to ensure that this data is not misused.

Special requirements for AI solution providers in healthcare

Health is top priority now and there is a rising demand for more trust, integrity, reported benefits, and associated costs for all procedures directed towards maintaining health, diagnosis, and treating diseases. As the use of AI becomes more prevalent in healthcare, these demands will also apply to AI in terms of capabilities, quality assurance methods, clinical validation, requirements for the data used, the avoidance of bias, and clear measurement for performance assessment.

*Dileep Mangsuli, Executive Director,
Siemens Healthineers, India*



Digital makeover for the insurance industry

COVID-19 has hyper accelerated digital transformation within the insurance industry. The tech trends to watch out for in 2021 are:

Collaborating Virtually

Life and health insurance business is and will

continue to be advisor-led even for Gen Z and Millennials. Insurance companies will enhance focus on enabling advisors with digital tools such as progressive web apps with best-in-class UX to provide the best in client experience (CX)- staying connected with clients through virtual channels, assisting application via co-browsing experience, video KYCs, automated underwriting, e-signature thereby eliminating dependency on physical files and in-person interactions, etc.



API: The connective tissue

API will not only improve efficiency via easy access to critical building blocks and business capabilities but also reduce complexity through cleaner integration among various IT systems and business units. With 'build once, deploy many' strategy APIs will become enterprise assets.

Data and Insights

Business processes are generating more data than before; exponential growth of computing power and faster communication is fuelling cloud adoption. Other than data storage and connectivity between applications and systems, focus will be on personalization of products / services for clients through recommendation engines. Time nudges at various life events will result in huge cross-selling opportunities.

*Shiv Ranjan, Head- Application Development,
Sun Life ASCI*



Promoting a culture of innovation

The year 2021 will see a faster transition and adoption to digital technologies. As seen, COVID-19 has resulted in speedier adoption and has enabled new user-generated cases around digital technologies.

AI and IoT will see faster adoption and can be a game-changer. With the upcoming of 5G Networks, Connected Device will become a reality and reach



to an implementation level as far as the smart city, smart health, smart retail, AgriTech and EdTech are concerned. There will be increased penetration of IoT and AI capabilities in the Connected Devices to address specific issues.

From the Indian perspective, this is both an opportunity that can leverage technology to enhance our Innovation Index and target our Supply Chain efficiencies and address core issues around Healthcare, Education, Agriculture and many others.

At the same, there has to be a great deal of focus to be imparted on creating skill sets of people who are trained in these upcoming technologies. The nature and type of jobs 10 years down the line will be based mainly on these futuristic technologies. So, vocational education in the school and colleges has to have a multidisciplinary approach and tightly integrated with coding and STEM.

The need of the hour is that we should not limit ourselves to being just a consumer of these emerging technological trends but how as a country we can also be a co-creator of technological solutions based around these emerging technologies. Policies like 'Atmanirbhar Bharat', and 'Atal Innovation Mission' can be an enabler and catalyst.

*Rajeev Tiwari, Co-Founder & CEO,
STEMROBO Technologies*



Enabling Remote Work

Every year, the innovations unlocked by technology seem to appear faster and faster. The coronavirus pandemic has forced businesses to adopt digital transformation more than ever before and has accelerated technology in a way we have never seen before. Here are some of the tech trends to watch out for in 2021.



5G

5G will turn out to be real in 2021. As digital collaboration, telecommunication, and videoconferencing turned into a part of our lives it is really required to get ways to boost speed. The deployment of this technology will be important for different tools like IoT.

Cybersecurity Mesh

It allows secure access to any asset (i.e. data,

file, device, etc.), by any person and from any place, regardless of where the people and assets are located. The benefit of this technology is that it allows people to place the security wall around individuals rather than the entire organization. Thanks to the cybersecurity mesh, the security perimeter goes beyond and covers individuals working remotely.

AI

AI has expanded its grip on our lives throughout the past year. Even as a global pandemic forced many data scientists to work from their homes, AI-driven innovations continued to pour from the smartest minds everywhere. In 2021, we will see more sophisticated applications of AI/ML across industries, including financial services.

Prashanth GJ, CEO, TechnoBind

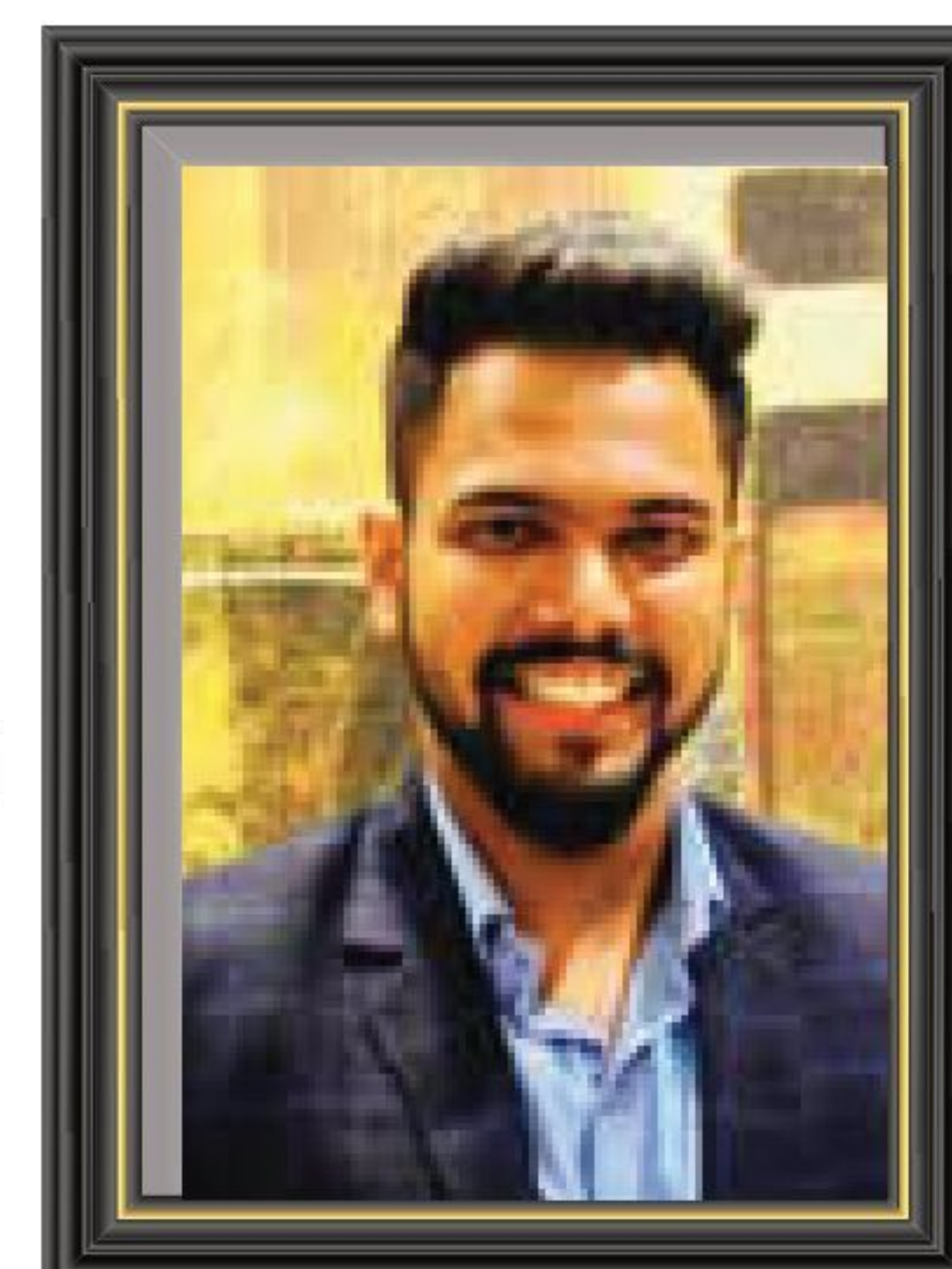


Move over to IPA & Intelligent IoT

Here are some of the technology trends that will shape 2021:

Rise of Quantum Computing

Recently, a team of scientists in China has claimed that they have developed the world's fastest quantum computer, which is expected to be 10 billion times faster than Google's Sycamore. So, it is estimated that there will be a massive competition among the big IT giants to provide services in cybersecurity, drug development, climatic condition prediction etc. with the help of quantum computing. With database processing as a critical strength of quantum computing, technologies such as AI will be one the applications which will get significant benefit from the superior processing of Quantum computers.



AI

AI will be going to expand its footprints in various sectors including Military, Defence, Agriculture, automotive, education, medical, construction etc. Power and scope of AI is unimaginable, it's endless. Additionally, with the launch of GPT-3 an autoregressive language model that uses deep learning to produce human-like text developed by the team of OpenAI lab, this model expects to generate excellent quality text that'll be difficult to distinguish whether humans or a machine generated the text.

Intelligent Process Automation (IPA)

IPA is the advanced version of RPA combining RPA and ML. Due to the outbreak of COVID-19, most of the IT industry has given intimation that there is a possibility to announce permanent work from home and some of the companies have already declared the same. During this scenario, it is essential for any industry to check the activeness, productivity and relative output from the workforce. Therefore, it will be expected from IPA techniques to increase process efficiency, better customer experience, optimize workforce productivity and increased revenue generation. Various IPA techniques will be going to help any company in constructing the raw data into a structured one, reduce human error and enhance customer satisfaction.

Intelligent IoT with Narrowband IoT

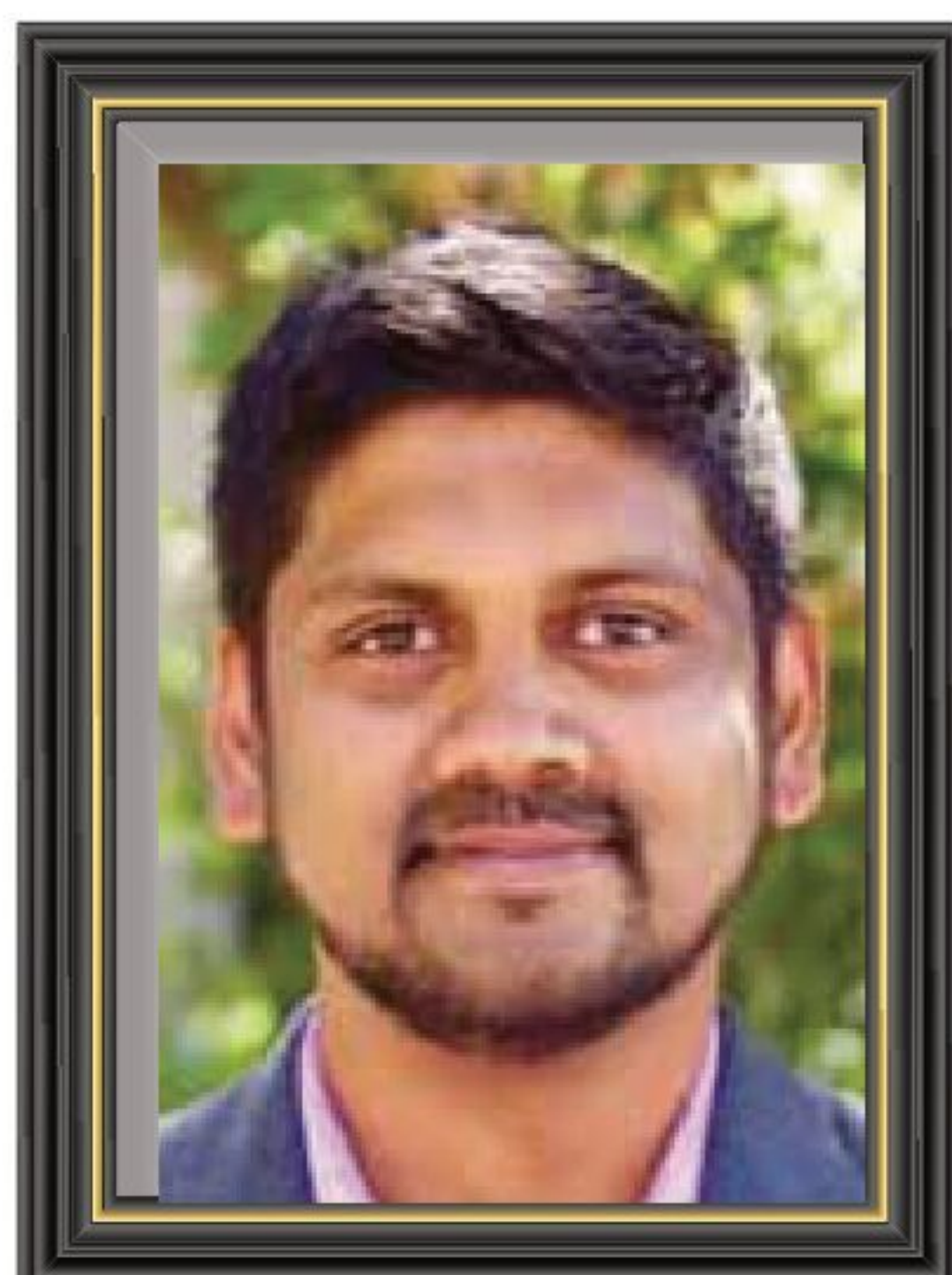
In IoT applications, there were two challenges, i.e., one is the range and second the battery life. These two challenges are now overcome with the help of Narrowband IoT (NB-IoT). Considering the fact that approximately 21 billion devices will be connected by 2025, there will be a huge competition between Telecoms like Jio, Airtel, Vodafone to provide cost-effective solutions to consumers in SaaS and PaaS model. Moreover, India is working actively on NB IoT, as in a first, BSNL with Skylo has launched the world's first satellite-based on NB-IoT to streamline various sectors including fishers, farmers, construction, mining and logistics enterprises.

Abhishek Gupta, Co-Founder & CEO, Hex N Bit



Android for touch-based IoT devices

2020 has proven to be a challenging year. However, it was also a year of new opportunities and avenues for us. One particular trend that we witnessed was the acceleration of digital transformation with traditional companies. Incorporating customer interactivity into their solution became a priority and the execution ranged from standing up self-service kiosks to augmenting the customer experience with innovative digital solutions. Android-based devices, in particular, have been deployed at a large scale to meet these demands. Looking ahead, we realize that



the pandemic has ushered in a new era that will be more digital and virtual, even in remote locations. Industries like education, fitness, restaurants and healthcare will see a flurry of Android based devices and Android will become a dominant choice of OS for touch-based IoT devices.

Shiv Sundar, Co-Founder & COO, Esper



The future of work is human

Three in five Indian executives predict the transition to a 'new normal' will be even more challenging than the initial shock of COVID-19, according to The Work Survey commissioned by ServiceNow.

India is experiencing a workflow revolution. Organisations will be looking to new digital workflow apps - low code and no code - to quickly respond to business changes, drive productivity and deliver critical services, such as vaccine management, in the months to come.

5G is set to roll out in the New Year. Expect to see organisations, industry-wide, tap available technologies from IOT-enabled devices to AI, to meet growing demand for services and streamline processes with complete visibility across the enterprise.

Everyone wins when technology is used in the service of people. In 2021, leading organisations will be better prepared for the unknown, tuned to employees wants and consumers' needs in an instant-response world.

Arun Balasubramanian, MD- India & SAARC, ServiceNow



Internet of Behavior (IoB) is the new catchphrase

2020, a year that no one wants to remember, also the year that catapulted us way into the future. Most people are now working remotely in a digital-first model and we are seeing companies gaining a competitive advantage by the use of AI and by automating processes through hyper-automation. But this, as we see, is a thing of the past. The



real question is 'What is the next wave of technology that orchestrates a successful and future proof tech-forward transformation?' Gartner details out that the Internet of Behavior (IoB) is something we'll tussle with in their Top Strategic Technology Trends for 2021. To quote, IoB will challenge "what it means to be human in the digital world". IoB is an extension of the Internet of Things (IoT) itself, the interconnection of multiple internet-enabled connected devices resulting in a vast array of new data sources. Data from these sources can be used to predict and influence people's actions. One needs to understand that the companies using the IoT to influence behaviors aren't really about the 'things'. As the IoT links people with their actions we inadvertently enter into the world of the Internet of Behavior (IoB). This, as we see it, will be the catchphrase of 2021 and will see businesses evolving in order to have better tech-enabled, user-centric, business delivery models that are reimaged applications of next-gen IT infrastructure services and are built for flexibility and speed while also being open to flexible technology partnerships.

Gaurav Shinh, Founder & CEO, DAAS Labs



Speeding up product development

Increasing revenue, improving efficiency, reducing cost- these continue to drive digital transformation in organizations. COVID-19 crises and economic uncertainties have only added woes to the organization's challenges. But good news is that these are all accomplished by implementing innovative technology that's purpose-built to solve the challenges holding very organizations back.



Some of the technological capabilities that will drive the industrial companies 2021:

AI is increasing its presence and impact in practical industrial application. AI-driven generative design is what manufacturing companies are adopting to optimize product development. Embedding AI into this process instantly provides dozens of optimized product design options with various materials, manufacturing processes, data sources and other design variants.

Remote collaboration with speeding up product development processes will be key in 2021 for growth. Product development SaaS platforms

will gain momentum and lessen the product development dilemma with powerful remote accessibility and design collaboration features.

Connecting products and factories for 'Remote everything'. We have seen how in a few weeks, continuity of business operations was quickly jeopardized by COVID-19. Remote monitoring and service enabled through Industrial IoT maintains factory machines and equipments in the field up and running ensuring the continuity of factory production and equipment service.

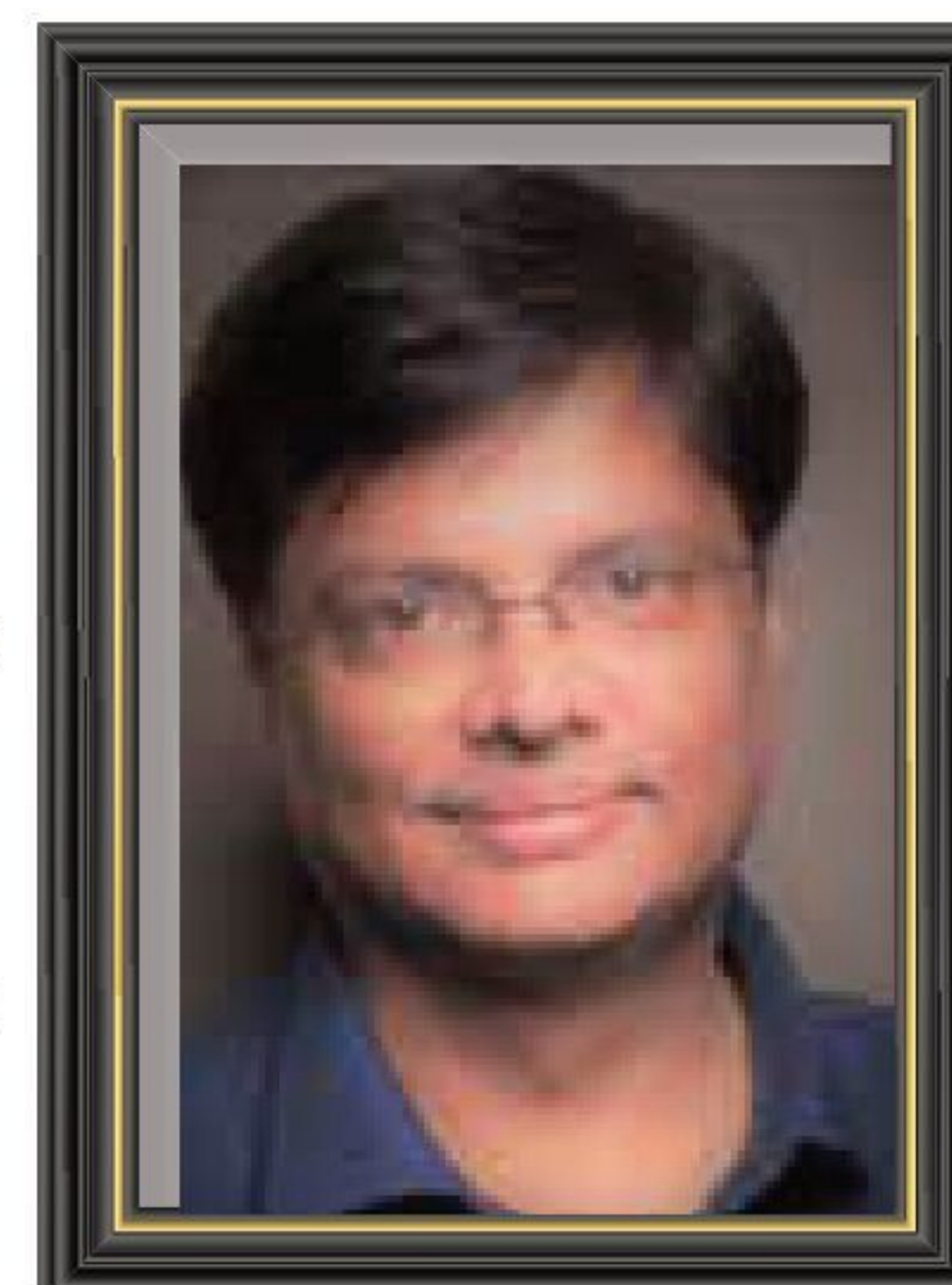
Bringing digital technologies to frontline workers. With 75% of the workforce being front line workers, enabling them with digital technologies such as AR and VR will gain significant momentum that will help front line workers to do their job efficiently and learn more effectively.

Dhirendra Kulkarni, Senior Director, PTC



A growing need for 'Adaptable Acceleration'

As the enterprises move from 'CPU-centric' to customized, distributed computing, the processing is now being brought closer to the data. No single application or workload dominates; algorithms for each of these workloads are changing much faster than silicon cycles. This leads to increased integration of compute with storage and network controllers. As the use of standalone accelerator cards for compute workloads is getting mainstream, we are seeing an increasing integration with storage and network controllers.



Because of this, we see a need for 'Adaptable Acceleration' i.e. deliver highest performance:

- Adapt as workloads change
- Delivering unprecedented benefits in performance, power-efficiency and operating costs from public clouds to on-premise data centers
- Adaptable Hardware acceleration ensures that innovators can always stay at the forefront of rapidly changing data center needs, without the expense and risk of customer ASIC development.

Neeraj Varma, Director- APAC & Japan Sales, Global Data Center, Xilinx

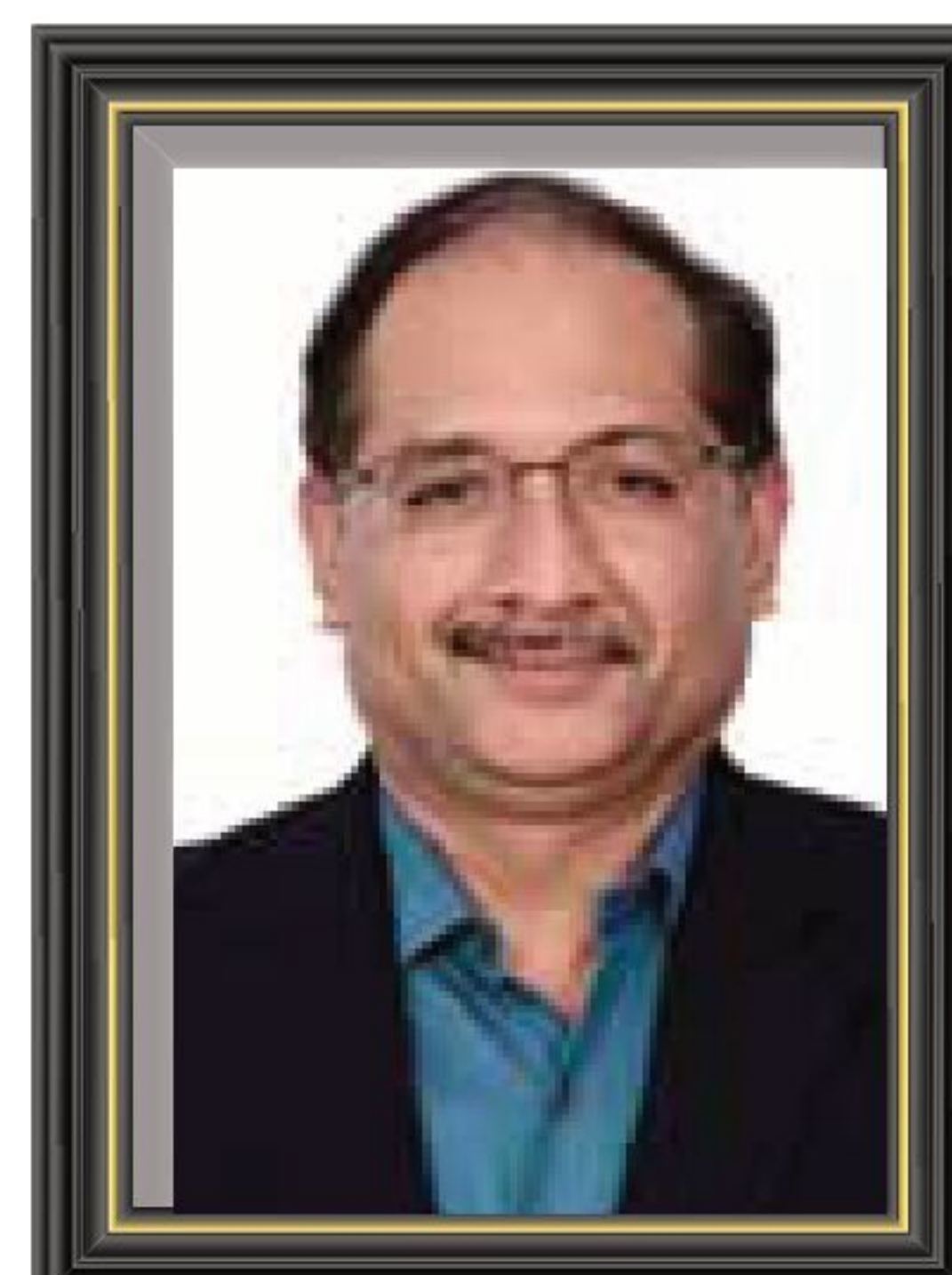


Digital transformation at an unprecedented speed

2020 is destined to be remembered as a year of transformation, particularly the shift to a digitised ecosystem led by futuristic startups and an increased trend of gig economy across the world. While we were already preparing for the digital future of work, driven by automation, connected devices, cognitive tools and cloud, COVID-19 accelerated the transformation – pushing enterprises to enable remote working for their workforce, and increase business resiliency, by embracing digital transformation at an unprecedented speed.



that are not streamlined will create immensely expensive and extensive issues- a 'patchwork' of technology that is not lean, connected nor optimized. Digital business requires efficiency, speed and democratization and therefore a comprehensive digital strategy. Organizations that don't focus on these will be left behind.



Kaushik Sarkar, SVP- Finance & Commercial, Robert Bosch Engineering & Business Solutions

SECTION

DATA



In 2021, organizations will be riding on the next phase of technological advancement and investing heavily in automating regular, repetitive and mundane tasks. Consequently, there will be a need for attention and investment towards employee's skill development in the workplace through upskilling or reskilling programs to fill the skills gap and meet the desired business goals.

The development of frontier technologies such as AI, IoT, robotics, blockchain, photonics, biotech, and quantum computing is expected to help businesses gain a competitive advantage over their peers.

Education technology solutions will grow and evolve from its original applications to enable more immersive and interactive experiences for students regardless of where they are located.

Healthcare industry will also look at employing cloud solutions, big data analytics, AI, ML, and cutting-edge imaging technologies to aid the early detection of life-threatening diseases and the quick and efficient delivery of treatment. Telehealth will also emerge as an essential area to ensure that people could receive care without physically entering a hospital, unless it is necessary.

There's no denying that the "new normal" has been one of the top buzzwords for 2020. With some staff in-office and some remote, it will likely be this hybrid approach that becomes the 'future of work' we are living and breathing in 2021.

Rajiv Bhalla, MD, Barco, India

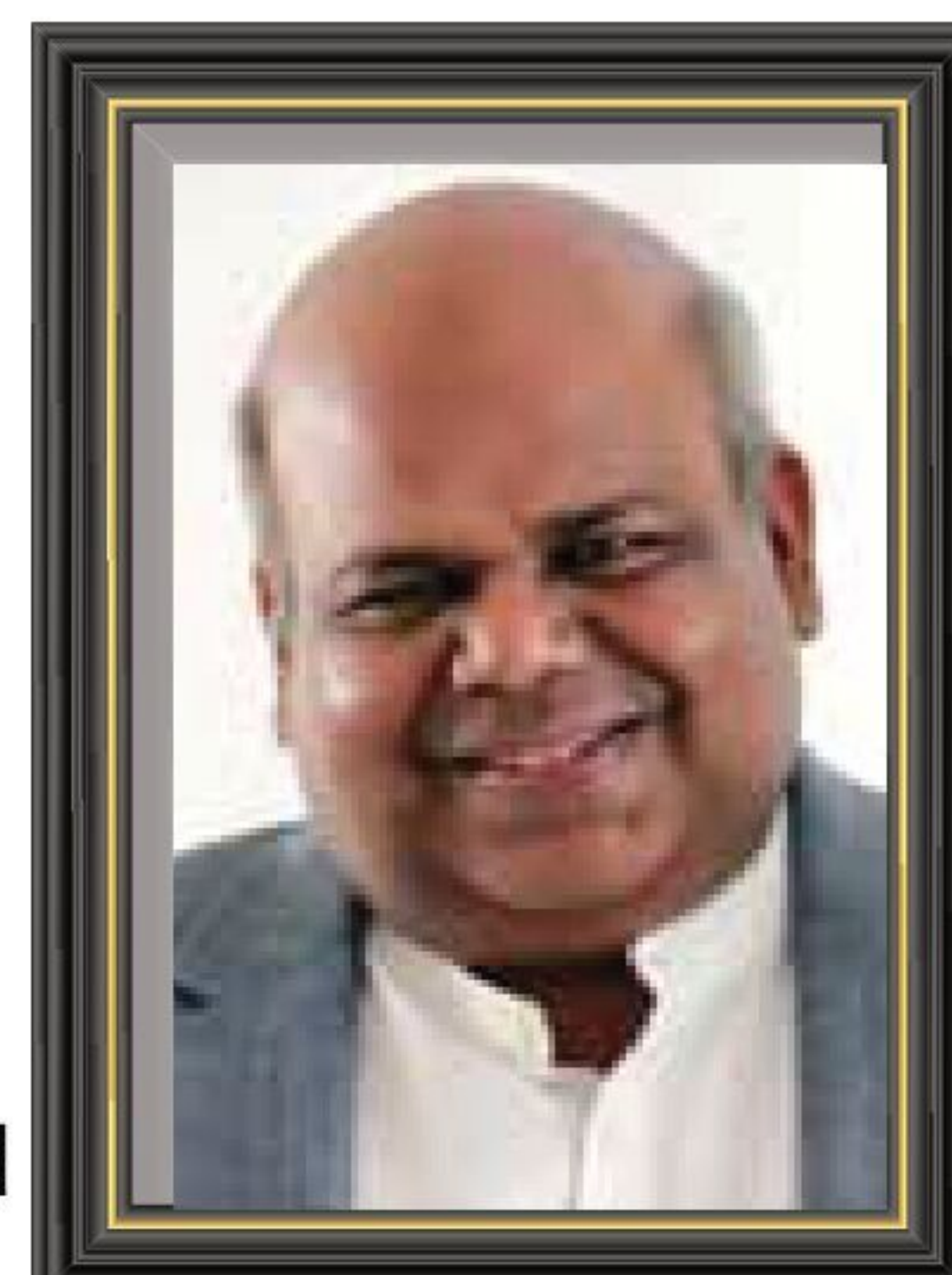


Businesses need comprehensive digital strategy

Hyper automation will be aggressively driven by organizations. Having legacy business processes

Unifying customer data with CDP

Some of the key emerging trends that I see for 2021 are:



Emergence of Customer Data Platforms (CDP)

More and more brands are now seeing the need to own customer data, and also aggregate the data into one platform. A CDP allows a brand to capture all customer data (browsing history, purchase history, engagement at a physical POS or ATM, pretty much every single customer touch point) into a centralised repository. And once data is captured, run machine intelligence to create real-time recommendations for enhancing the brand experience for the customers.

Voice Technology

Voice tech continues to gallop and voice devices (like Alexa and Google Assistant) are now the fastest selling household gadget. Not only do these gadgets respond like an obedient assistant (when you need some information), but for many they have also become part of the family. As per Alexa, millions of users get up in the morning and wish their voice device a 'Good Morning' before starting the day. Soon Alexa will replace the family dog!

Blockchain

Generally when we think Blockchain, we think

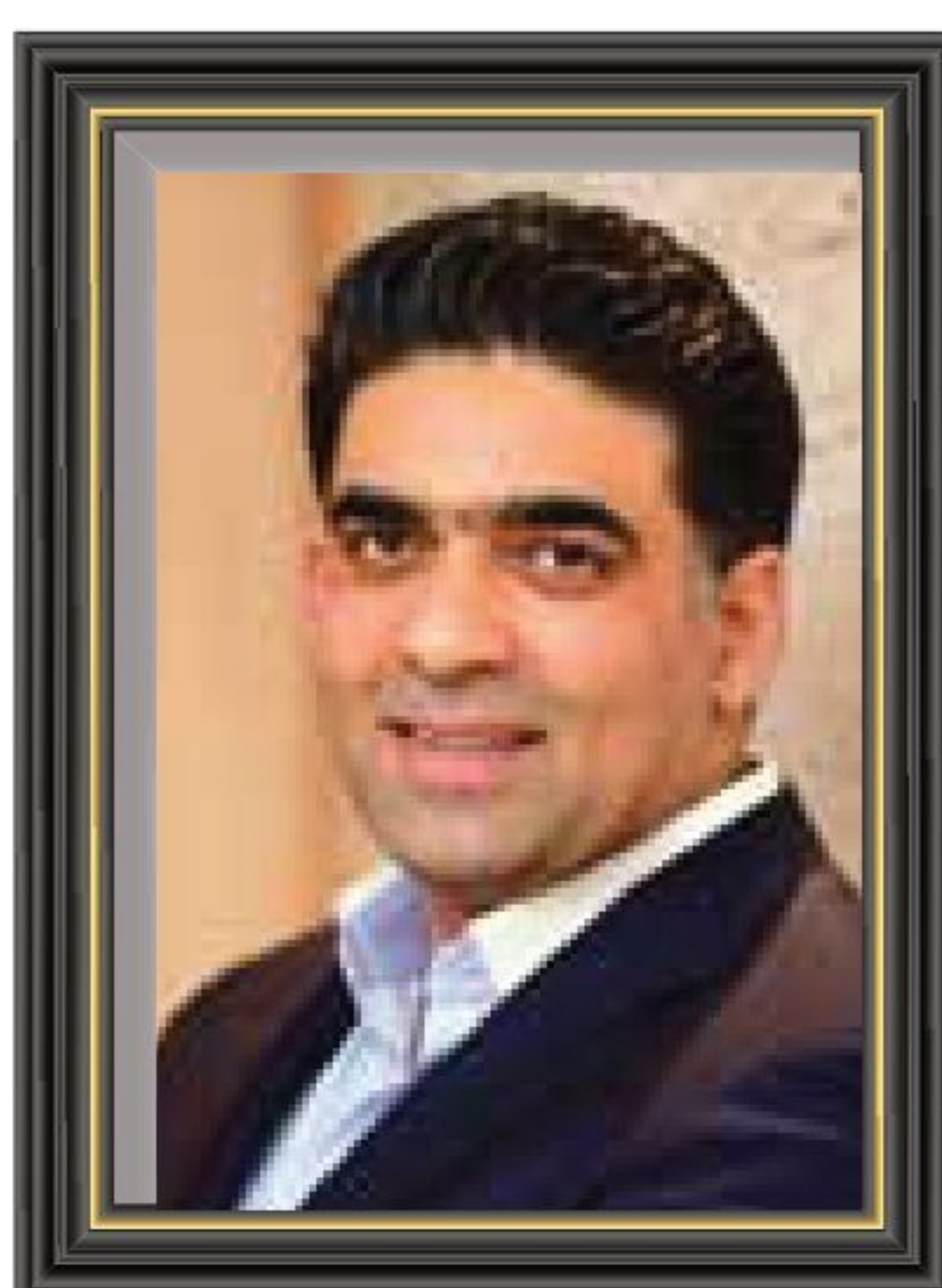
Bitcoins. But Bitcoins (or cryptocurrency) is just one application of Blockchain. Blockchain enables creation of a secure trust layer between two unknown entities. And using this trust layer, in the form of smart-contracts, an exchange of money, goods, services can happen without incurring the costs that are charged by institutions like banks, which have traditionally been the carrier of 'trust'.

*Hareesh Tibrewala, Joint CEO,
Mirum India*



Moving towards software-defined storage

With mostly everything shifting to digital platforms, we are amidst a huge deluge of data creations and consumption. Internet proliferation has made accessing data easy, and the use of socially generated data in our daily activities has become a new technique to understand and predict our collective behaviors. Among others, trends such as work from anywhere, online classes, uptake in gaming, the proliferation of smart videos and video security have contributed to the data surge.



Similarly, the Indian data center market is also witnessing robust growth in the era of virtualization and cloud computing. It is led by digital transformation among enterprises. We expect a more vital need for the data storage market in 2021 as unleashing the real value of data in the future requires advanced data storage infrastructures.

Datacenter managers are looking forward to technology upgrades that replace an aging data center infrastructure with innovative technologies like ArcticFlow, and IsoVibe, which will reduce cost and increase efficiency dramatically by better performance and less risk of loss of data. NVMe-powered SSDs will become more prevalent in data centers. The NVMe over Fabrics, is starting to drive significant shifts in data speed and efficiency. Additionally, the coupling and decoupling of storage, compute, and networking will lead to a surge in software-defined storage and a push for simplicity, mainly through the adoption of hyper-convergence, which has been rapidly spreading across the storage industry. In 2021, data center managers will realize that general-purpose

architectures are inefficient and carry resource and cost overhead, and, therefore, will move towards software-defined storage.

Khalid Wani, Director- Sales, Western Digital India



Focusing more on data and user privacy

Covid-19 acted as a tipping point for digital transformation of the workplace and we anticipate this to speed up further as technology is playing a huge role in enabling businesses to run remotely. There has been an uptake in the adoption of new-age digital technologies like cloud-based connectivity and collaboration solutions, IoT, Data management and security solutions across industries. Here are some of the emerging tech trends that will become more pronounced in 2021.



Cloud, IoT, and AI

Cloud will continue to 'take centre-stage' in the recovery from the pandemic given its benefits of improved accessibility, scalability and flexibility. Businesses will continue to harness the native digitalness of cloud to adopt cloud-based connectivity, communication and collaboration solutions to build operational excellence and enhance customer relations.

Data and User Privacy

Cyberattacks like phishing and ransomware saw an upswing during the pandemic; India is second in global ransom pay-outs in cyberattacks. It becomes necessary for businesses to focus more on data and user privacy. We will see more businesses adopting cost effective and comprehensive Security as a Service solutions that are tailored fit.

Reimagined Customer Experience

Virtual presence of customers has assumed greater significance in the wake of minimized physical interaction environment; adopting an omnichannel approach has become a critical business imperative. We will see more businesses going for Omnichannel tools. These bind all customer facing interfaces together integrated at the backend and helps in creating better experience for customers across platforms be it web apps,

mobile apps, intelligent chatbots, wearables etc.

*Joyjeet Bose, SVP- SME Operations,
Tata Teleservices*



Gearing up for a new data-driven world

The year 2020 laid down the foundation for us to pause, reflect and work towards becoming better versions of ourselves as individuals, enterprises and economies. In the hindsight, digital adoption and cloud migration stole the show, opening up avenues for emerging technologies such as intelligent data management, to be at the forefront of this accelerated transformational journey.



As we step into a new data-driven world, business leaders are taking the compassionate leadership route at the helm of this new normal. As for the future, it can only be navigated successfully by leveraging the in-house data lake through optimised data management solutions, empowering the workforce and clients with robust endpoint protection framework, augmenting use of cloud native applications across environments and unleashing the potential of 5G.

While 2021 and beyond looks promising, the onus lies with digital enterprises to choose the sustainable route and become Future-Ready. Ultimately, the decisions enterprises make from here on, be it their IT systems or data security, should not just reflect the capabilities to stay successful today but also deliver ammunition to fight the uncertainties and threats of tomorrow.

*Ramesh Mamgain, Country Manager,
India & SAARC, Commvault*



SECTION

**ARTIFICIAL
INTELLIGENCE**



Intelligent applications and services

The pandemic has impacted our way of life, working practices and business operations and brought the security sector at the forefront. Here are some tech and security trends to look out for in 2021:

Customers and end users are demanding transparency around how tech is used and how data

is managed, especially with increased surveillance. This, together with the need to maintain privacy, will be a key challenge.

Intelligent applications and services will be deployed across all three instances – server, cloud and edge – employing the best capabilities of each, improving solution performance and efficiency. The next year will see momentum towards horizontal integration between environments. This will lead to increased speed while reducing bandwidth energy and cost.

The move to zero trust networks will therefore accelerate, where the security profile for each device and application is independently evaluated. Security experts can move to a proactive, event-based way of working, rather than continuous manual monitoring.

The positive impact of AI can be outweighed by the attention given to specific failures.

It is expected that in 2021 sustainability regains its position as a primary area of concern. Surveillance solutions with people-counting capabilities will become the norm, to ensure adherence to social distancing regulations.

Johan Paulsson, CTO, Axis Communications



Chatbots out, Vertical AI in

Over the last 2-3 years, the world saw the emergence of conversational AI (or chatbots) as a disruptive technology that can transform the way any business interacts with its customers. Targeted towards always-on digital native generation who love more conversational experience and demand instant answers to their queries, chatbots offered a lot of promise initially.

Fast forward to 2020, Gartner reported 'chatbots' in the trough of disillusionment since other than customer service automation use cases (that of answering repetitive transactional queries from customers), chatbots in general have failed to deliver largely when it came to handling a diverse set of topics and complex questions from consumers.



Why? Because building an intelligent AI system that can truly understand the diverse customer needs and serve relevant responses calls for an industry domain understanding in the AI, an ability to easily train (and retrain) the AI on a wide variety of enterprise data and lastly an ability to ingest and learn from both structured and unstructured data formats to facilitate rapid 'build-test-learn' iterations.

That's Vertical AI – Industry specific solutions that come with AI models pre-trained on the domain ontology. Once trained on your specific products and services, these solutions not only deliver tangible conversion ratio uplift but also deliver consumer insights the business might not be aware of, from the natural language interactions with real customers.

Dinesh Sharma, Co-Founder & CEO, AskSid



Businesses embracing AIOps

2020 has ushered in significant changes for every business and economy. One such change is an accelerated consumer shift to digital. To succeed in 2021, embracing digital will be non-negotiable. In this push towards digital, analytics and technology will play a key role. Here are some tech trends to watch out for in 2021.



AI-enabled Operations (AIOps)

As several employees continue to work remotely, businesses will adopt AIOps. Doing so will enable them to automate IT operations by integrating big data and ML to address security matters such as cyber-crime and automatic resolution of IT issues.

Analytics on Cloud

The accelerated shift to digital is giving rise to a vast amount of consumer data online. For businesses to stay relevant, it is important to appropriately store the data and analyze it for valuable consumer insights. Shifting to cloud will offer vast computing power and open-source analytics, and help improve the way businesses engage with consumers.

AI / ML models to accelerate personalization

Businesses that wish to differentiate from the rest to build meaningful consumer relationships will turn to personalization using AI / ML models. To achieve

this, ML-based algorithms can help in analyzing large amounts of consumer data, developing strong consumer profiles, and personalizing messages.

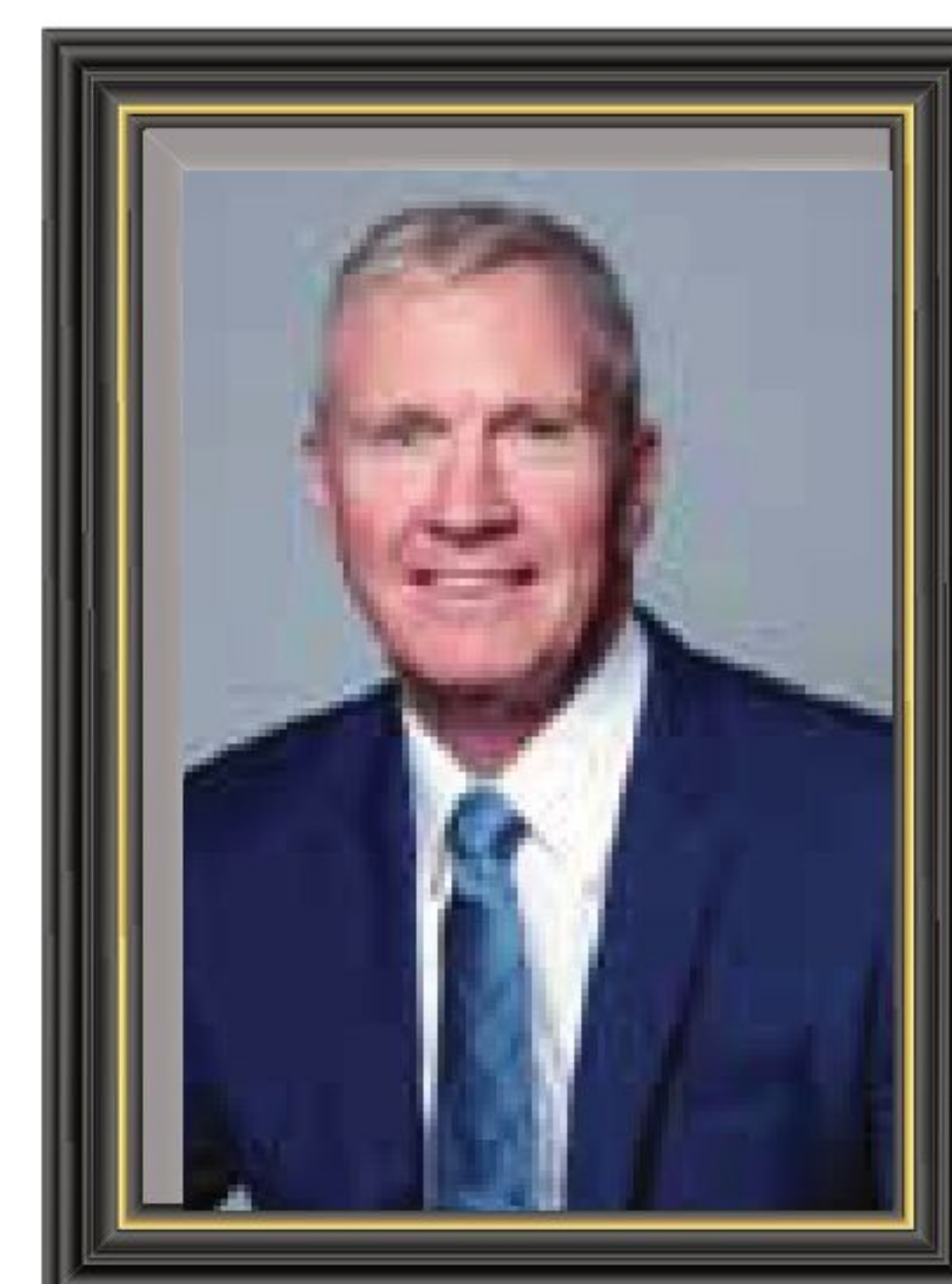
Arpita Sur, AVP, Ugam



DevSecOps at the heart of new digital offerings

Acceleration to more zero-touch customer interactions

We are stepping into 2021 with a fresh challenge: delivering first-class digital service with a spotlight on zero-touch customer experience powered by DevSecOps. Businesses are rapidly enhancing their digital capabilities to replace face-to-face customer interactions and gearing up to achieve the best of both worlds—creating an optimal user interface while building lasting digital trust. DevSecOps lies at the heart of these new digital offerings, bringing security into agile software development enhanced with AI technology to build consumer confidence and satisfaction. Organizations will see increasing automation of AI-based testing and application vulnerability detection within the development lifecycle to unlock the door to a successful omnichannel brand experience, with the ability to scale and adapt to the ever-changing customer preferences—one that stands out from the competition.



Security risks from WFA

In the face of security risks from an increasingly remote workforce, organizations will increase investment into access security, analytics, and automation to protect sensitive information. Failing to cover end devices with rigorous security policies has proven to be costly and many organizations have paid the price for that in 2020. As the attack surface continues to expand in 2021, we can expect more organizations to keep a tighter rein on intra- and inter-organizational data flow, with defense measures encompassing context-based access controls, geofencing of employee remote work location,

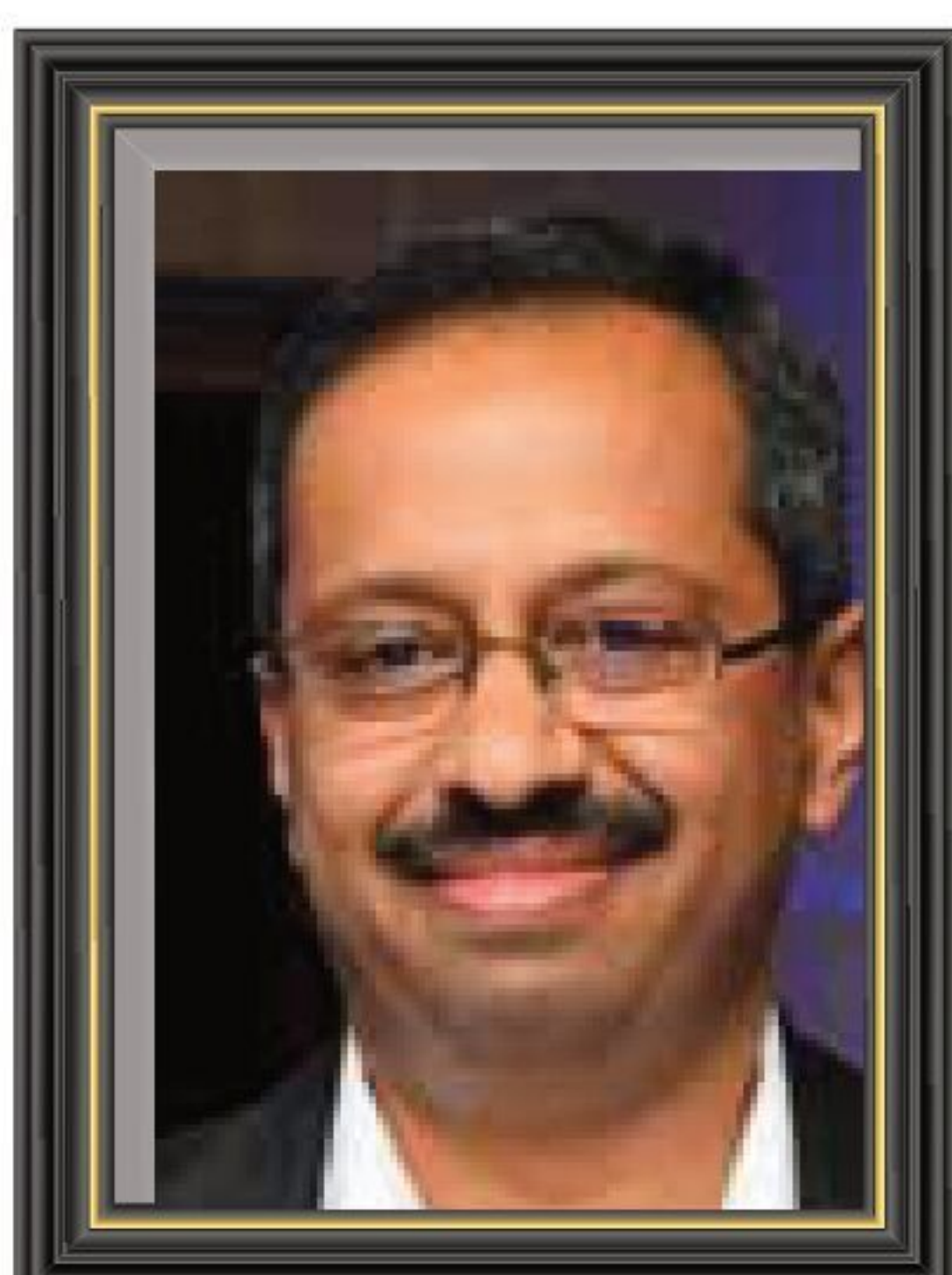
and encryption. Security analytics and automation will become mainstream to help organizations detect anomalies in user behavior and deploy quick remediation to block malicious activities.

Stephen McNulty, President- APAC, Micro Focus



Reinvent security and digital workspace strategies

In 2021, we are more likely to see companies increasingly reinvent their security and digital workspace strategies, and refine their approach to building a comprehensive digital infrastructure that can withstand future disruptions. I see CISOs taking on a larger and more strategic role, integrating security into every aspect of the business.



We believe that older bolted on approaches to security are obsolete and do not work in the modern landscape of heightened risk. We believe that to be truly effective, security must be architected into every layer of the IT architecture. Intrinsic security strategies use the entire infrastructure to guarantee greater visibility, context and control over the applications and data that are being protected.

Apart from security, SaaS adoption will also evolve considerably as organizations focus on modernizing applications and we will see further cloud adoption across sectors. The concept of offering solutions 'as a service' will also gain momentum as the demand for scalability increases. Overall, we are really excited about 2021 with companies addressing the challenges of exponential data growth, while also being proactive on issues like privacy, security, and compliance.

BS Nagarajan, Senior Director & Chief Technologist, VMware India



Pandemic-led pressure drive insider threats

The pandemic has created tremendous pressure on employees and their families.

Economic uncertainty and the move to remote work and school has put many in uncharted territory. These new challenges could likely drive more employees to make poor decisions when it comes to cybersecurity and create a whole new wave of insiders.

As we've already seen in 2020, attackers are

increasingly offering employees with privileged access tempting financial incentives to share or 'accidentally' leak their credentials. In addition, privileged access on the dark web is more popular than ever, with some reports indicating that attackers will pay a premium for privileged access to a corporate networks, VPNs and workstations.



The potential financial payoff, combined with increased economic anxiety, will drive new threats that organizations will struggle to deal with.

David Higgins, Technical Director, CyberArk



Security will get pushed to the edge and simplified

2020 was a watershed year and a true test of our collective digital resilience. With the impact of COVID-19 likely to be felt for years to come, businesses are having to relook at their strategies to navigate the new normal in the longer term. With our increased dependence on technology, how successfully are businesses securing their digital future for 2021? Here are some cybersecurity trends that will influence our digital futures in 2021:



Working from home gets smarter and safer

Companies everywhere scrambled to implement a variety of measures to facilitate remote working amidst the abrupt lockdowns and social distancing measures. In a matter of weeks, digital transformation moved from "tired buzzword" to an "adapt to survive" necessity.

From unstable VPN connections to physical fobs and digital keys, a significant number of these solutions rely on legacy technologies and were never designed for numerous, simultaneous connections. Many of these were also only ever meant to serve as short-term fixes or were too complex for employees with limited understanding of the cybersecurity implications.

If 2020 has taught enterprises anything, it's that remote working on a company-wide scale is possible.

With people at the centre of everything, 2021 now offers an opportunity for businesses to chart a new way forward and ask how they can deliver work to their people.

The value of cloud computing becomes ... less cloudy

With the increased adoption of cloud tools, we could see a reduction in the need for pricier devices with more computing power as virtualised desktops become an increasingly popular solution.

Businesses could instead provide employees with simpler, connected devices that enable employees to access the programmes and resources they need online, delivering the work to them directly – and in turn, protecting the company's crown jewels.

This radical redesign of the way employees connect does away with the cybersecurity complications associated with BYOD – or, as it has become the norm, bring your own computer (BYOC) policies – while enforcing the segmentation of networks more efficiently and effectively.

Security will then need to be delivered via the edge, which will see solutions such as secure access service edge (SASE) being the new cybersecurity norm, thanks to its flexibility, simplicity and the visibility it offers.

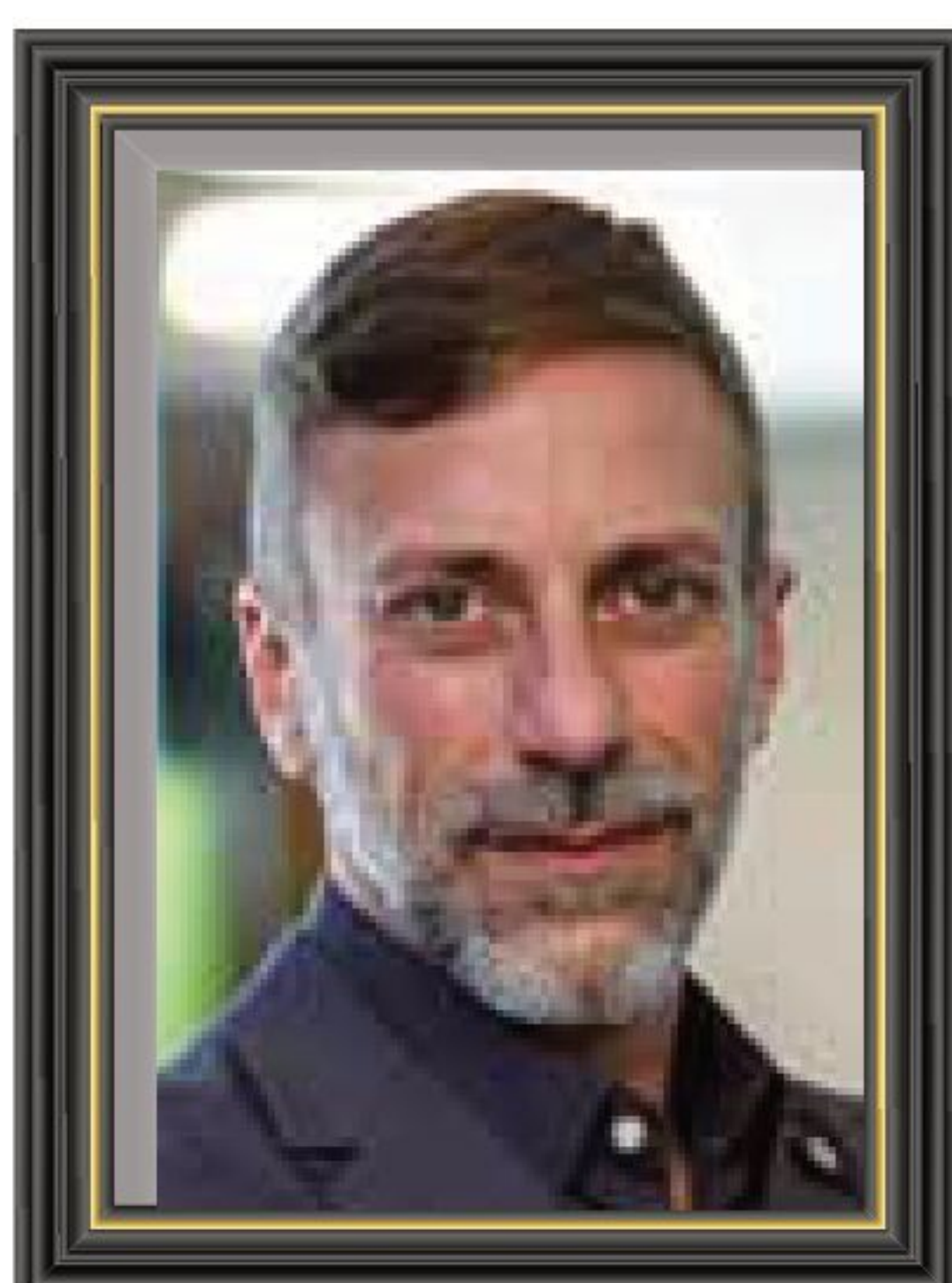
Sean Duca, VP & Regional CSO, APAC & Japan, Palo Alto Networks

Democratization of AI and ML in InfoSec

Within the information security industry, we enter 2021 with a heightened awareness of the relationships that exist across the cyber and physical worlds. We have a better understanding of how abuse of technology platforms (everything from social media, to facial recognition, to big data analytics platforms) affect the world around us. This understanding shapes how we respond next year.

In 2021, every organization will face three challenges: the need to verify information and certify credible sources, the need to secure borderless networks and the need for cloud resiliency.

In response, expect 2021 to see: Democratization of AI and ML technology, Commercial technology



focused on mitigating disinformation, and maturity of security architectures that support borderless networks.

The security industry has by and large taken a black box approach to implementing ML algorithms and models into their product offerings or gussied up rudimentary use of such technologies as 'next-generation'. The results have had questionable efficacy, no way for security professionals to understand how the solutions work and require significant data science experience to tune or modify.

In 2021 we will begin to see technology with abstraction layers intended for subject matter experts, and the ability to build, train, test, and deploy new models accounting for the unique nature of their organization. This will be the first step leading toward the commoditization of AI and ML technology and furthermore required for the broader adoption of the benefits AI and ML have long promised.

Anthony Di Bello, VP- Strategic Development, OpenText

Security & privacy at the heart of products & services

2020 brought unprecedented change for organizations across the world and had deep implications for trust and cybersecurity. Trust in technology has perhaps never been more important. With most of the world connecting remotely, cybersecurity today is a strategic priority for every organization to protect their data, while ensuring the privacy, security and digital safety of their workforce.

Since the start of the pandemic, there's been an exponential rise in cyberattacks, targeting individuals, organizations and often critical first responders like hospitals and public health authorities. With cybercriminals and nation-state attacks becoming more sophisticated, a strong industry collaboration is required for sharing threat intelligence and protecting against cyberattacks. It will need multiple parts, but perhaps most important, it must start with the recognition that governments and the tech sector will need to act together.

Looking ahead, cybersecurity will continue to be critical as hybrid work environments fuelled by cloud



and mobility solutions become the new normal. Organizations will need to have a strong cyber resilience plan pivoted around a zero trust strategy to manage their needs across identity, security, management and compliance.. This means a shift to more robust security tools and protocols, powered by cloud-based threat monitoring and analytics. As we move towards a digital economy, building trust in technology will be critical for every sector as people will only use technology that they trust. Security and privacy therefore need to be at the heart of how organizations and governments build and deliver products and services and cannot be an afterthought. No single organization can go the distance alone- we have a collective responsibility to build a tech ecosystem grounded in trust and strong ethical principles.

Keshav Dhakad, Group Head & Assistant General Counsel- Corporate, External & Legal Affairs, Microsoft India

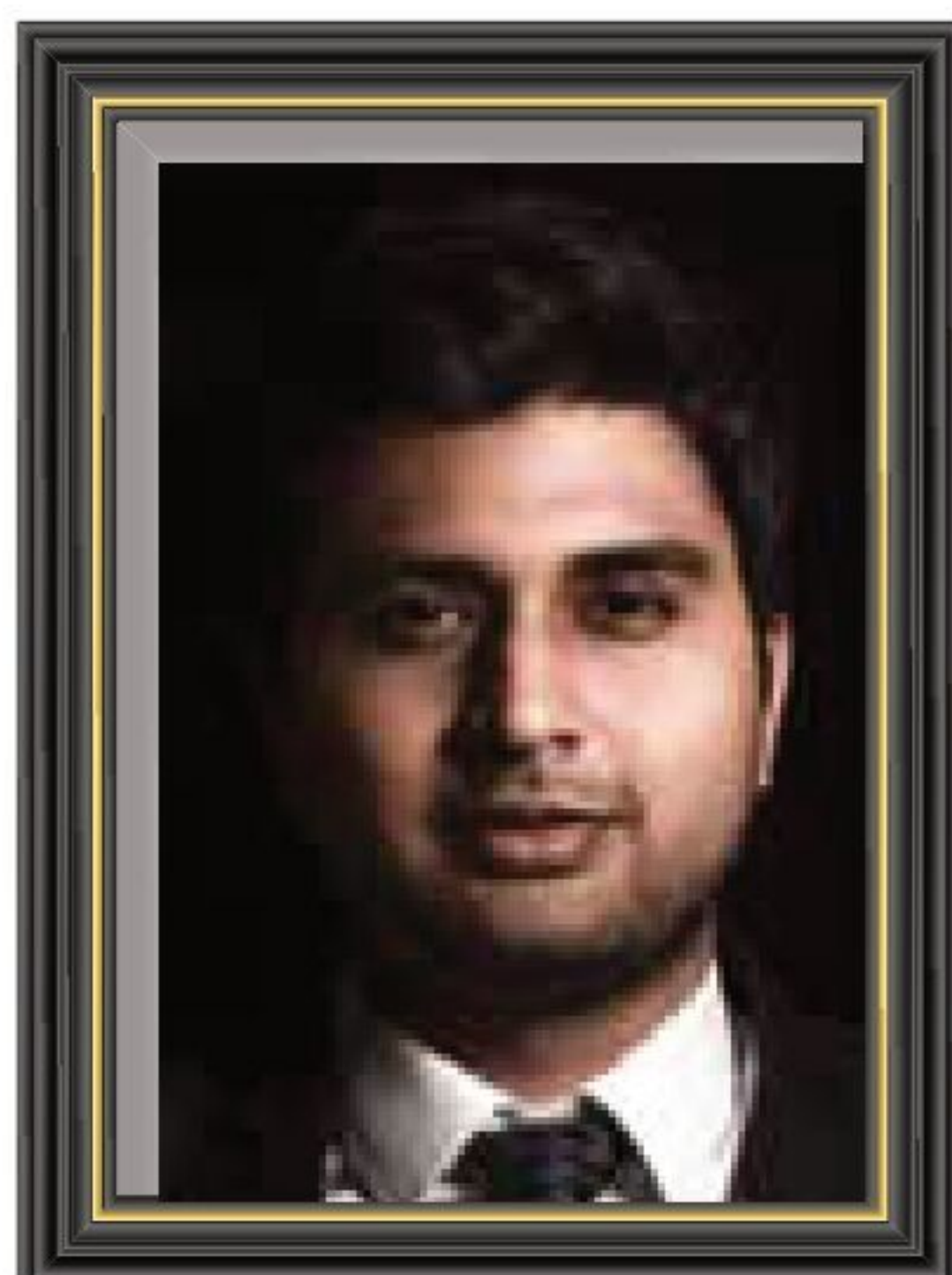


Cyber security products and services adoption will grow

Considering the surge in cyber attacks and rise in security demand due to hybrid culture during the pandemic, below are the trends that will make the headlines in 2021:

Rise in Ransomware

With time, the ransomwares are getting smarter and stronger. Initial phase of the pandemic turned out to be the rosy days for attackers and that's where the greed has gone high. For extortion, things are not just limited to encryption of data but have been turned into a threat to release the data in the public domain if ransom is not delivered on time. Being a highly profitable business line for cyber criminals, businesses will face the increased impact from it and remain in bulletins in 2021.



Surge in Demand of Human Capital

Rise in adoption of cyber security products and services at all three sets of enterprises - Small, Medium and Large has itself triggered the need of talent to manage and strategize them on a day-to-day basis. It is again a golden period for those who are willing to build their career in the cyber security

domain. People involved in the business of cyber education, training or certification can play a very positive role and add tail wings to the aspirations of such individuals and eventually create a suitable workforce to fill the gap of shortage. 2021 will prove to be a turning point for this required momentum.

Transformation in Security Architecture and Technology Stack

Due to the hybrid workplaces, the roles of CISOs have multifold. Lot of transformation will be happening around the architecture. 2021 will be a year where adoption of cloud delivered security will be witnessed significantly and more number of local players will mark an entry in this space. The probable introduction of 5G by the end of 2021 could add an ample of opportunities and use cases, leading to the addition of new cyber security categories. In Indian context the most awaited Personal data protection bill and National Cyber Security Strategy would also further add immense value to the entire ecosystem.

More Bets

Based on the current trend, it is very much expected that the number and potential of the funded local cyber security companies will shoot up substantially.

Karmesh Gupta, Co-Founder & CEO, Wijungle



Rise of purpose-built security solution

2020 forced us through a complete revamp of enterprise work infrastructure. From working at a minimum on-premise capacity to complete remote working, we saw various challenges with these working conditions. Enterprises rushed the work from home setup and the adoption of cloud infrastructure that increased dependence on SaaS/cloud application, opening a larger challenge in ensuring data security. Negating these challenges can be difficult by holding on to the older security approach, the impact of which we saw in the recent data breaches faced by Spotify, Big Basket, etc. This new work infrastructure demands for a more robust and purpose-built security solution with a newer approach to security, such as the Data Security Approach. It keeps data at the centre of all its



initiatives, covers enterprise's SaaS/Cloud application platforms and brings the remote/WFH users under the security infrastructure to prevent intentional/unintentional, internal and external data exploitation while protecting from network threats, keeping us ready for the future.

Sonit Jain, CEO, GajShield Infotech



SECTION

MOBILITY



Mobile commerce is a flourishing trend

The global pandemic has led businesses to adopt digital transformation and inculcate its techniques into their business intelligence strategies. Technology is going to be deeply embedded in our everyday reality from now. What businesses can do is harness the power of technology to drive success.



The gallop of technology has been a boon for customer-centric businesses as it helps in keeping pace with the changing customer demands. Omnichannel support systems and conversational support are going to be the future of customer service. More companies will switch to omnichannel in 2021 and move away from a siloed approach.

AI has already taken up the world and will continue to register its mark in the future too. In the customer service arena, AI-driven chatbots have made an exceptional change in enhancing the customer experience. By employing algorithms to respond to customer queries, chatbots can provide accurate, real-time information to customers. Studies say that 47% of organizations are expected to implement chatbots for customer support services, and 40% are expected to adopt virtual assistants.

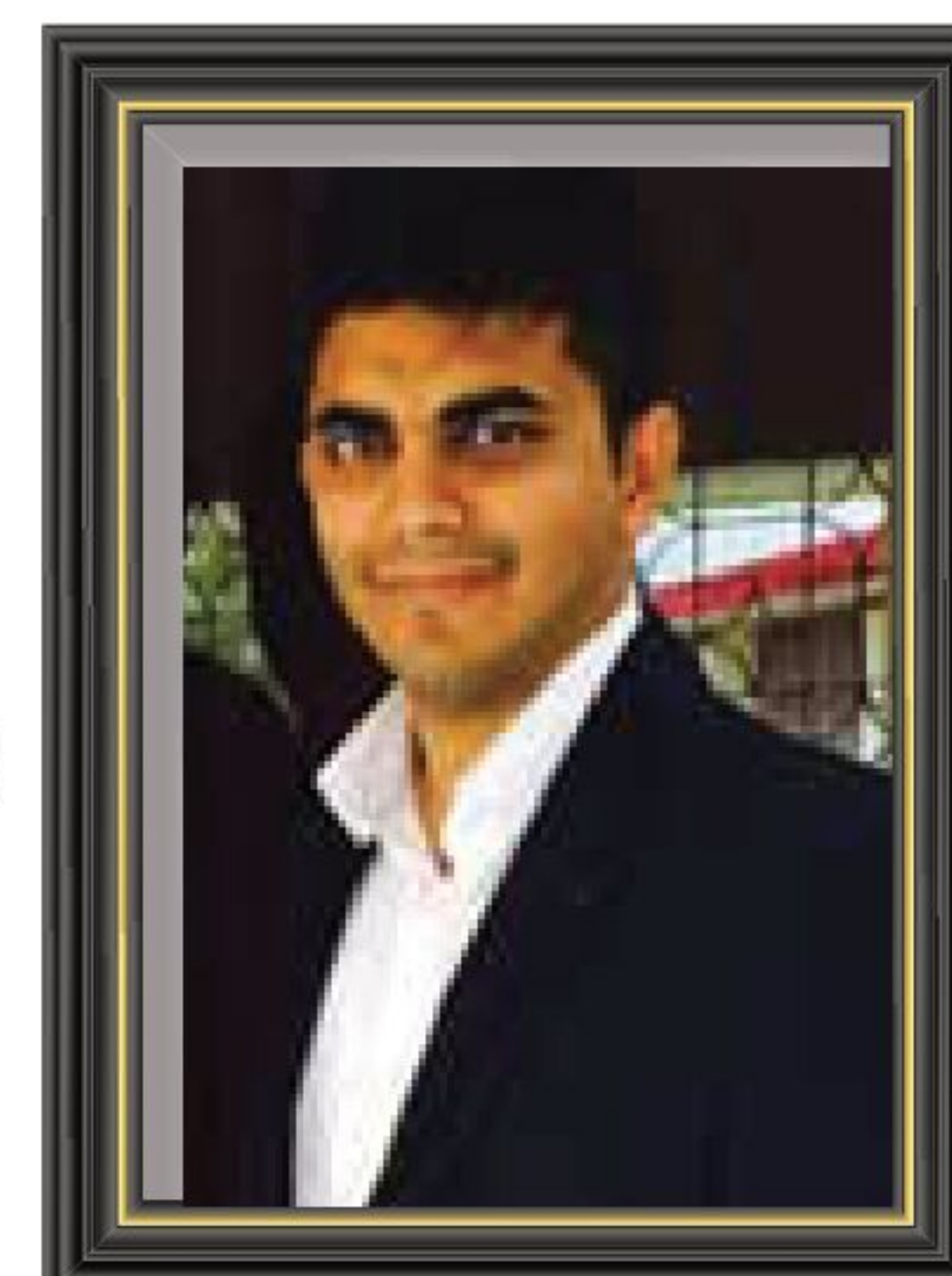
With digital transformation, more businesses are going completely online, which makes mobile commerce a flourishing trend for the future. With mobile shopping, payments, and banking, mobile e-commerce sales are expected to account for more than half of the total e-commerce sales by 2021.

Sheshgiri Kamath, Co-Founder & CEO, Kapture CRM



Growth in the App-First Businesses

2020 has seen most of the businesses move their marketing spends to the digital medium. Traditional businesses have also started exploring various online marketing channels to expand their footprint. Facebook and Google have strengthened their foothold in online marketing while LinkedIn, Snapchat, Apple Search Ads, and various other channels have seen a great increase in advertising spends. 2021 will see many more businesses explore online as a prominent marketing channel.



App-First Businesses have become one of the fastest-growing businesses in the world. 2020 has seen many app focused ed-tech and fin-tech startups generate substantial fundings from investors. Likely in 2021, we will see a continuation of this trend.

Raghav Kansal, Founder & CEO, ET Medialabs



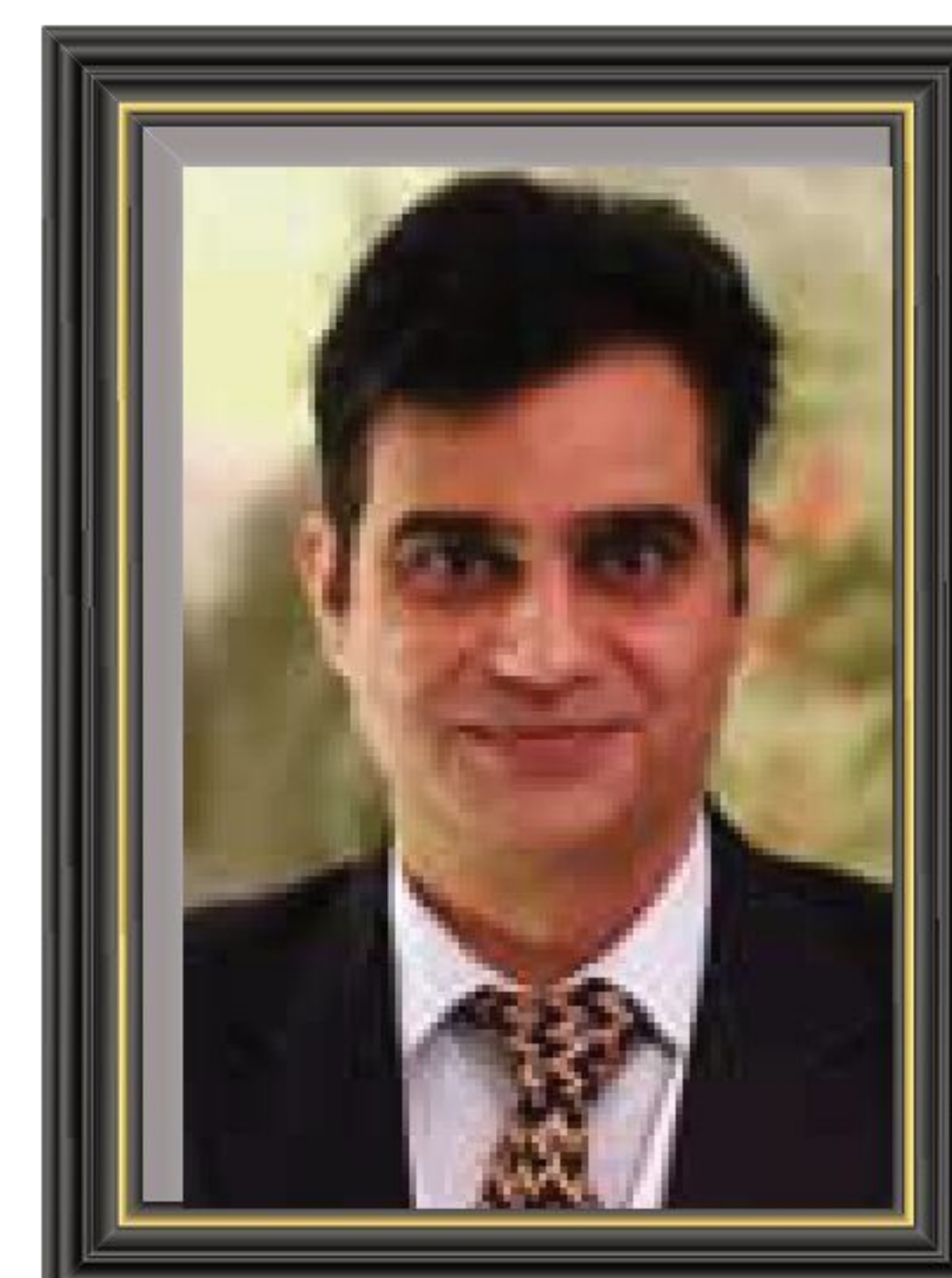
SECTION

ICT



AI and 5G will drive economic advances in 2021

As the world adjusts and settles down to the new normal of work from home, e-socialising and online entertainment, we believe that year 2021 will be one driven by innovations designed to further this new lifestyle. It will be backed by new innovations on the wave of mass rollout of 5G, AI deployment, smart assistant use cases and home robot adoption. AI and 5G will drive economic advances in 2021 as they have the potential to affect every aspect of the digital world. Use cases and trends such as living and working with bots, zero search with sensor equipped appliances, augmented creativity with Cloud AI, symbiotic economy and reduction in greenhouse gases with use of ICT technology will emerge in 2021 and shape how we live and work. As we witness the rapid rollout of 5G, it is foreseen that by 2025, there will be 6.5



million 5G base stations deployed and 2.8 billion 5G users around the world. These technologies will help build a solid foundation for the intelligent world and we, at Huawei, are committed to developing new skill sets and supporting the new ICT infrastructure for the realization of India's digital ambitions.

Srishty Raj Koul, CTO, Huawei India



GIS to play a pivotal role in India's growth story

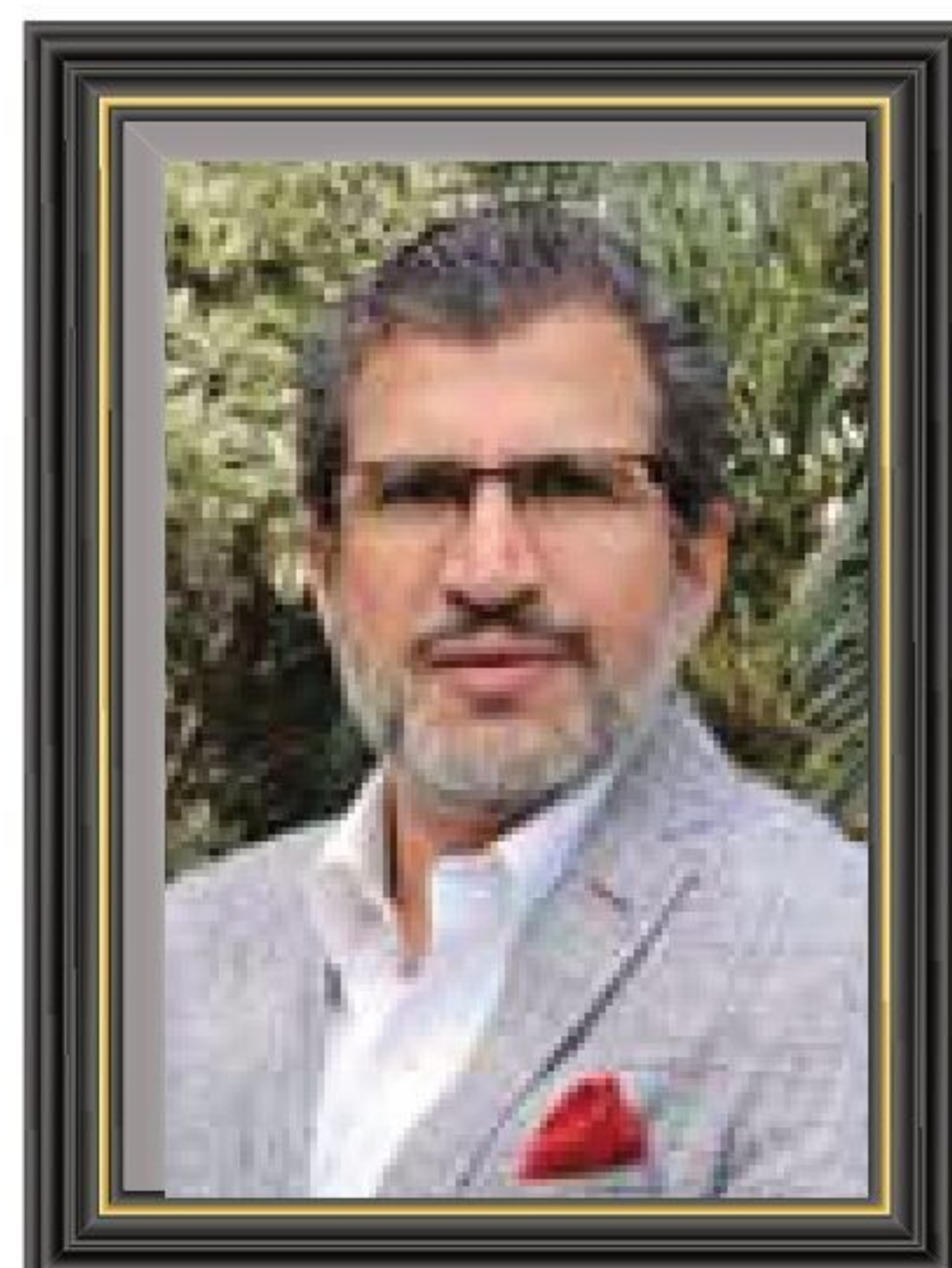
As the fifth largest world economy, India is at crossroads staring at historical opportunities to fuel its growth and aspiring to be a \$5 trillion economy. India's story will be defined by its ability to strike a right balance between economic, social, and environmental priorities by embracing inclusiveness, sustainability and resilience. This cannot happen without exploring and understanding interconnections and interdependences between economic, social and environmental ecosystems spatially and temporally. In 2020, the Geographic Information System (GIS) has emerged as one of the most disruptive and transformative technologies. Its adoption has substantially increased in sectors like healthcare, agriculture, water and environment. COVID-19 has taught us – unless we have a spatial understanding of data, our ability to respond during critical situations will remain constrained. Apart from managing the COVID-19 situation, GIS is also being leveraged in managing business continuity and vaccine distribution. While advanced geospatial technologies are uniquely positioned to play a pivotal role in India's growth story, for the real benefits of productivity, efficiency, transparency, and monitoring to reach citizens and customers, geospatial infrastructure holds the key. By harnessing geographic context, GIS can provide unmatched capabilities to discover insights from within data and transform how organizations and communities see, think and act.

Agendra Kumar, President, Esri India



Unleashing the potential of location intelligence

With the various new restrictions caused due to the COVID-19 pandemic, the location industry has undergone tremendous changes and has been a



boon for multiple industries around the globe. The demand for highly accurate location data is growing rapidly, with companies relying on highly accurate data for delivering the best services and exceeding customer expectations, the utility of location in businesses has outgrown by manifold. Industries across retail, logistic, QSR, healthcare, real estate, BFSI have been dependent on location intelligence to discover useful and contextual data, ensure data quality and accuracy, and mitigate distribution costs.

The coming years will further see a spike in the use of location intelligence as the age of automation is ushered. Emerging technologies like AI, ML, Deep Learning, and IoT will deliver optimum outcomes and help in developing new frameworks that cater to industry requirements only when they work in sync with the location. Several factors are driving the demand for location intelligence, but most importantly the dire consequences of low-quality location data when the location is increasingly being used in decision-making. Besides that, companies also need to have the right people to run this analysis to unleash the maximum potential of the location intelligence.

Ashwani Rawat, Director & Co-Founder, Transerve



SECTION

COMPUTE & ELECTRONICS



Building a connected and intelligent world

One of the biggest trends I foresee in the coming year is around building a connected and intelligent world. The emergence of devices that are not only connected but are able to take informed decisions based on data is well underway and this trend will largely be defined by four pillars:



Connectivity

The fourth industrial revolution will be built on 5G,

which will be driven by convergence of digital and physical technologies such as digital connectivity, cloud and edge-computing, IoT and smart devices, AI, robotics, blockchain, and AR/VR

Sensor

While more pixels and more cameras will be enhancing the quality of our pictures, smart sensors will provide more intelligence and will enable us to choose the best shots too. Beyond image sensors, other sensors are also catching up to mimic human capabilities

Data

With big data on rise, storage solutions have evolved from core storage to a hybrid multi cloud infrastructure

AI

AI will be critical with movement from Cloud based AI to Edge based AI, to enable real time decision making

*Balajee Sowrirajan, MD,
Samsung Semiconductor India R&D Center*



Gearing up for smarter lifestyles and workplaces

The smart device ecosystem will be a game-changer in 2021, with homes and workplaces gearing up for a connected future. Multimedia is expected to drive this change, enabling gadgets to stay connected at home, work and on-the-go.

AI is one of the biggest technology game changers and by 2021, it will become even more valuable and useful tools across industries. Robotics, drones, and vehicle automation will be the second trend to look out, which will shape the technology sector in 2021. At present, we are working on technology upgrades like 5G modem technology, WiFi-6, Edge AI capability, and 8K capability among others.

These trends will work as a primary source, in tandem with 5G, to assist smarter lifestyles and workplaces, in the coming years. 5G will open doors for smarter and faster-connected devices in 2021. In smartphones, 5G and advanced gaming capabilities will be major trends to look forward, with better



experiences of Ultra HD, HDR images and video experience with incredible sound quality, rich content, reliable connectivity and ultra-saving capabilities to make your smartphone run for a longer duration.

Anku Jain, MD, MediaTek India



Focus on immersive home entertainment experience

Some of the megatrends that are shaping people's lives in the post-COVID era are:

Remote work has increased the need for high quality devices, security and collaboration platforms. With the traditional network suddenly moving away from the corporate environment, the perimeter has now expanded to all devices connected remotely to the cloud or other work devices- where even smart home devices may add risk to corporate networks as employees log in from home.

Companies are shifting from hardcopies to cloud applications and multi-cloud management solutions. There will be a demand for always-on and always-connected PCs, offering freedom from dependence on Wi-Fi alone.

Further, connected smart home assistants will also grow in popularity. The Work/learn-from-anywhere culture will prompt tech companies to develop and enhance tech that is tailored to the new behaviors of the workforce.

Stepping up services to enable seamless support to our customers anywhere and anytime. Notable camera improvements across all device types, particularly in PCs driven by video culture.

AR-enabled smart glasses could come to the fore. Home Immersive entertainment experiences will benefit from the display, audio, and battery life improvements that can be automatically optimized by AI and ML built into the devices. This is even more relevant for gamers as gaming as a way to stay entertained and socially connected, while apart, will continue to flourish in 2021.

Rahul Agarwal, MD & CEO, Lenovo India

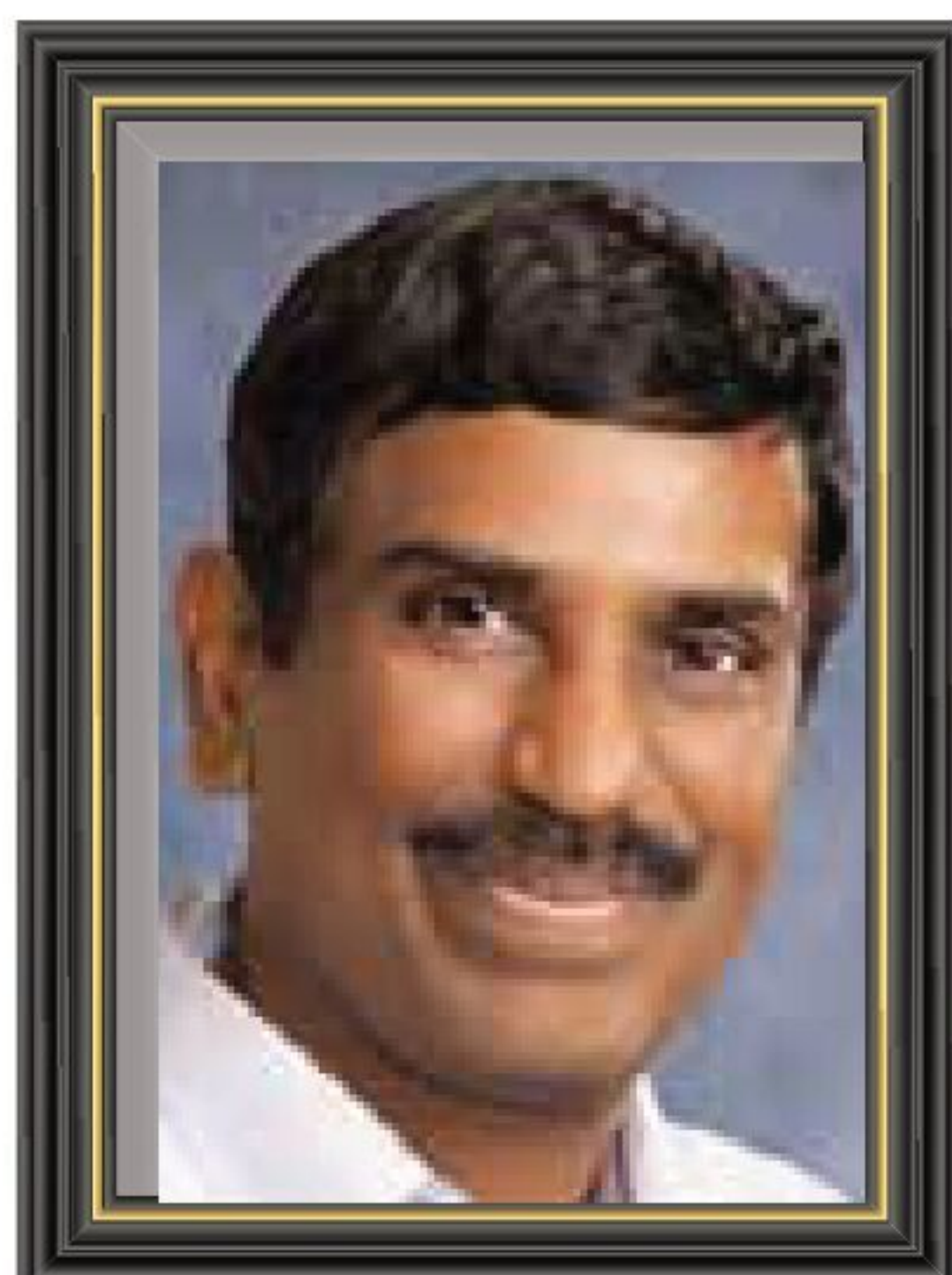


Electronics manufacturers bet on IoT, Big Data

As a result of the coronavirus pandemic, 2020



will be recorded as one of the most disruptive years in history. Its global impact had one common denominator - Digital Technology. The electronics industry coupled with emerging technologies helped humanity steer through this turbulent year. In the post COVID era, the following trends will continue to give us even more advanced smart devices that can help make our lives easier and safer.



from data drawn from various sources. Thanks to new technologies, every business irrespective of size, has access to this treasure trove of data. As a result, electronics manufacturers have been able to use this information in a variety of ways. Much of this is seen in the reduction of operational costs while increasing profit margins and market share. With coming times, when the margin for errors will continue to get slimmer, the decisions have to be made based on hard hitting facts derived from data.

Sailesh Chittipeddi, EVP & GM, IoT and Infrastructure Business Unit, Renesas Electronics



IoT

The electronics industry as a whole has been increasingly embracing the IoT sphere to connect 1 trillion edge and endpoint devices. The electronics manufacturing industry has been leveraging this technology in a variety of ways, each of which has had unique benefits. Alongside this has been smaller sensors, more powerful microcontrollers (MCUs), options for security, voice user interface, graphics, ML, and wireless connectivity, which have allowed more devices to be quickly and easily connected to the cloud. In addition, the IoT will greatly help robotics for the factory floors, health sensors for air quality monitoring, and medical devices for at-home self-test kits for COVID-19, which are expected to be widely available by early spring 2021.

Predictive Maintenance

Downtime is something that no company can afford. This results in a significant loss in revenues and reputation. Here, predictive maintenance comes to help. This can be done with a variety of technologies, including MCUs, AI and ML, depending on which equipment a company is using. While avoiding the costs associated with downtime is obvious, there are a few other savings. Chief among these is reduced maintenance and repair cost, which is enhanced by equipment being more long-lasting. Much of this is done in conjunction with IoT technology, which can monitor the health of equipment. Coupled with data collection, this can predict when and how a piece of equipment may fail, allowing business owners to avoid it.

Big Data

We live in a data-driven world, where almost every decision is taken based on insights that we draw

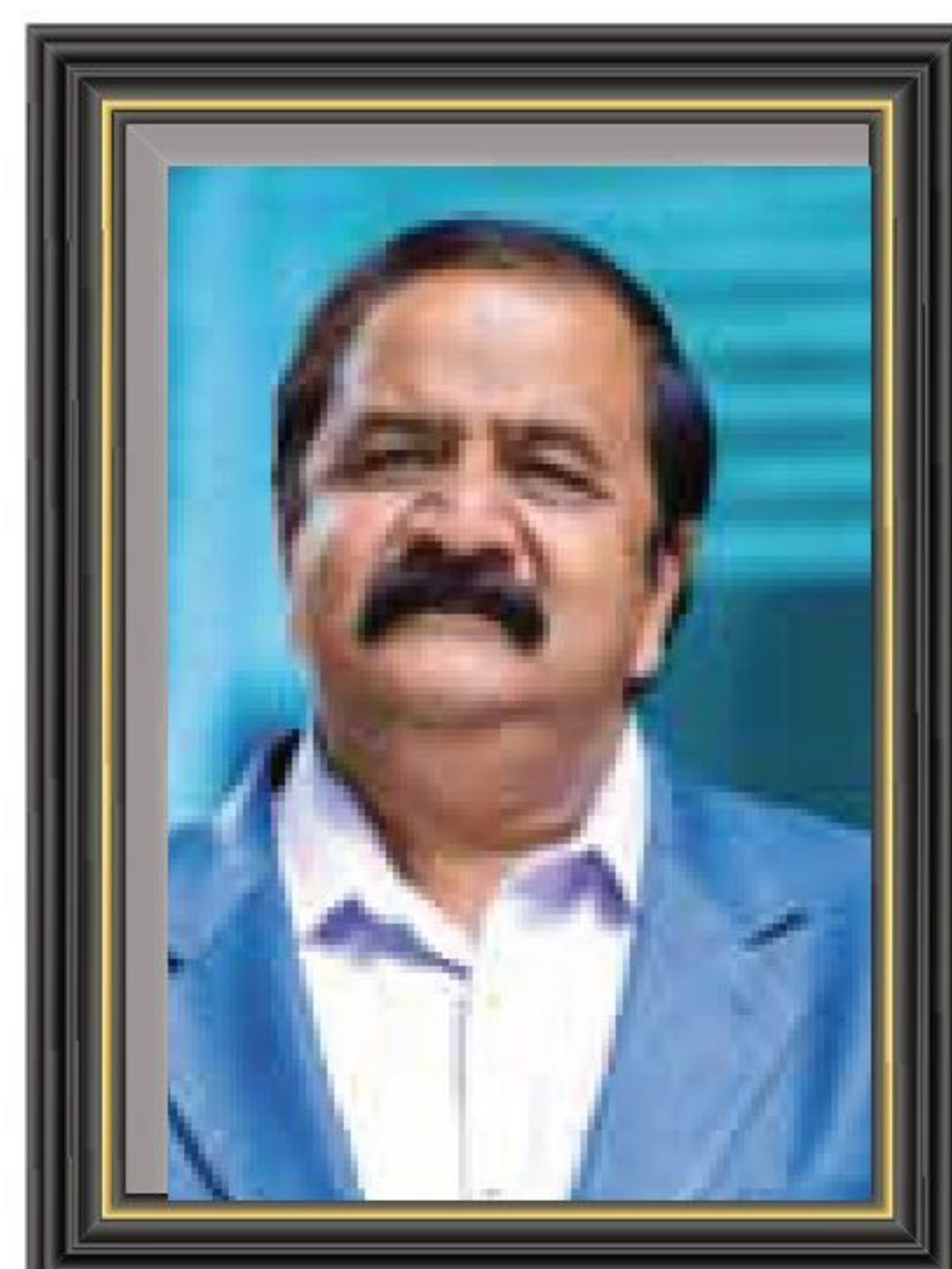
Computing takes a big leap

The year 2021 looks to be a promising year in the way new technological trends are constantly evolving to reshape everyday life as we adjust to the limitations of a post-pandemic world.

5G and next-generation WIFI 7 with additional technologies that enhance efficacy and speed will turn out to be real. Edge computing, Supercomputers, will take the next big leap further to offer incessant support to scientific, engineering work. Larger servers, more storage space, latest cooling technology in laptops that intelligently adjust cooling, fast charging laptops, next genre of AR and VR will have the attention of PC manufacturers alike. Thunderbolt ports hitting the market in the coming months will bring together incredibly fast speeds, advanced protocols, offering a top tier user experience. A bunch of new applications like always-connected laptops have a bright future ahead.

Another area of growth opportunity is the Gaming Market and Cloud Computing which is on an exponential rise. One can expect the latest VR headsets to render realistic 3D graphics and reach more genres of games.

In 2020 there has been a larger focus on Cloud Computing and this is only going to grow. As the sector matures, enterprises and the education sector will have an opportunity to efficiency-improvements. It will be an excellent computing paradigm to deliver diverse computing services thereby proving beneficial in terms of instant uploads, ease of access, efficient collaboration to save money on data storage



within the education fraternity and enterprise community.

Sudhir Goel, Chief Business Officer, Acer India



Focus on enhancing the learning experience

Despite the unprecedented challenges put forward by the Covid-19 pandemic, there has been a tremendous acceleration in the use of technology to amplify the student's learning experience, which makes the EdTech sector an excellent place to jump over and provide an impactful experience to all the students globally.



Virtual Learning

The paradigm shift observed in the education system from traditional classrooms to online learning methods is accepted by a majority of parents, teachers and students. This learning is not only restricted to academics, but also other important and crucial skills like coding, project-based learning, virtual labs etc. All such platforms have ensured the involvement of students in positive learning and experiencing new methods for recreation.

Gamification

Enhancing the experience of learning is the foundation for the existence of EdTech. As technology continues to advance more aggressively than ever, it has become a matter of concern to keep the student's engagement intact. Thus, the adoption of gamification technology will be a more viable option to involve students in learning and enhance the experience. This can be possible by replacing usual toys with DIY Kits and applying high-end graphics in the platforms being used by students for learning online.

Experiential Learning

Learning by doing is a popular concept, where students can understand the subject more immersively and can connect with real-life. Use of DIY Kits, STEAM methodology and Robotics in imparting

education may witness an exponential rise in 2021.

The introduction of NEP 2020 will also play a significant role in channelizing focus towards EdTech, as it promises to deliver informal education, vocational skills, or technology-based educational courses as an additional tool to formal education.

Anoop Gautam, Co-Founder & CEO, Tinker Coders



5G will transform online learning experience

EdTech is set to grow even more now as more students rely on technology solutions for receiving education. Here are some technologies that will trend in 2021:



AI & VR

AI has transformed the education industry by showing its true powers in times of distant learning and is known to be one of the most useful technologies in today's time. VR will continue to help the teachers to make their teaching-learning process in a more productive and engaging manner.

IoT

IoT devices will replace chalks, blackboard and soft board in the near future just like we all shifted to online classrooms in this pandemic.

Mobile Tech

The children of today are tech-savvy and are comfortable in handling tech devices.

Education has become mobile throughout 2020 and will become even more so through 2021. Students find comfort in the fact that they're now able to access education from anywhere and at any time.

Online Games

Earlier games were used only for the purpose of entertainment but future-ready students are appealed by the usage of games for the purpose of learning concepts, networking and learning with their peers.

5G

5G technology will contribute to the incredible growth taking place in the education sector by adding speed and dependency that will definitely

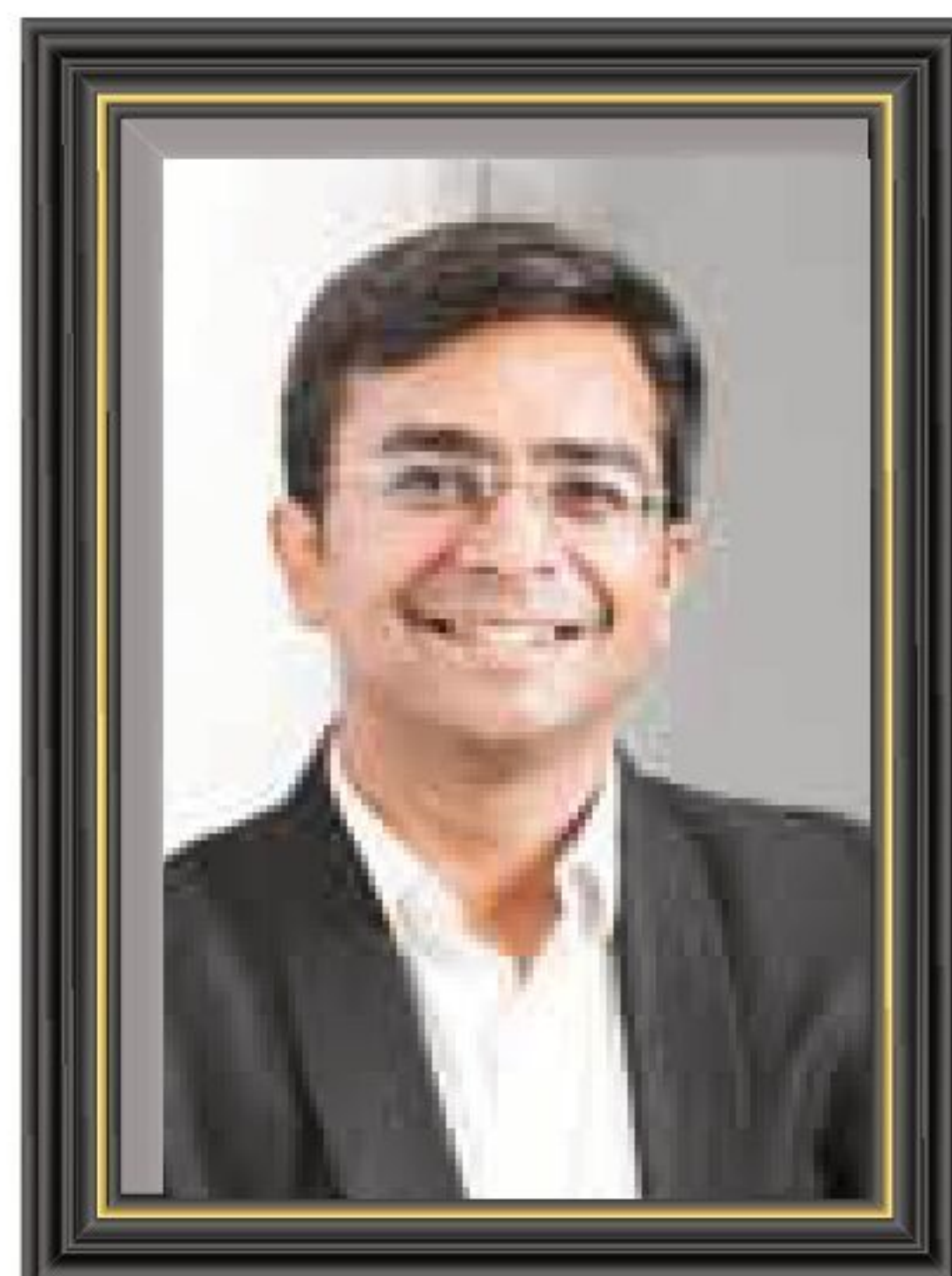
transform the learning experience of the students.

Aarul Malaviya, Founder, Zamit



A deeper infusion of emerging tech in the education

The COVID-19 pandemic has given a fillip to digitalization in education. In 2021, we expect the deeper proliferation of emerging technologies to automate instructors' tasks, enhance the quality of pedagogy and improve learning outcomes. We foresee the deeper penetration of AI and NLP to serve a diverse community of learners with varied learning pace across geographies and cultures. The use of Big Data to gather insights such as learner enrolment, feedback and performance will be the key to improving user experience. Video-assisted learning, Gamification, Virtual Reality and Augmented Reality will emerge as useful technologies to enable students to experience a simulation of the real world, thereby making e-learning more interactive. Cloud technology will be the mainstay to provide learners access anytime, anywhere and on any device. 2021 will also witness the paradigm shift in the use of social media as a tool to disseminate and share information and a forum for facilitating online discussions among a vibrant student community.



Rohit Manglik, Founder & CEO, EduGorilla



Learning Analytics & Gamification for online test preparation

In 2020, the EdTech industry attracted students from schools, universities, businesses and individuals as classroom training was at a standstill due to the virus outbreak. The online test preparation industry is about to experience its busiest season in the coming months. Learning Analytics and Gamification will play inevitable roles in the online test preparation industry, as it will allow educators to assess and report student learning only on the web and will further assist them to better understand and optimize learning. For example, teachers will be able to see what kind of knowledge students most enjoy and use it accordingly (text, photos, infographics, or videos). They will be able to note which portions have not

been delivered successfully and strengthen them next time. Besides, learning analytics can also help educators classify learners who may have academic or behavioural problems. Teachers could then build a way to help students achieve their full potential.

Abhishek Patil, Co-Founder



& CEO, Oliveboard



SECTION

GAMING



Gaming to become mainstream as spectator sport

2020 has been a stellar year for the gaming industry in India, which recorded growth numbers like never before. As we enter 2021, we expect this industry to scale-up even further.

According to a recent report by YouGov, 67% of gamers in India play on mobile phones and just 12% on consoles. As a mobile first country with the second largest smartphone market in the world, this sector is expected to skyrocket further as this industry flourishes.



Gaming has also become mainstream as a spectator sport. YouTube Gaming recorded its biggest year in 2020 garnering 100 billion watch time hours and over 40M active gaming channels. As e-sports also continues to pick up steam in 2021, there is expected to be a shift globally, with the number of spectators overtaking the number of gamers.

Furthermore, as our infrastructure and broadband connectivity develops further, we are likely to see the advent of 5G in the country. This will revolutionize the gaming industry, bringing concepts like AR/VR, cloud gaming, Gaming-as-a-service to the forefront, and taking this once niche entertainment to masses across the country.

Overall, gaming has become an incredibly lucrative business for all involved. With it increasingly finding relevance across sectors, we will soon be able to harness the full potential of this industry, which in

turn will help drive job creation and fuel the country's economy.

Rajan Navani, Vice Chairman & MD, JetSynthesys

Esports bets on deep tech

The COVID pandemic has brought about a transformation to every industry in the world and the esports industry is no different. The lockdown fueled this already-burgeoning industry. The industry sought to bring in new strategies that paved the way for growth in the sector such as the adoption of AI, ML, Big Data, live streaming of gaming content, and an increase in prize pools in tournaments or leagues. Further, investments are also on the rise in the gaming and esports industry.

There is no doubt that technology has played a long-standing role in online gaming growth. The industry has made way for new innovations and technologies to give a seamless and unique experience to gamers across the country. The mobile gaming industry is backed by deep-tech such as AI, ML, Big Data, and quantum computing, which are constantly gathering data from players' interactions and performance on gaming apps, helps in analyzing insights to bring new and attractive strategies making it more experiential for the gamers in the esports ecosystem. The use of AR and VR has transformed gaming into an interactive, stimulating, and realistic experience, where India is now recognized globally as one of the top markets in gaming. These cutting edge technologies and innovation will truly change gaming, making India a gaming superpower!

Abhishek Madhavan, SVP, Growth & Marketing, MPL



allowing remote access and management has seen the FinTech sector grow even further.

Software as a service (SaaS) based innovation in FinTech will witness increasing demand for digital tools and automation amid the ongoing pandemic. The decision-makers in the payments sector are increasingly acknowledging the fact that DIY (Do It Yourself) Tools; AI is central to delivering the best services for customers. Investment in cloud-based solutions will be foundational more than ever to ensure nimble growth and adapting to the change.

Data-driven technologies like Federated Learning will be the game-changer, as the competition gets tougher and more intense. Product companies will become extremely innovative in gaining the trust of the customer, and offering a seamless digital experience is the key. FinTech players who can connect cash, digital rewards, and loyalty points for more unified omnichannel payment experiences (with global content) will likely emerge as winners. As the ultimate trend of 2021 is consumer, therefore paying attention to consumer security and consumer experiences will be extremely critical in the coming year.

Sachin Lala, Senior Director- Engineering, Blackhawk Network India



Bank-FinTech partnerships grow stronger

India is touted as the global hub for FinTech innovation. Advancements in FinTech are closely linked to regulatory acceptance and India has emerged as the global leader in terms of creating public infrastructure for a thriving FinTech ecosystem. In less than a decade, we have seen Indian consumers go from relying only on cash on delivery for their ecommerce purchases to widespread adoption of payments technologies such as UPI and app-based investing. The future too, seems bright. Today, you can travel to any major Indian city or town like with no physical cash and still experience a frictionless journey.



SECTION

FINTECH



Consumer experience will be the key differentiator

When it comes to innovation and design, the pandemic saw the FinTech sector delivering accelerated solutions that reshaped the entire payments ecosystem. Over the past year, the move towards creating contactless solutions and

Moreover, the pandemic and the resultant physical restrictions brought about by the lockdown has boosted the demand and public acceptance of digitization of financial services. Like for example, in the education financing space adoption has grown significantly and there is a stronger interest from both customers and investors.

While new age FinTech companies in each category such as lending, investing, insure-tech etc. have all seen great boost in acceptance, existing legacy financial services companies like banks have also engaged in massive 'digital transformation' exercises. The defining trend of 2020 for us has been the significant willingness and initiatives from larger banks and FIs to engage in deep partnerships with new age financial services companies like ours.

The RBI too has been forward looking in its regulation towards FinTech companies – enabling a culture of innovation via FinTech friendly notifications and sandbox initiatives. With Bank-FinTech partnerships going mainstream and even getting the RBI's support via recent notifications, we have seen significant interest from multiple national banks to come on board as our lending partners.

Rishab Mehta, Founder & CEO, GrayQuest



Digital payments & UPI to be widely adopted

2020 has been a 'See-Saw' year. Post the lockdown, the pandemic acted as a catalyst to the growth of digital payments in the country. UPI itself doubled from 0.9 billion transactions to 2.2 billion transactions.

I believe that 2021 will see a further acceleration in the adoption of digital payments in India. UPI and WhatsApp Pay will continue to be the driver. Also, I believe that in 2021, we will see Tier-2, Tier-3, and Tier-4 cities as the key growth drivers for UPI and digital payments in the country. We are confident that digital lending is also set to grow as the businesses try to get back using credit.

Ashneer Grover, Co-Founder & CEO, BharatPe



A fundamentally different approach to commercial lending

When it comes to commercial lending, banks

rely on risk models to make decisions. These models have been built up internally over decades of lending across thousands, if not tens of thousands of loans, but COVID-19 has exposed unexpected flaws in them. For example, these models are based on historic data which doesn't adequately reflect the unique situation we now find ourselves in or take into account the future challenges that the world will be facing as it enters into the worst recession in three centuries. They also make broad assumptions about entire sectors rather than developing an understanding of the portfolio at the granular loan level and taking into account the individuality of each business.

I believe the only way to course-correct for the new normal is to take a fundamentally different approach to commercial lending than what's been done for decades, and technology will be central to this.

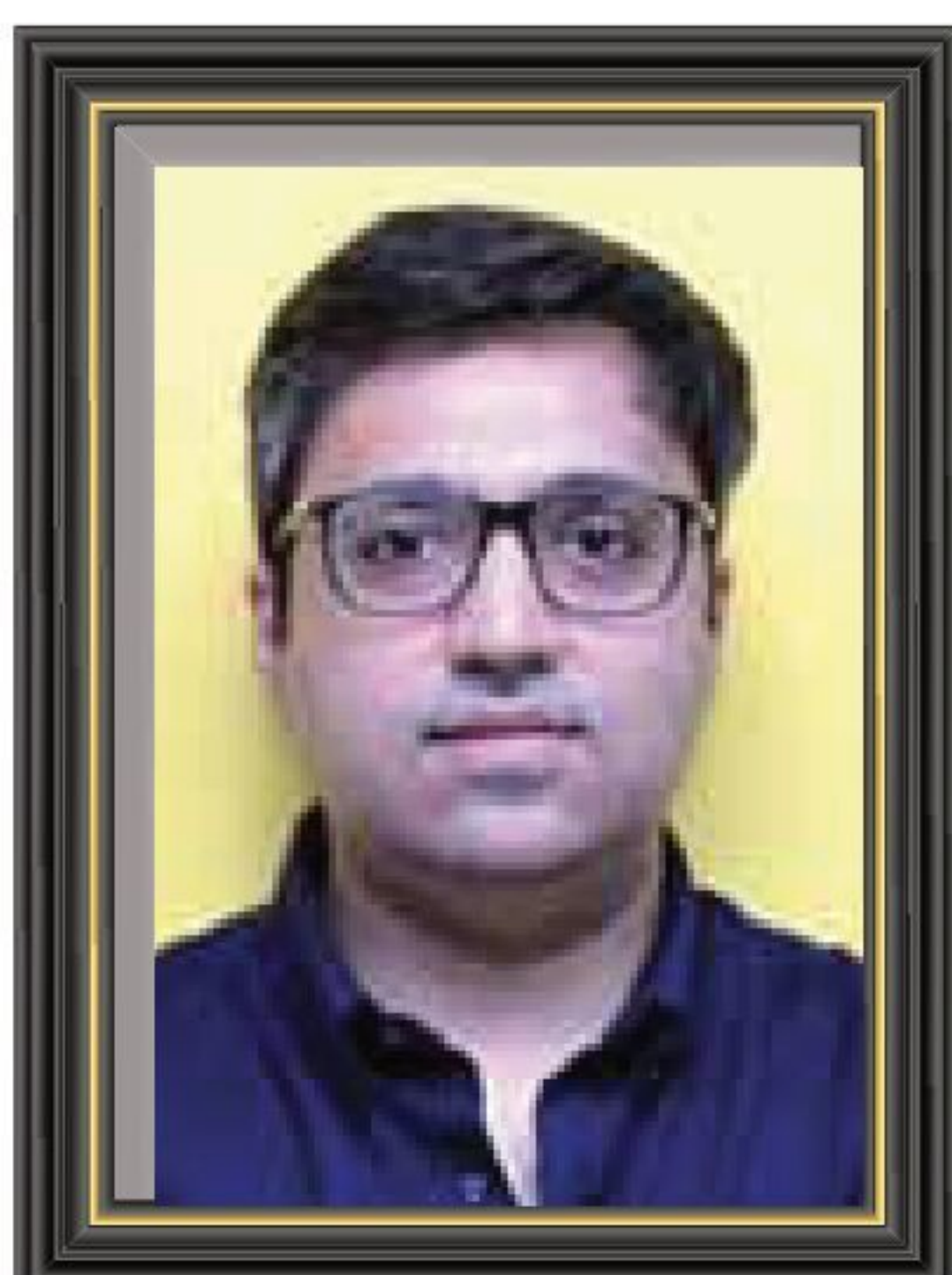
In the future, banks are going to have to combine backward-looking data with a forward-look view, as well as take a granular, loan-by-loan approach rather than an overall portfolio or sector-level approach to credit analysis. They are also going to have to conduct reviews on an ongoing basis, rather than annually; update parameters to reflect the ever-changing situation; and use alternative data such as foot traffic to inform their models.

Sean Hunter, CIO, OakNorth



Digital payment volumes will reach new heights

The COVID-19 crisis has been a huge shot in the arm for India's digital payments industry, driving both consumers and businesses to adopt contactless or less-contact digital transactions. In 2021, we will see this trend continue, with digital payment volumes reaching new heights. Technology will emerge as the single largest critical factor for banking and financial organizations to drive innovation, as everybody tries to find new avenues of growth, with greater



operational flexibilities. With volumes of digital payments skyrocketing and consumers demanding a never-before-experienced agility from banks, it will be crucial for banking and FinTech decision-making executives to prioritize innovation and drive change as a fundamental way to unlock post-crisis growth. We will, therefore, see significant and concerted efforts by banks and financial institutions, to rethink their payments strategy that will help them effectively manage both innovation and scale, while transforming the end-user experience. Despite disruptions and delinquencies, the post pandemic world will throw up new and enhanced opportunities to innovate, better consumer experiences and relationships, increase future-technology investments, and effectuate a mindset shift to adapt to the new future.

Kaushik Roy, VP & Country Leader, South Asia, ACI Worldwide



Blockchain transforming FinTech

Blockchain technology is revolutionizing the future of FinTech firms and has had a huge impact globally. FinTech incorporating blockchain solutions can make the KYC verifications, remittance process and trading faster and effortless. As a result of process simplification, FinTech companies operating in cryptocurrency, insurance, digital wallet, digital lending, and digital banking space can use blockchain-powered solutions in varied ways. FinTech firms operating in the cryptocurrency space have already seen the widespread use of blockchain solutions. As the digital currencies garner more interest from investors and central banks, the FinTech blockchain market is expected to grow more.

With such huge growth potential among FinTech firms, the blockchain technology market is expected to touch \$6.7 billion by 2023 from a meagre \$231 million reported in 2018. As digitisation gathers pace in the post-COVID world, FinTech companies that are early adopters of blockchain technology will have a fast mover advantage.

Raj Darji, Founder & CEO, Aarav Solutions



SECTION

JOBS



Demand for IT talent to see a 10-12% growth

2020 was an eventful year for IT professionals- while in the first half IT talent witnessed a near muted hiring, it started picking up by July. The fastest recovery was for temp staff. The IT contract staffing regained nearly 75% of the pre-covid times by September 2020. The drivers for this recovery were digitalization, new projects and product development across captives, GIC, GDC in BFSI, pharma, manufacturing. In fact, with the positivity in the demand for IT talent is expected to continue its momentum even in 2021. 2021 is expected to see a 10-12% growth in demand for IT talent.



Some of the skills that would be in demand are Data Science / Data Analytics. It is expected to see a 45% increase in demand than the previous year. With 95% of organisations planning to increase their cloud spends in the coming 12 months, talent skilled in Cloud Computing/DevOps also will be in demand. Jobs in Cybersecurity will increase from 5-15%. Demand for AI/ML as well as Product owners/ Certified PM Professionals will increase significantly. Lastly, RPA (Robotics process Automation), Full Stack/ Front End Developers and Python Developers are also some of the other profiles that will be in demand in the year 2021.

Apart from growth in demand, 2021 is expected to see a complete change in the working patterns as well. Remote working will continue and the criteria of location for a job will become less important. Recruitment will become data-driven with the help of AI and the digital experience will be enhanced with respect to virtual screening, interviews and even on boarding the candidates. The focus of the companies will be 'employee branding' and 'employee retention' while also keeping in mind the diversity hiring and reskilling and upskilling for resources.

Siva Prasad Nanduri, VP & Business Head- IT Staffing, TeamLease Digital



TOP 3 TRENDS IN ANALYTICS

NLP, graph, and augmented analytics are transforming the way businesses use analytics

Vishal Goyal



Analytics has become an important aspect for any business in the modern times and comes handy while identifying the right target audience, their habits and most importantly, their feedback. Brands rely on these insights to upgrade themselves to meet the evolving needs of their customers and stay ahead of the curve.

Insights-driven businesses are growing at an average of more than 30% annually and are on track to earn USD1.8 trillion by 2021 reveals a recent report by Forrester Research. Similar research from other consulting organizations highlight the emergence of firms that are dominating their sectors as well as expanding into new markets by generating actionable insights through data collection and analytics.

Below are top three technology trends in the space of analytics which will make a huge impact in 2021 and beyond:

NLP Analytics

NLP and Conversational Analytics provides any user with an easier way to ask questions about data, as well as receive an explanation of rendered insights. In combination with augmented analytics capabilities, a salesperson might, for example, ask for an analysis of sales or a pipeline. Or the system may have learned that the sales manager also looks at this information. Based on that person's role and/or behavior, they will be served up an explanation or narrative — in text or voice — of statistically important drivers of change. This ability will continue to grow in sophistication. For example, currently, you may be able to ask things such as "What is the average spend per customer this fiscal year?" As the technology evolves, you will be able to ask things such as, "What is the average spend per customer within a 10-mile radius this fiscal year versus last fiscal year?"

Consider the timesheet data for your business unit which includes information for several delivery units with split across different projects, different effort types (billable, non-billable, leaves, training amongst others) and for thousands of employees. One way of analyzing this information is to build standard dashboards with predefined columns, filters and business logic to show the numbers.

What would be fantastic is to be able to ask a question such as “Timesheet data by project for Vishal Goyal for Dec-2020”. This is possible by having a linguistic schema defined and imported into the tool which will recognize “Vishal Goyal” as employee name, understand what “project” and “timesheet” means and use NLP engine to display results. Being able to do such analysis makes it very powerful.

Graph Analytics

Graph analytics is a set of analytic techniques that allows for the exploration of relationships between entities of interest such as organizations, people and transactions. Graphs in a data and analytics context are concerned with the modeling, finding and traversing of relationships. The number of use cases is increasing with the need for complex analysis - fraud detection to customer influencer networks, through to social networks and semantic knowledge graphs. Conversational analytics, health advisors, financial crimes and risk detection can also leverage graph capabilities.

Covid-19 has spread from one city to the whole world. And this spread has happened over a period of time across continents. If one had a way to establish relationships between different cities, countries, continents in order to track an infected citizen and additional details on him, it would be a fantastic way to analyze and contain the spread. And if this information is available in real time, we can look at stopping the spread. All this is possible using graph analytics.

Augmented Analytics

Augmented analytics enables AI and ML-assisted data preparation, insight generation, and insight explanation to augment how business people, analysts, explore and analyze data in analytics and BI platforms. It also augments the expert and citizen data scientists by automating many aspects of data science and ML model development, management and deployment. Augmented analytics uses ML/AI techniques to automate key aspects of data science and ML/AI modeling such as feature engineering and model selection (autoML), as well as model opera-



VISHAL GOYAL, Head- Digital Transformation CET, Fujitsu Consulting India

tionalization, model explanation and, ultimately, model tuning and management. Before augmented analytics, data scientists took months to build models to find the best handful of hybrid seed combinations out of thousands to sell to farmers. With augmented analytics, domain specialist geneticists took over the process and reduced process duration to days.

Consider the timesheet data use case I mentioned above for NLP analytics. Take a scenario where you as a business user want to do a root cause analysis as mentioned below.

1. Which project contributes maximum billable hours to total hours in a month?
2. Which employee has maximum non-billable hours in a month on a particular project and particular business unit?
3. Which delivery unit has most leaves being taken?

Being able to do this without any data scientist and using simple tool capabilities is extremely powerful and Augmented Analytics can be extremely handy in such scenarios.

The author is Head- Digital Transformation CET, Fujitsu Consulting India

LOGISTICS IN THE NEW NORMAL

Last-mile delivery, real-time transportation visibility, and customer experience are the key aspects of a resilient and scalable logistics operation

Kushal Nahata



The pandemic has driven unprecedented change across industries and one such industry that has been at the forefront of disruptions is the supply chain and logistics. Enterprises across industries be it retail, grocery, e-commerce or manufacturing are increasing investments in areas that will make their supply chain and logistics operations resilient in 2021. The impact of the ongoing pandemic will sprawl over 2021, hence it's only logical to expect those new supply chain and logistics trends that emerged in 2020 to lead the way next year. Let's quickly glance through some of these.

Increase in Mail-Order Drug Delivery

Lockdowns during the onset of the pandemic triggered a sudden spike in mail-order drug delivery. For instance in March, mail-order prescriptions grew 21% in the US from the previous year to bring their share of the prescription drug market to 5.8%, the highest share in at least two years, the WSJ reported. Pfizer said that for patients in its assistance program, it is sending more medicines directly and extending shipments from 30-day to 60-day supplies. Now with lockdown restrictions being relaxed across the globe, people are continuing to buy medicines online as online pharmacy providers are making onboarding customers easy, applications interactive, ensuring medicine authenticity, and also helping patients easily connect with their preferred physicians.

Investing in Technology to Scale Deliveries Efficiency

To build resilient and highly scalable logistics operations delivery stakeholders will find themselves increasing focus on three critical areas--last-mile delivery, real-time transportation visibility, and customer experience.

- **Last-Mile Delivery**

In a world driven by virtual or online purchasing, businesses are quickly waking up to the reality that the last mile is the most important physical touchpoint between a brand and the customer. Embracing digital tools that enhance routing, scale deliveries, boost driver productivity, shrink delivery turnaround-time, and optimize delivery costs will be the smart way forward to build robust logistics operations in 2021.

- **Real-Time Transportation Visibility**

With 62% of enterprises identifying 'visibility' as a major challenge in the supply chain, poor



KUSHAL NAHATA, Co-Founder & CEO, FarEye

visibility will continue to remain a serious concern with regards to executing seamless transportation operations. Investing in advanced transportation platforms that provide real-time tracking and tracing and ensure predictive visibility of ground-level and intermodal logistics operations will be a key trend in 2021.

- **Enhancing Customer Experience**

At a time when businesses were finding it difficult to keep up with lightning-fast delivery expectations, new models like contactless deliveries added to existing logistics complexities. Then there is an acute need to provide customers with self-service delivery models and ensure high-levels of delivery visibility. Hence, to improve the delivery experience and boost customer loyalty savvy businesses are using cutting-edge delivery platforms to quickly change delivery workflows based on customer needs, provide real-time notifications on delivery progress and delays and drive payments through secure digital gateways.

Curbside Pickups

Curbside pickups gained immense traction this year. Not only does it eliminate the need to stand in

queues and spend more time outside to buy groceries and other essential items, but it also provides customers with flexibility. Leveraging curbside pickup facilities, customers can select their own delivery pickup windows and store location. According to the 'COVID-19 And The Future Of Commerce' survey, 87% of customers want brick and mortar outlets to continue to offer curbside pickup and other processes that limit the need for in-person visits. In fact, According to digitalcommerce360 nearly 44% of top 500 retailers with stores now offer curbside pickup to ensure a better customer experience. Clearly, curbside pickups will sprawl across 2021 as an important trend with regards to keeping customers happy and loyal.

Environmental Sustainability

When the world paused for a few months, nature got a brief relief from growing carbon emissions. This significantly contributed to driving environmentalism mainstream. A report highlighted that 71% of people today think it's important for brands to take a stance on social movements. We are already seeing a significant increase in demand for eco-friendly products, it's only a matter of time when consumers would want their brands to ensure carbon-neutral deliveries. As a proactive measure, Amazon recently announced its plans to introduce "Shipment Zero" that will drive the company's vision to have 50 percent of all deliveries reach net-zero carbon emissions by 2030. A key to achieving eco-friendly deliveries will be things like order consolidation, loop optimization of delivery routes, greater first-attempt delivery success rates, and more.

Bringing Inventory Closer to Customers

Surging demands amid localized lockdowns and travel restrictions made inventory management extremely difficult. To respond to this problem savvy enterprises bought inventory closer to customers by converting localized brick and mortar stores and retail outlets to fulfillment centers, dark stores, or mini-warehouses. Realizing the benefits of this strategy like faster pickups, easier inventory management, customer proximity, scaling daily delivery volumes,

and more, brands are willing to stick to it for a longer period of time and realize its full potential.

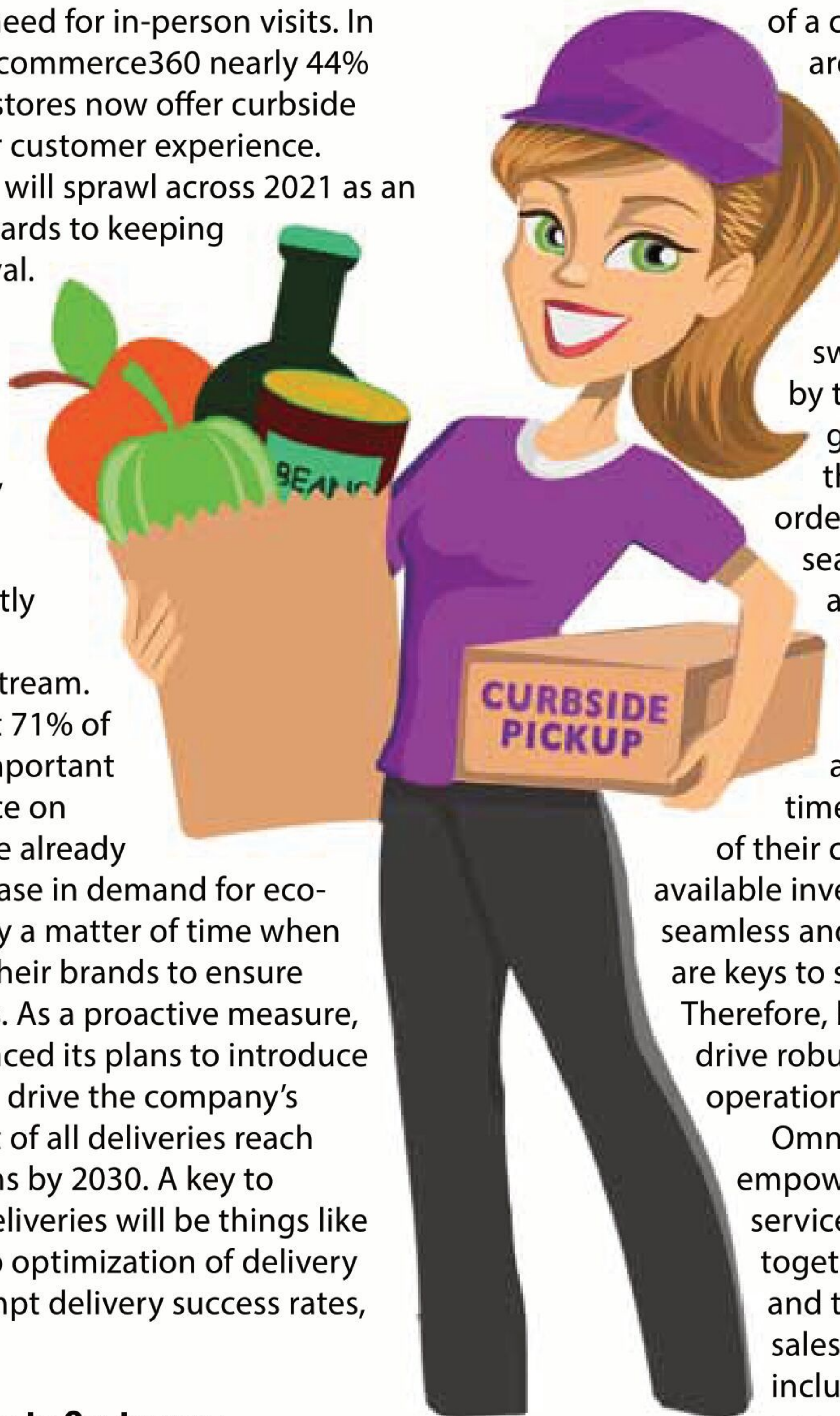
Keeping Customer Experience at the Core To Drive Loyalties

Owing to the growing popularity of online purchasing, a key driver being the COVID-19 pandemic, there is no single preference of a consumer anymore. They are constantly looking for products across disparate online channels and also in-store facilities. They are buying apparel, furniture, grocery, medicines, and more just by a few clicks and swipes. The demand is driven by the need to be instantly gratified. Irrespective of the channel used to place orders, consumers expect a seamless delivery experience accompanied by quick delivery turnaround-times. This means that businesses need to be present and available to customers every time they buy via a channel of their choice. Hence, an always-available inventory and more importantly seamless and quick logistics operations are keys to satisfying modern customers. Therefore, businesses will need to drive robust omni channel logistics operations.

Omni-channel logistics empowers businesses to quickly service customers by tying together inventory, distribution, and transportation across sales engagement channels, including in-store, social media, e-commerce portals among

others. In 2021, the need to create omni channel logistics operations will gain rapid momentum.

These are some of the key trends that will continue to shape the online delivery and logistics industry in 2021. Embracing advanced digital delivery tools will empower enterprises to not only navigate these trends smoothly but also master them.



The author is Co-Founder & CEO, FarEye

Users' Choice



Consumer segment - February 2021

Consumer buying behaviour changed post March 2020. Work from home became mandatory and shift to essential gadgets became priority.

PCQuest along with research partner Cybermedia Research announces Users' Choice survey aimed at the understanding the user's choices, preferences along with product satisfaction.



Product Categories : Nationwide Survey



Laptop



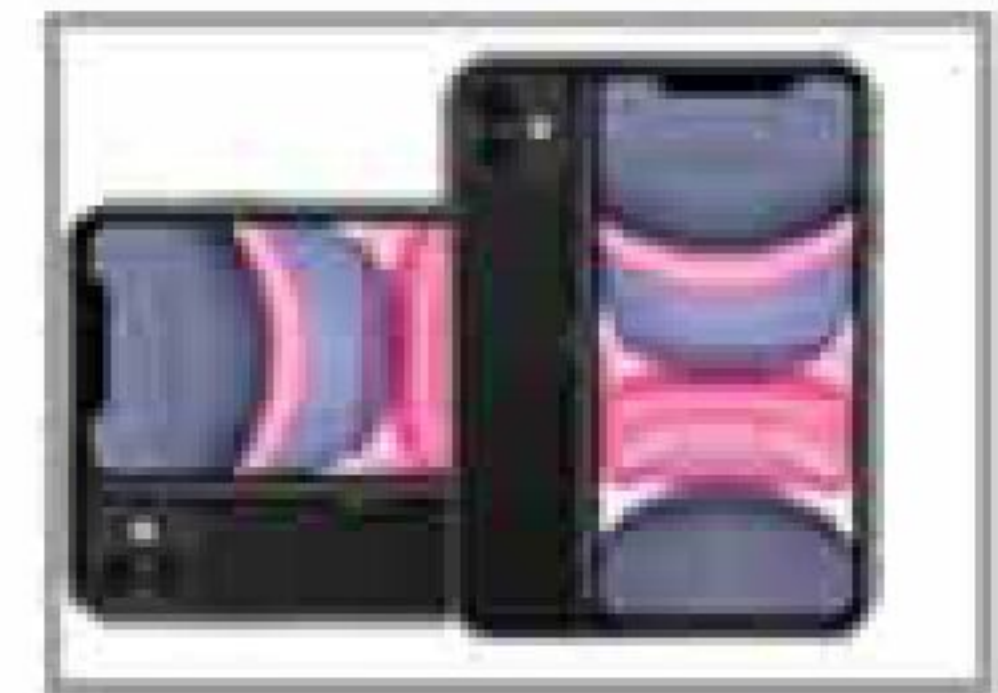
Desktop PC



Gaming laptop



Smart Speaker



Smart Phone



Tablet



Wireless Headset



Smart Watch



Smart Band



Smart TV

Highlights of the Survey

- 30+ Brands will be featured
- Top brands in each Product Category will be announced
- Study the awareness and usage of the brand
- Consumer Satisfaction level of the brand
- Brand Advocacy
- Future trends

Annual Program

- Advertising/Sponsorship
- Brand Advocacy Talk Series
- Coffee Table Book
- Social Promotions
- Awards Gala, Digital campaigns
- Content Marketing
- Video Interviews
- Product Reviews

Partner with PCQuest. Last date for advertisement booking is 30th January 2021.

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HYBRID WORKPLACE FOR A FUTURE-READY BUSINESS

Cutting-edge collaboration is the mantra for post-pandemic business growth

Besides causing widespread loss to business, the global pandemic of 2020 also brought to the brim, a rather overdue realization – one that is challenging the basic manner in which we work. Businesses far and wide have realized that the best place to conduct business may not really be the all-important workplace. Post-pandemic, it is estimated that a meagre 12% want to return to full-time office work. Businesses are using this statistic to move fundamentally improve how people work. A lot of them are choosing to adopt the concept of a hybrid workplace as the best fit for the new and improved normal.

Setting the premise

All across the world, work cultures are changing. Businesses are relooking at their real-estate investments and realigning them to suit a new model of working where, at any given point of time anywhere in the world, only a minimal workforce is present in the so called workplace. It is certain that work from home will be adopted in the years to come, far and wide across businesses of all sizes, and across industries. While this disruptive new work paradigm is a direct result of the pandemic, the corporate world is exploring this opportunity to realign and refresh the basic culture of work and employee productivity.

From precise to being adaptable

At the core, businesses realize that the philosophy to a successful business has changed from being precise to being adaptable. Earlier, efficiency was measured in terms of precision or the exactness of the product in relation to customer needs. Today, this has changed to the magnitude of adaptability to customer needs and aspirations. Even within an organization, the precision of work goals has morphed into the flexibility one is able to provide to their workforce, to work on any device, and at any location. In short, both the external customer needs and internal outlook to IT has changed from precision to adaptability. As



“With over 10 months of remote working, increasingly more companies are getting comfortable with Virtual Collaboration tools and are able to work productively and efficiently. However, we are noticing some of the companies are opening offices and have started to plan safe return to work. As per industry experts, moving forward, we will experience a hybrid work culture. 97% want changes to make them feel safer at work and 96% want to improve their work environments with intelligent workplace technology,” says **Sudhir Nayar – Managing Director -Commercial, Cisco India & SAARC**

such, the definition of collaboration has evolved. Today, most corporate employees are working on their personal computer devices, mainly through a home Wi-Fi system. Fundamentally, the home Wi-Fi systems were not built with enterprise grade data security. Also, to ensure seamless productivity, the ‘screen’ and experience should be one that was used in the original workplace setup. Overnight, IT had to fast mitigate these challenges. Extrapolating this challenge in the area of collaboration, businesses are finding that three things – user experience, scale and reach, and flexibility are of supreme importance

in the new scheme of things. Collaboration, as we know, is the backbone for any business, and hence, it is one of the first challenges that a CIO is tasked with solving. It takes a singular data leak at one of the 15,000 employees' endpoint to expose the entire corporate network, and if the leakage occurs from a collaboration tool, millions of data pieces that can be misused. Hence, the level of security and trust is a no-compromise component of any business, today.

Cisco – redefining collaboration

Cisco has been a global leader in the area of enterprise-class collaboration. With decades of research and technical knowhow to back them, Cisco collaboration tools have consistently evolved over time, and today are one of the very few brands that has pandemic-ready solutions for businesses of all sizes. Built over a robust layer of security, Cisco collaboration solutions today redefine work environments – from connectivity software to display hardware to cloud security to endpoint devices, backed by round-the-clock technical support and extreme ease-of-installation. The new-generation collaboration solutions from Cisco are flexible and sync up with multiple other solutions, providing to businesses, a consistently watertight level of security, along with useful meeting tools like virtual notes, and translations, among others. In order to digitally transform a business, collaboration is paramount, and Cisco helps achieve this through its tools and solutions.

The business resiliency challenge

In a recent survey by PricewaterhouseCoopers (PwC), CFOs of more than half the enterprises in the world are seriously considering remote working as a permanent fixture, long after the current global pandemic is over. Additionally, more than 50% of all enterprises are also looking at long-term IT investments and deployments to make their business future-proof. These two statistics point towards another important challenge of the current times – Business Resiliency.

Managing business in an uncertain future

IT pundits define business resiliency as a strategy to counter sudden interruption in business or an unexpected economic stress that organizations have to suddenly deal with, to ensure that their business recovers as soon as the economy does. While there are multiple facets of business resiliency ranging from personnel psychology to IT security, the core premise is to integrate the disparate IT processes working



“Cisco Webex platform is designed to support the modern hybrid workplace. It is enabled with smart features based on Artificial Intelligence and Machine Learning technologies. Cisco Webex Suite comes with a wide range of video conferencing products which include

Software-as-a-Service tools, HD video devices, Webex Room series with high resolution cameras to provide seamless collaboration for customers working from home, working remotely or from the office.

Specially during these unprecedented times, safety is critical. Features such as Webex voice assist which provides touchless experience and background noise removal have been most useful for customers. We have also made it easy for customers to purchase Webex Meetings through our Online portal,” says

Pankaj Agrawal, Director, Collaboration Business, Cisco India and SAARC

in silos, and manage them centrally. In other words, digital transformation of individual IT processes is imperative to prepare global businesses for the uncertain future. Cisco globally resonates the belief that changes today will help manage the uncertainty tomorrow. To this end, Cisco offers a comprehensive portfolio of solutions to help businesses reimagine and redesign their IT.

Secure and seamless workspaces

CTOs today have to provide an enterprise-class experience in their employees' home computing network, adding to the already challenging scenario of threats and data attacks. To ensure that workers

are productive and operate in a flexible environment, businesses have to optimize workers across a complex matrix of cost, performance and security. One of the biggest challenges here is to ensure consistency of work and seamless security across network protocols, endpoint devices, and quality of connectivity.

Eventually, some employees will return to the workplace, others will continue to work from home and businesses will realign to this model fuelled by the human resilience of their workforce. Both the workforce and the workplace should prepare themselves for a post-pandemic onslaught.

Collaboration with purpose

Currently, the basic need is to optimize the office footprint and provide a flexible working environment, where the employee's home is the new collaboration hub, and the workplace is used to maintain basic humane connect. Diving deeper, this means that a substantial chunk of the workers who work remotely will be armed with collaboration software and purpose-built devices to ensure actionable teamwork, irrespective of location. On the workplace end, return to work must be made safe, with a rotating cast of office workers, who come to office on a need-to basis. This presents a two-pronged challenge – one, the core work culture and community needs to be retained with a minimal, rotating workforce, and businesses need to look at the reduced workforce to optimize technology interventions to provide a better user experience.

In a virtual roundtable by Cybermedia and Cisco, Sudhir Nayar – Managing Director – Commercial, Cisco India & SAARC, articulated the new-age collaboration challenge as: “With over 10 months of remote working, increasingly more companies are getting comfortable with Virtual Collaboration tools and are able to work productivity and efficiently. However, we are noticing some of the companies are opening offices and have started to plan safe return to work. As per industry experts, moving forward, we will experience a hybrid work culture. 97% want changes to make them feel safer at work and 96% want to improve their work environments with intelligent workplace technology”.

Merging the workforce with the workplace

Understanding the premise and application of a hybrid workplace is important. Cisco believes that the foundational requirement of a hybrid workplace is to provide workers with agile, intuitive and feature-rich collaboration tools that can be seamlessly operated from any location, and provide a consistent and secure



“Before the pandemic, we had 25% of our employees working from home. This dramatically changed to 95% in order to keep the business running. Besides encroaching into newer verticals within the transportation and hospitality space, we had to create a global VPN gateway overnight and in order to ensure business continuity, reimagine its delivery, connectivity bandwidth and data center capacity to include a massive number of new users. To achieve this, the company chose Cisco Webex as its collaboration platform partner. With its highly secure, consistent yet user-friendly collaboration solutions, Cisco was able to help us tide over pandemic-induced challenges, while going a step further and realigning its workforce in such a manner that the company has decided to have 45% of its workforce in WFH mode in the long term,” says **Roman Rafiq, VP – Global IT & Security, IGT Solutions**

user experience. Businesses need to be cognizant of the fact that workers getting dispersed across geographies and locations creates challenges of inconsistent endpoint devices, often unreliable connectivity, and most importantly, data security. The virtual roundtable revealed that all of these can be arrested by a unified, flexible and easy-to-use collaboration solution that merges the workforce with the workplace.

Identifying the best collaboration suite

So, what forms the backbone of a successful hybrid workplace? Identifying and deploying the right collaboration solution with the best experience. This drills down to minute considerations like having the ability to switch between messaging, voice and

video calls, say a virtual whiteboard is created, can it be accessed on-demand? Is the user able to view the same content irrespective of screen size and device configuration? Questions like these go a long way in eliminating investment in tools that may not be optimal in the long run. Secure storage of meeting data and its real-time retrieval by the right personnel also goes a long way in making a seamless and flexible collaboration solution purchase.

All-new Cisco Webex

Cisco Webex is one of the world's most successful virtual collaboration solutions. Explaining how Webex blends into the new hybrid workplace mandate, **Pankaj Agrawal, Director, Collaboration Business, Cisco India and SAARC says, "Cisco Webex platform is designed to support the modern hybrid workplace. It is enabled with smart features based on Artificial Intelligence and Machine Learning technologies. Cisco Webex Suite comes with a wide range of video conferencing products which include Software-as-a Service tools, HD video devices, Webex Room series with high resolution cameras to provide seamless collaboration for customers working from home, working remotely or from the office.**

Specially during these unprecedented times, safety is critical. Features such as Webex voice assist which provides touch-less experience and background noise removal have been most useful for customers. We have also made it easy for customers to purchase Webex Meetings through our Online portal."

Cisco recently concluded a global conference on collaboration called Cisco Webex One. Speaking at the virtual event, Jeetu Patel, SVP/GM – Security & Applications said, "The world that we live in, it's unfortunate that opportunity is unevenly distributed, but human potential is not. Cisco fundamentally believes that technology can change that for us. This chance to level the playing field is one of the things we are excited at Cisco. There are about 3 billion digital workers in the planet and billions of those are knowledge workers and 2 billion are frontline and field workers. Cisco's goal, regardless of the geography, language, preference and personality type is to make these 3 billion digital workers to equally participate in the global economy. To achieve this, Webex's mission is to build an inclusive future for all, that's our core value. Cisco wants to make Webex experience 10X better than in-person interactions. Everyone gets a seat at the table, being inclusive, empowering remote worker, enabling safe return to

office and delighting customers with exceptional and seamless collaboration".

Secure, yet flexible and easy-to-use

Companies of all sizes and across verticals can leverage from Cisco's expertise in collaboration solutions. For instance, BPM, IT and Digital Services and Solutions provider, IGT Solutions, a company that serves 75+ transportation and hospitality customers globally, is heavily reliant on customer experience.

"Before the pandemic, we had 25% of our employees working from home. This dramatically changed to 95% in order to keep the business running. Besides encroaching into newer verticals within the transportation and hospitality space, we had to create a global VPN gateway overnight and in order to ensure business continuity, reimagine its delivery, connectivity bandwidth and data center capacity to include a massive number of new users. To achieve this, the company chose Cisco Webex as its collaboration platform partner. With its highly secure, consistent yet user-friendly collaboration solutions, Cisco was able to help us tide over pandemic-induced challenges, while going a step further and realigning its workforce in such a manner that the company has decided to have 45% of its workforce in WFH mode in the long term," says Roman Rafiq, VP – Global IT & Security, IGT Solutions

AI and ML enhancements

At the WebexOne conference, Cisco also announced 50 new innovations and features in the areas of intelligent customer experiences and seamless collaborations to enable smart hybrid work experiences.

The new features range from noise cancellation and speech enhancement innovations, virtual background, real-time translations, along with competencies around closed captioning and transcription, enhanced video layouts, real-time action items, a new component called Webex Huddle that allows ad-hoc meetings in a single click, besides AI for messaging and better actionable insights. While the Webex collaboration suite is seeing innovative additions, many of the new features are aimed at helping the world move to a hybrid workplace model, which many believe, is the future of collaborative business.

True collaboration is an inclusive experience. And in today's work environment it has never been more important to connect and collaborate across the barriers that keep us apart. Cisco seems to have all the pieces of the collaboration jigsaw puzzle to make for a pretty picture in the months to come.

THE MOVE FROM 'PRECISE' TO 'ADAPTABLE'

Sudhir Nayar, Managing Director – Commercial Sales Cisco India & SAARC and Pankaj Agrawal, Director – Collaboration Business, Cisco India & SAARC talk to PCQuest Editor Sunil Rajguru about the concept of a hybrid workplace as a means of survival and disruption in the new normal that has resulted due to the Covid-19 crisis. Here are a few snippets from the interview:



Sudhir Nayar, Managing Director – Commercial Sales Cisco India & SAARC

Sudhir on the need for adaptability during the current pandemic:

"We have changed from being precise to being adaptable. We have understood that adaptability in our business, in our technology, and in our mindset, is one of the biggest changes we need to make. This applies to me personally and for all the businesses that I speak to."

the freedom to choose where they want to work from."

Sudhir on the multi-faceted role of IT in a hybrid workplace:

"I've always believed that IT is enabler but today, I'm saying that IT is a differentiator in most areas. I don't know a single customer of mine whose business was disrupted because of IT. IT has been able to stand ground firmly. I hear a few priority areas from a few hundred CXOs I have spoken to. Firstly, they are using IT to get their data strategy right. Then we got an explosion of application usage. Third, the focus was on giving a good digital experience to your customer. That need has now morphed into digital decision making. Two more areas that are loud and clear are collaboration and security. All of this will fail if we don't have the right security solutions."



Pankaj Agrawal, Director – Collaboration Business, Cisco India & SAARC

Pankaj Agrawal on the ideology of a hybrid workplace:

"Organizations have now realized that the future of work is hybrid: A certain percentage of people will continue working from home, maybe forever. There are clear advantages

for both organizations as well as employees. For organizations the biggest advantage is the expansion of the talent pool. From an employees' perspective they become more productive when they are given

Sudhir on the uncompromised need for security:

"We have developed a fatigue of alerts. How do I know this alert is serious enough? We launched a very good platform called SecureX to mitigate this challenge. On an average, any CSO uses around 8-10 different technologies in his/her organization. How do you implement a common dashboard? What SecureX does is not only integrate any device and any security tool that you are using from Cisco. It also opens up to 165 other products. It is based on Open API."

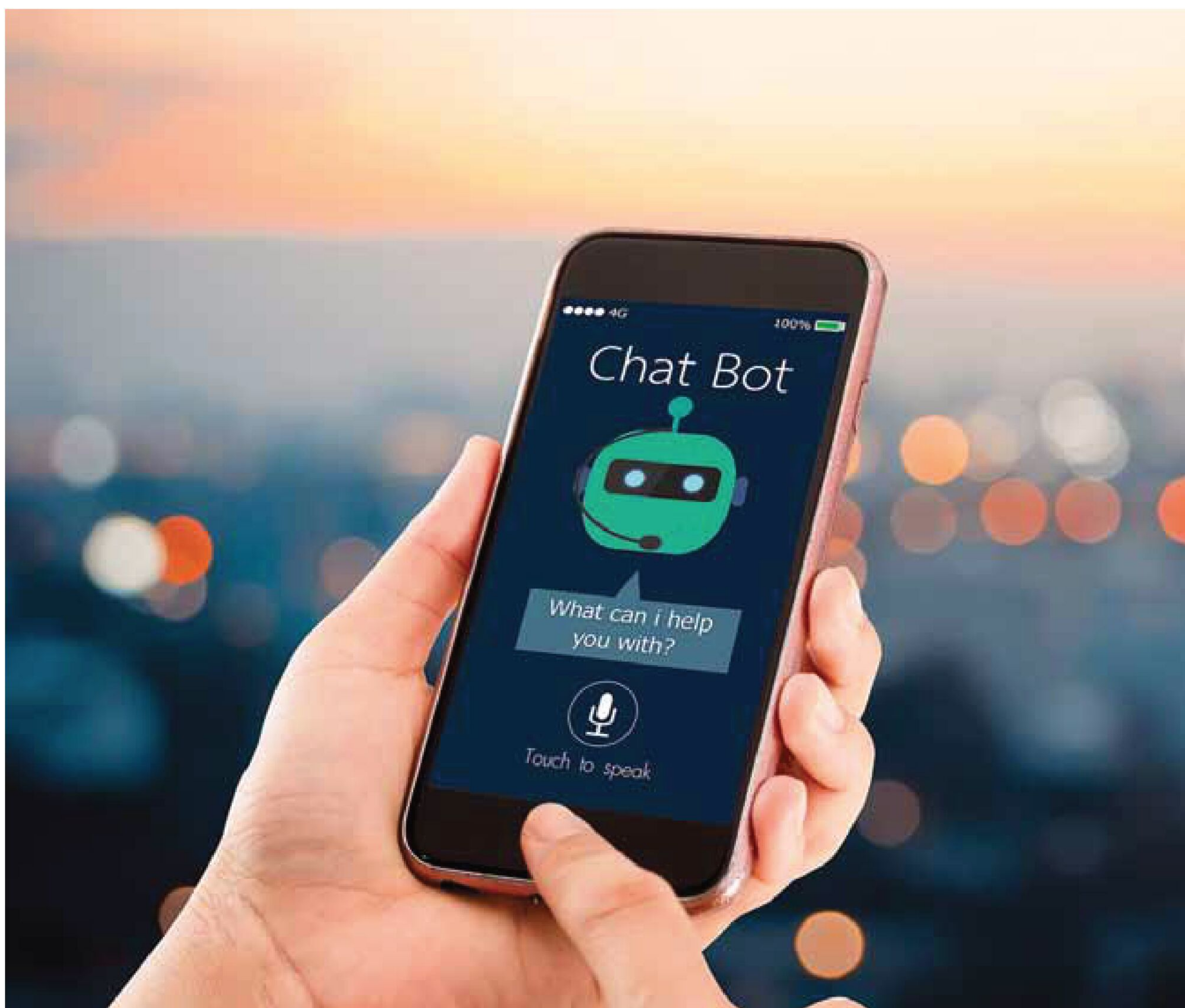
To access the complete panel discussion, head over to the PCQuest YouTube Channel:

<https://www.youtube.com/channel/UCgdOsyTFZxHzYJ2agFioUfg>

CHATBOTS FOR BUSINESS ENTERPRISES

The chatbot is basically a computer software or utility that can have a discussion with an individual in an intelligent way. There are several use cases where a chatbot is helpful, ranging from client assistance to simplifying internal communication within the organisation with a put of showcasing higher commitment

Ashish Mittal



This year could easily be marked as the turning point on how we use our digital technology. As the coronavirus is spread all over the world people and companies are forced to stay in their houses and carry out their regular tasks. A culture of being available online is on the rise and even after when the corona will be gone this might not change.

On the dark side, this very act of working from home has impacted businesses drastically in a very negative emotion the ability of mankind to adapt to whatever problem it has been forced to face.

The rise in the use of video conferencing apps like Google Meet, Zoom and Microsoft Teams has allowed that transition from physical to online. This aspect of Working From Home is being coerced very well by these apps, but one sector which still hasn't been mentioned properly is the use of Conversational AI or chatbot in the daily business routine.

The chatbot is basically a computer software or utility that can have a discussion with an individual in an intelligent way. There are several use cases where a chatbot is helpful, ranging from client assistance to simplifying internal communication within the organisation with a put of showcasing higher commitment. For instance while serving a business customer at the point when the individual visits the item site, the chatbot can draw in with the individual and discover a couple of inquiries regarding what's up and with the assistance of an informed estimate, furnish the individual with a fix of the issue.

The excellence of the chatbot is its capacity to filter through a lot of information and data and give pertinent outcomes. It is in reality more effective than a human in light of the fact that the administration community specialists may some of the time not have the solution to your inquiry. Most organizations have awful information bases so the chatbot is a basic response to this issue.

Use of AI and automation in business:

Conversational AI or chatbot alone has the power to manage most of the daily tasks performed in a company. Conversational AI doesn't just mean answering a few FAQs to their customers. It is rather talking to them in a human like way, to reply to their questions 24x7 in an intelligent manner ensuring to provide the best user experience to the visitors.

Conversational AI can easily be implemented on the majority of the tasks performed in a business,

be it marketing, customer service, client handling, educating employees, and much more.

So now before going forward talking all about its impressive perks, let's for a moment take a breath and understand what Conversational AI is built on.

For creating a chatbot smart enough to handle your digital visitors elegantly, you need 5 important things...

1. A basic software utility having UI/UX of chat window
2. Machine Learning and Artificial Intelligence
3. Natural Language Processing
4. Your business training to the bot
5. Its integration into your website, Facebook page, Google Chat or WhatsApp

To have a better understanding of these things you can read the blogs dedicated to them specifically.

Lot of companies have started offering Chatbot Development Services, while there are few SaaS based Chatbots also now available. There may be a difference in billing models for the two kinds of bot development services available in the market right now.

Few deciding factors to choose an ideal chatbot solution for your purpose:

1. How intelligent is the chatbot indeed. Does it really deploy AI and NLP during conversation or it is just another FAQ bot type utility?
2. What is your end goal after having a Chatbot for your business? Do you want to use it for lead generation or for post sales customer support or for internal use to automate your HR practices etc. then evaluate which chatbot offers most befitting features around your requirements.
3. There should not be an overdo of the technology. In case you do not need too heavy a solution then the same company offers basic versions which may just solve your FAQ functionality needs at lower prices.
4. What is your dependency on the chatbot team after the bot is integrated. Will you need to reach out to the development team for everything or will you have some sort of control yourself to manage the bot's intelligence?
5. What level of technical know-how is needed in your team? Does it require any kind of coding knowledge or knowledge of AI and Machine Learning too?

6. What all kinds of integrations are available with the chatbot and is it scalable enough to have more integrations with your existing system? Say for example can it be integrated with your
 - a. CRM (HubSpot, Pipedrive, FarVision and more),
 - b. Support Ticketing System (Zendesk or others),
 - c. EPBX system for attending voice calls,
 - d. eCommerce (WooCommerce, Magento or others)
 - e. Facebook Pages to have your bot talking through your FB Page
 - f. Your existing HR systems
 - g. WhatsApp Business API
 - h. Other possible required integrations as per your business needs.
7. What is the price of the bot? Will it cost per conversation basis or will it cost some or no license fees at all. The second option will keep you informed about your monthly expense while the first one will generate the bill on your use basis which can be a black box for you.
8. Few established examples of Chatbot Frameworks currently serving the Indian market are: Google Dialogflow, IBM Watson, HelloYubo, Haptik, Yellow Messenger and few others.

It is important that you decide your chatbot with utmost care, because this is not just about development but your efforts and money invested in making it intelligent for your business. It is difficult to change it with ease once integrated because re-investing the same efforts again in future for making a second bot intelligent for your business is not very easy.

Some key points to rekindle the advantages of chatbots in businesses:

1. **Time and money saver:** Clients ask repetitive inquiries over and again. Responding to those common inquiries burn through your representative's time. Chatbots can respond to these rehashed questions and they do this productively, consequently, to save your time. They additionally set aside your cash and assets you spend on dealing with these questions and furthermore helps in your financial plan.
2. **Content customers:** Gartner says, Customer Service is the greatest factor for the achievement of a business. Chatbots improve

client support and do it by being accessible all day, every day, answering questions quickly, and lessening their composing endeavors. In the event that you need more satisfied clients, you should execute chatbots in your business.

3. **Extend the audience:** Chatbots utilize a shrewd strategy to develop your crowd. It catches the information of the clients who get in touch with them on visit. They do it so perfectly in the discussion that clients don't wait to give them their contact subtleties.
4. **Wipe out errors:** Chatbots remember things, they work on pre-composed orders, and consistently do what they're customized for. Henceforth, they don't submit botches.
5. **Drive customers through the funnel:** Chatbots can pitch and convince clients with offers and convert them into purchasers by recommending the correct items they need to purchase. This wipes out item perusing, subsequently, facilitates their purchasing venture.
6. **Brief open and engagement rate:** Chatbots support commitment and open rates. Messages bots ship off the clients have an open-pace of 70-80% by and large. Since the warning of these messages goes directly to the clients' very own gadget, open paces of these messages can go up to 60%.
7. **Personalization:** Brilliant or AI chatbots recollect what items you requested that they show beforehand. They start the following talk with similar information so you don't need to ask all the things once more. This gives an individual touch to the talk that fulfills clients.
8. **Solicitation handling capacity:** Doesn't make a difference if it's 10 or 100 inquiries all at once. A chatbot can answer every last one of it productively without griping.
9. **Adaptability:** Chatbots are something that can be utilized in such a business. There are chatbots for e-commerce, advertising, medical care, money, and so forth are as of now utilizing them. You can likewise utilize them whatever industry your business works in.

Conclusion

Chatbots has proved itself to be a reliant technology and something that has the ability to help businesses grow.

The author is Director,
Yugasa Software Labs Pvt Ltd.

TOP 5 FANTASY GAMING APPS OF 2020

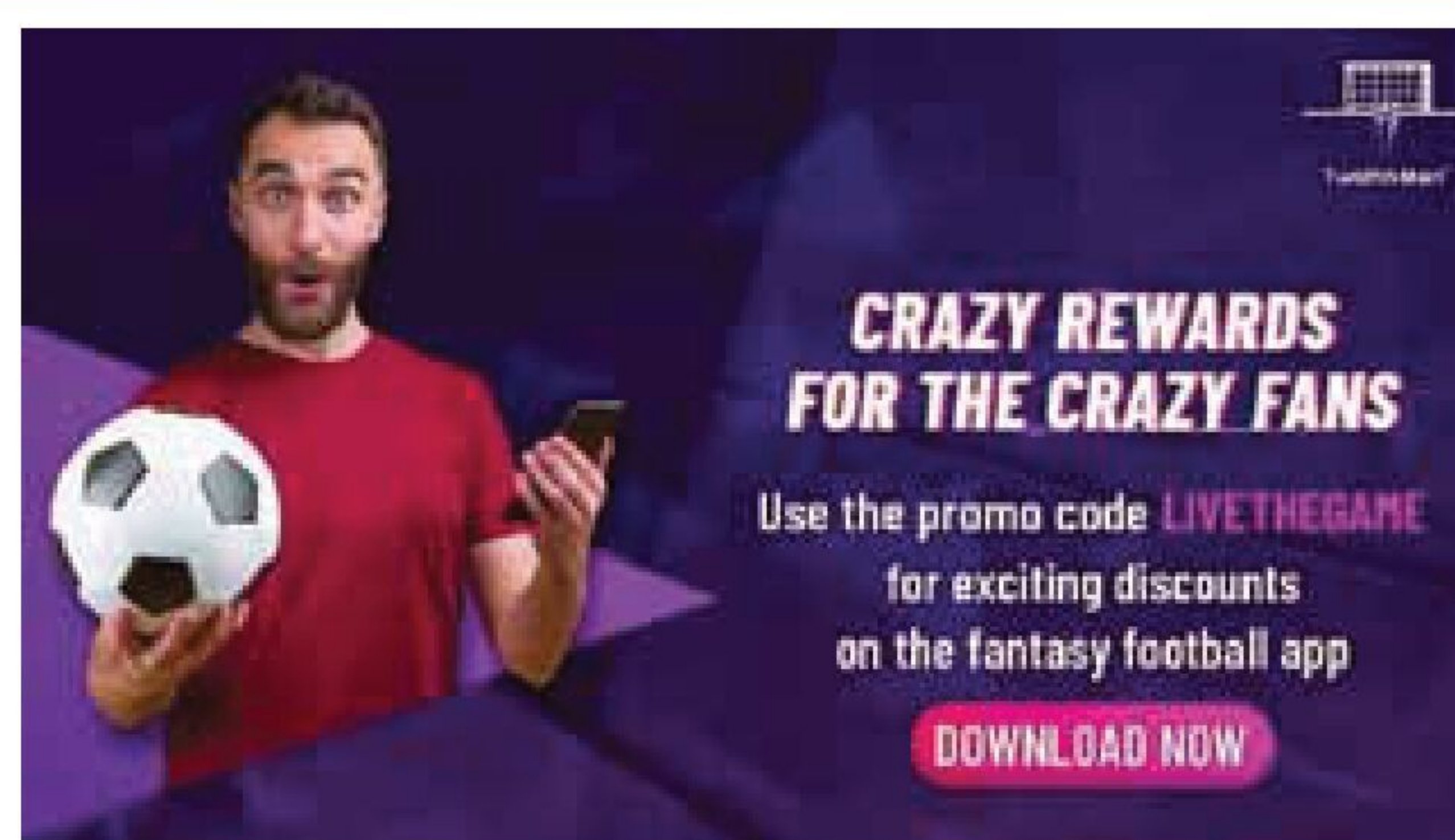
PCQ Bureau



With the return of the Indian Super League, football fans in India are too excited. And as the major leagues restarted, fantasy sports enthusiasts were the happiest. They were quick in getting on board with different fantasy sports apps. There has been a surge seen in the number of fantasy sports app users. Fantasy sports apps mainly gain popularity based on different aspects like contest variety, features, user interface, etc. There have been a number of fantasy sports apps available in India for the past few years now that have clearly dominated the market. Some of the popular platforms have got the biggest user base in the fantasy sports industry. Below are five fantasy gaming apps that one can download for the marvelous gaming experience at the comfort of one home:

Twelfth Man

Football is without a doubt the most popular sport on the planet. More than 200 countries have

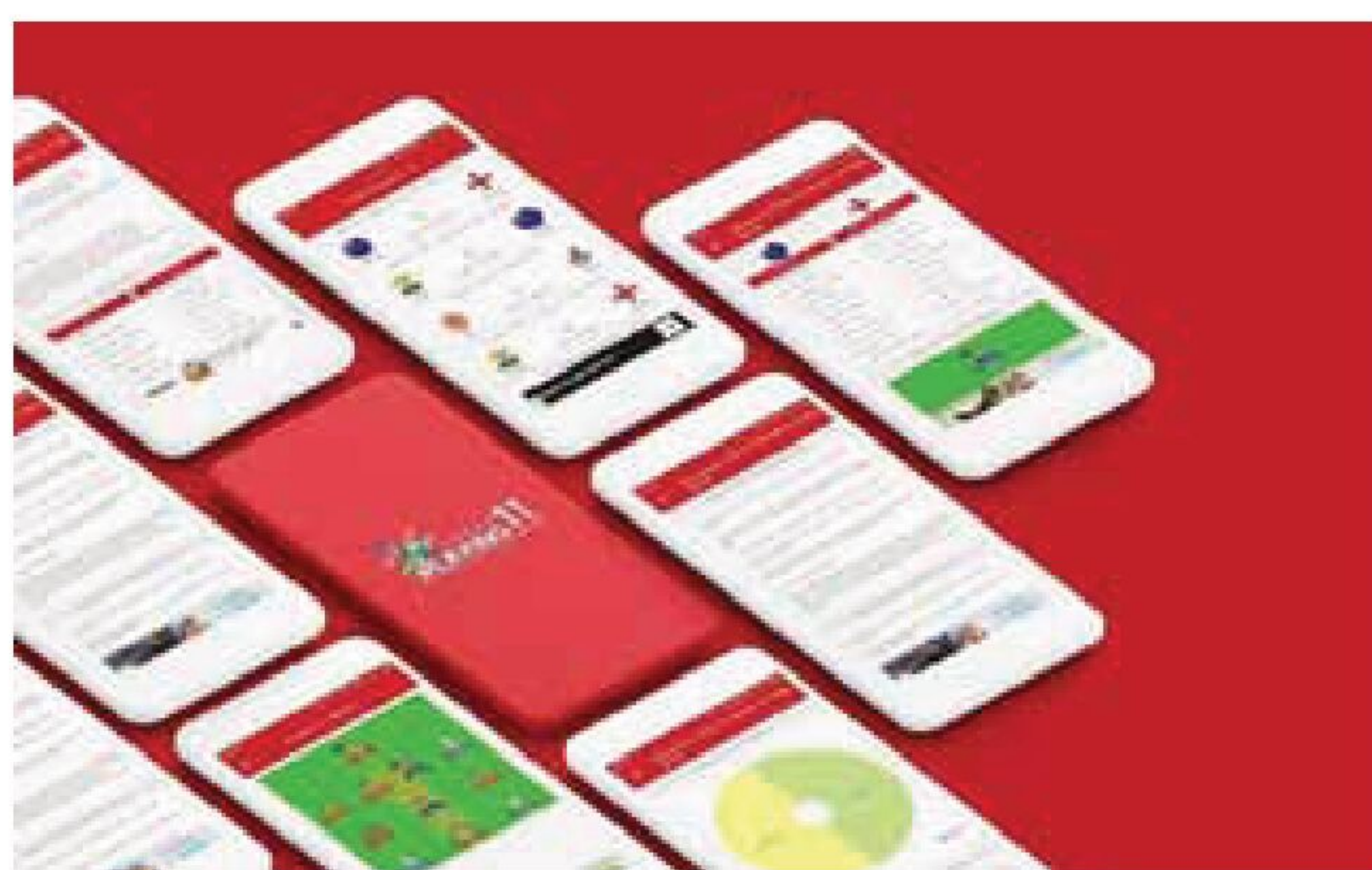


taken up the beautiful game over the years and its fan following is widespread. Owned by NxGn Interactive its flagship product is Fantasy Football Platform- 'Twelfth Man', which was launched in April 2020 with professional footballer Sunil Chhetri as its brand ambassador. Twelfth Man is the first dedicated fantasy gaming app for football. It provides a variety of contest types (DFS, League, Live/Offline Trivia, Head-to-Head DFS, and H2H League) as well as monetary and

non-monetary rewards to the players. Within a year of the launch, Twelfth Man has successfully grown from a document piece to a family of 600k users. The app is currently available in a freemium mode.

Playing 11

Delhi-based Playing11 is a platform establishing its presence in the increasingly crowded fantasy sports market. In the initial phase, Playing11's growth centered on two major cricket events — IPL 2019 and ICC Cricket World Cup. Playing11 has garnered 300,000 users in a year. These users played 6,000+



leagues and earned over Rs 30 lakh in prizes.

Dream11

Dream 11 is the oldest player in the fantasy sports industry founded long back in 2008. Based in Mumbai, the app struggled to gain popularity in its initial years. In 2012, they introduced freemium fantasy sports. This was initially just for the cricket enthusiasts. This concept showed a lot of interest and by 2014, the fantasy cricket app reported 1 million registered users. Dream11 is not only the country's first and only so far gaming unicorn but also the largest player in the sector and one that made fantasy gaming mainstream in the country. It has over 80 million users and holds 1,000-plus daily contests across sports. The Dream11 app is available on Android and



iOS; users can get a download link on SMS by entering their mobile number on the Dream11 website.

MyTeam11

MyTeam11 is among the recent entrants in fantasy gaming, but has made rapid strides in the last two years. It has over 12 million players, who have earned more than Rs 15 crore in winnings on the platform. Players can increase their chances of winning by scoring with their fantasy team captain and vice-captain who earn in multiples of 2X and 1.5X. Users can also participate in polls and earn bonus cash through



referrals. The MyTeam11 app download link can be obtained on its website. Besides IPL, players can also create fantasy teams for Caribbean Premier League (CPL) T20.

HalaPlay

Halaplay was originally founded in 2017. But as compared to a lot of new fantasy sports apps, Halaplay has sought huge success. HalaPlay is a daily fantasy sports app that lets users participate in quick and easy real money games. It has grown over 10X since inception and crossed four million users in 2019. It has conducted over 5,000 daily sports contests across sports leagues in cricket, football, and kabaddi. Users can win cash prizes up to Rs 10 lakh per day on the app.



VALORANT GAME GUIDE, HOW TO GET NEAR PERFECT AIM, TIPS & TRICKS

Sushant Rohan Singh

So you have heard about crossfire placement. You practice your aim and you probably got into a rank you're already proud of but how do you perfect your aim beyond that. Today we'll be bringing you our advanced Valorant aim guide in order to push yourself to finally reaching that rank of your dreams.

#1 Third-Party Aim Trainers

To improve your aim even further than it already you should start using third-party aim trainers. If you really want to work on some of the more specific areas of your aim make sure that you're using these third-party aim trainers like Kovacs 2.0, Aim lab, aimtastic or aim hero. You don't have to use all of them but you should definitely try them out and see which ones that suit you. These aim trainers have a lot of different scenarios that work on all kinds of different parts of your aim. Some of which might be a lot harder to do in-game and thus performing it on an aim trainer instead is more efficient and also tends to be a cleaner environment just because you really only have to worry about one thing at a time.

For example, if you want to work on your tapping game against moving targets in Valorant you can either go with the in-game practice mode although those targets will become predictable quite fast or you can hop into deathmatch but then you won't have targets to shoot at the entire time or in fact not even the majority of the time. On top of that, you'll also have to worry about other things like your own movement or even the recoil of your weapon. In a third party aim program that's just not the case and your practice is a lot more isolated in focus.

#2 Work on your Weaknesses

Something else that's very important to take a look at is your weaknesses. If you're an experienced player and already have decent aim you're probably aware of your weaknesses. Just in case, the best way of finding out your weaknesses is by looking at your demos especially taking a look at what engagements you're winning and which ones you're losing or alter-



natively recording yourself playing something like deathmatch in Valorant and doing the same.

Once you see what engagements you're winning and which ones you're losing you probably have a good idea of what you're strong at and what you're weak at. By working on your weaknesses you'll both see the fastest results and you'll also lose fewer matches. Of course, it still makes sense to have a balanced practice regime working on all areas of your aim but at the end of it make sure you're having a big focus on the areas that are holding you back that way you'll be improving and ranking up the fastest way possible.

#3 Losing Focus

if you ever held an angle longer than 5 seconds in Valorant then you've probably experienced losing focus. You're just so focused on looking at the angle that you just zone out and your reaction worsens. A lot of players refer to this as falling but how do you avoid sleeping on the wheel? How can you be sure that you're always laser-focused?

Well, there's actually a neat little trick for it that's both surprisingly easy to execute and unbelievably effective. All you really have to do is move your screen a bit either by moving your crosshair or by doing a quick jiggle by simply using your movement keys. A pro player that's pretty known for doing this is Stewie2k who is currently playing for team liquid. Whenever he's holding an angle for a reasonably long amount of time and he suspects that he's losing focus all he does is shakeup that crosshair.

COVID SEES BREAKING OF THEATRICAL WINDOW WITH DIRECT-TO-DIGITAL FILM RELEASES

The current trends will outlast the pandemic and are here to stay. Digital platforms will continue to thrive and evolve per the needs of customers, says Vinit Mehta, Head of Sales, Indian Sub-Continent, Brightcove

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WHAT IS AVAXHOME?

AVAXHOME-

the biggest Internet portal,
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fresh magazines, hot games,
recent software, latest music releases.

Unlimited satisfaction one low price

Cheap constant access to piping hot media

Protect your downloadings from Big brother

Safer, than torrent-trackers

18 years of seamless operation and our users' satisfaction

All languages

Brand new content

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What are the trends seen in the OTT space, especially due to excess video demand? How will this impact the video industry post-Covid?

Original content has always been a driving force in the adoption and growth of OTT services, but the pandemic has made originals even more crucial. Still, the industry has witnessed a trend of the rising number of original shows in the form of licensed content and an escalation in regional content. The OTT platforms are actively putting their efforts to attract viewers with their exclusive content which is tailored to specific audiences.

Another major trend has been the rise of "Direct-to-digital" with films having to premier on digital mediums before their theatrical release due to worldwide lockdowns and social distancing norms. This breaking of the "theatrical window," the time between when a movie can be released in theaters and then on streaming services, itself is unprecedented and appears, increasingly to be the new norm and something that likely will stay with us. But it's not just video on-demand that's been impacted, publishers and broadcasters have seen huge upticks in the amount of news consumed through streaming as the pandemic and other world events have made news awareness crucial.

From the customer standpoint, we looked at our data with the Brightcove Global Video Index, a quarterly index that analyses video streaming data points from our customers globally. In the most recent index, we saw the following trends in India:

- India's video viewing is primarily on smartphones. In 12 months, smartphone views have increased in share from 80% to more than 88%.
- Android is the device of choice. Q2 saw 95% of video views on Android phones, and Android tablets also dominated with about 66% of views.
- CTVs hold the longest view times. CTVs view times were 4x that of smartphones.

The coming year will be transitional for OTT players with a new population entering with distinguished demands. We are sure that the trends brought up by the pandemic will outlast the pandemic are here to stay and digital platforms will continue to thrive and evolve per the needs of customers.



VINIT MEHTA, Country Manager, India, Brightcove

How has the new real-virtual hybrid model worked for corporate events and what will be the trends in the future?

Video is now at the forefront of how we communicate with others, how we conduct business and is enabling us to stay connected even when physically apart. Now, more than ever, we need events to flourish and connect us in a virtual video experience. We have seen many in-person events and meetings who pivoted to an online video at a rapid pace this year. For example, NAB Show, the annual trade show of the National Association of Broadcasters (NAB), delivered a new virtual experience, called NAB Show Express in place of its annual event earlier this year. The virtual event reached over 40,000 industry professionals and featured over 200 video-on-demand assets for conference sessions, real-time video clips on social channels, and eight-hours of streamed content daily.

With no timetable for the return of large-scale,

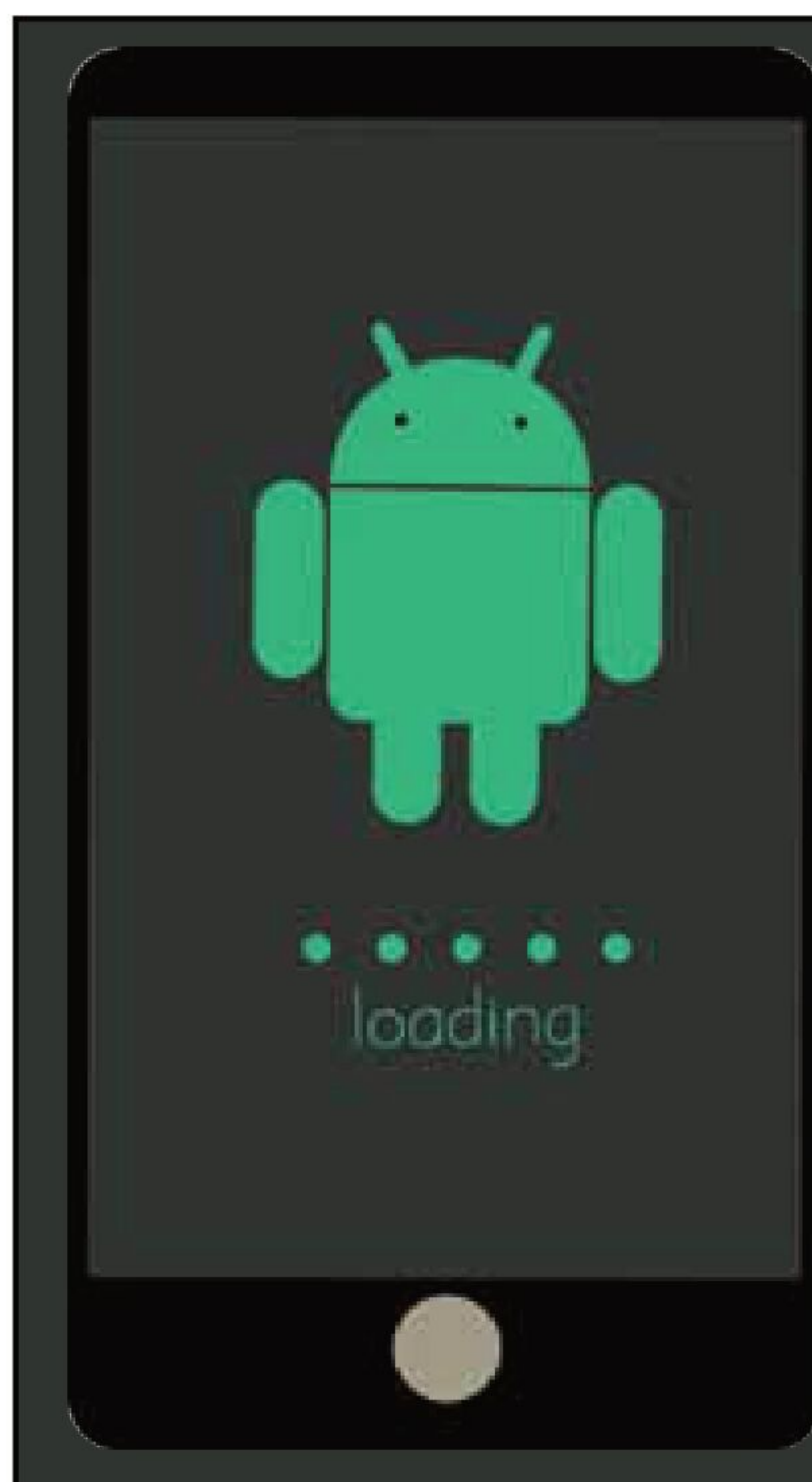
in-person conferences and events, marketing & event professionals understand that there is a strong need to adopt a more video-centric approach. Post-COVID, the world will ultimately be able to get together again in person, but virtual events will remain pivotal as businesses have discovered video enables them to expand their reach, go beyond the limitations of a physical conference room, and is cost-effective. The future of physical events has to evolve to where the expectation is either virtual-only or hybrid, for those that want the in-person as an option. With advances in technology today, organisations can adopt a digital-first future very quickly and deliver exceptional virtual events experiences quickly and securely.

How are companies collaborating with certain tools and techniques to maintain efficiency when it comes to working virtually?

Video is now at the forefront of how we stay connected with others in our personal lives and professional. For organisations with a remote workforce, video has emerged as a critical tool that allows stakeholders to remain engaged, effective, and productive. In our Brightcove Global Video Index, one of the findings was that for most organisations' business continuity plans are now heavily dependent on video technology. Content created by enterprise video views saw a strong uptick on smartphones by 660% during this year – showing the increased growth and dependence on video technology in the dynamic business environment.

We have also seen the importance of security, quality, and scalability required in global business workflows. Organisations need to ensure that they are streaming high-quality video experiences with security and control for both public-facing audiences and private internal communications.

What are the types of industries Brightcove works with and can you name some of the solutions that have worked in various sectors?



India Mobile Video Trends

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Brightcove works with many of the leading OTT streaming providers, broadcasters, publishers, enterprise, retail, e-learning, arts and entertainment companies in India and across the world. We work with some of the most innovative companies around the world, companies that are pushing the boundaries when it comes to using video. For example, we help Revry, a global streaming network, reach a diverse audience on its OTT service available in over 130 countries and provide SEEK the tools to increase its brand presence using video. The Tribeca Film Festival has increased engagement with fans using Brightcove video, and the Dropkick Murphys reached over 9 million viewers with their Streaming Outta Fenway event earlier this year, raising over \$700,000 for charities helping the community during COVID.

Our mission is to help organisations meet their business goals and create strategic opportunities by inspiring, entertaining, and engaging their audiences through video. Brightcove provides its game-changing video solutions to over 3,381 customers globally. This roster includes industry leaders spanning verticals, from media titans like and AMC Networks, food and beverage giants, Chick-Fil-A and Dunkin' Brands, authorities in entertainment like the Academy of Motion Picture Arts and Sciences and the Tribeca Film Festival, virtual education company MasterClass, along with sports partners like USGA's U.S. Open, and many more.

FOCUS 2021: ACCELERATED PROBLEM DETECTION & PRE-EMPTIVE ACTION

The banking system is on the constant lookout for high-quality data, emerging technologies and a robust FinTech strategy to will assist them, says Jaya Vaidhyanathan, CEO, BCT Digital (Bahwan Cyber Tek group)

Sunil Rajguru
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How are we handling the absolute explosion of data of the modern age further pushed by the Covid crisis? What are the kinds of analytic tools that are helping us cope?

In the past, the banking sector has handled customer data primarily within their internal systems like Core Banking System or Loan Origination System. Today, the quantum of data that they can leverage is so enormous and can be overwhelming to make a distinction between good and bad data and to process it towards good decisioning. Even in pre-Covid times, we were using AI to identify NPAs by helping bankers identify large risky accounts and flagging it off for action.

A black swan event like Covid-19 has accelerated the use of AI, Predictive Analytics, BigData in the banking sector through FinTechs. Bankers now need

to quickly measure the impact of a pandemic on their growth and recovery. To depend on even the best of human analytical expertise, this could take months or years to comprehend.

It has opened-up the black-box approach to risk management, offering more accountability and predictability in decision making in the banking system. Today, accessing data is simplified even more through digital sources, by and large, like Credit Bureau information, real-time alerts on corporate actions etc., that synthesize huge volumes of structured and unstructured data sources, thereby making technology inevitable in decision making. This further helped in moving away from orthodox methods to AI based analytics to quickly predict fall outs, quantify data and build recovery measures.

The need for innovation and technology is ever

dynamic. Specifically, the banking system is on the constant lookout for high-quality data, emerging technologies and a robust FinTech strategy that will assist them.

Going forward, what will be the role of Artificial Intelligence in all of this? Will AI dominate data and data analytics?

The massive amounts of diversified data from various sources can only be tapped with the use of technology. As we move to 2021, the emphasis will be on accelerating problem detection and pre-emptive action. AI powered technologies can analyze thousands of different data points, based on intelligent pattern matching with a great degree of accuracy within micro seconds. For instance, real-time alerts are essential in preventing high tech frauds possible today in the BFSI industry making it important that the decision-making process is data driven, which requires precise integrating technology through open APIs.

Considering the economy and the financial sector, it is foreseen that banks may aggressively implement AI driven technology systems to control risks. Regulators will now want to intervene before other risks can manifest and thereby push for advances in regulatory guidance for model risks, liquidity risks and operational risks. This will lead to a risk-optimized banking experience which will eventually rely on the strengths of game-changing technologies like AI to redefine the FinTech arena.

Can Deep Tech and local innovation help in 'Make in India' campaigns related to sectors like BFSI?

The complex Indian banking sector requires products that are engineered for the Indian market considering the unique gradations that are part of India. Global products that are designed outside India simply may not fit the cultural variations, business complexities and most importantly, the scalability in terms of number of customers/accounts/transactions per day, of this country especially in core areas like NPAs, financial inclusion, payments etc.

We need to look at the technology needs both from the perspective of global regulators and that of the bank. Let us take the case of NPA and the EWS solution for instance—in India, we have alerts that the RBI and other regulators like the DFS have mandated. Over and above, banks depending on their risk appetite, may want to monitor their asset books through custom alerts, focusing on specific sectors or business verticals. To trigger these alerts, the volume, source, and complexity of data have



JAYA VAIDHYANATHAN, CEO, BCT Digital

to be considered while engineering the product. Deep Tech and local innovation can definitely help in this regard by coming up with products that are conceptualized for India, designed and made in India and deployed in India.

What according to you is the new normal in the post Covid world and what role does digital transformation play in getting us there?

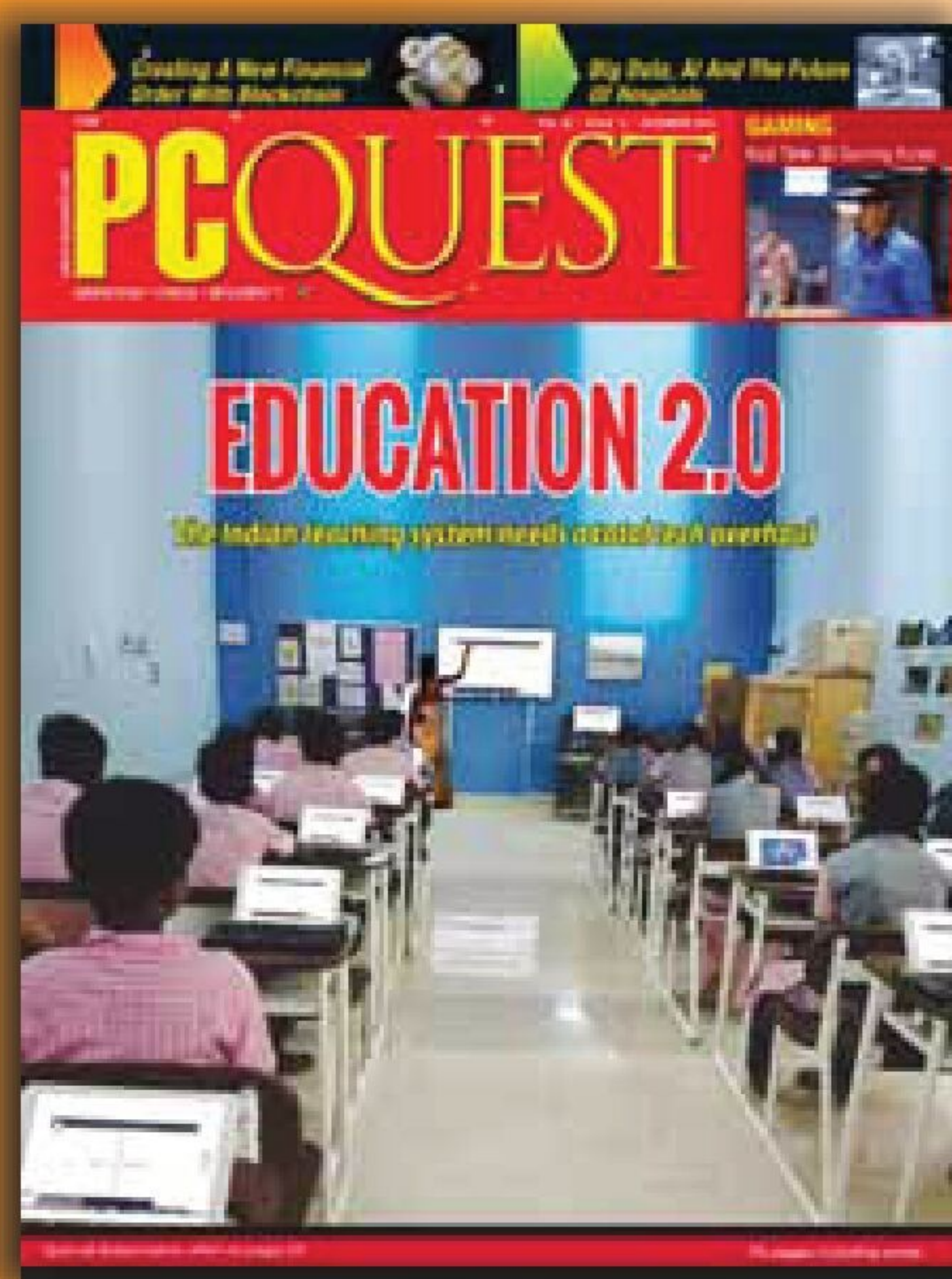
In a market that is stagnant or in slow growth phase, financial institutions will focus more on risk planning and management. Business cycles during this time may get shorter and new business models will evolve, changing the game. In the new world, conventional technologies will not be able to help stay productive or profitable. When the economy and financial sector revives, the goal will be towards risk mitigation. This holds true particularly when viewed both in the context of banking risks like credit & liquidity risks and in the context of changing regulatory landscape.

Safe and responsive banking will also take the course in the years to come. Accelerated problem detection and taking pre-emptive actions will be emphasized and executed through use of analytics for predictive modelling of macro and microeconomic events, use of Artificial Intelligence to make unbiased decisions with thousands of data points taking the digital realm above and beyond.

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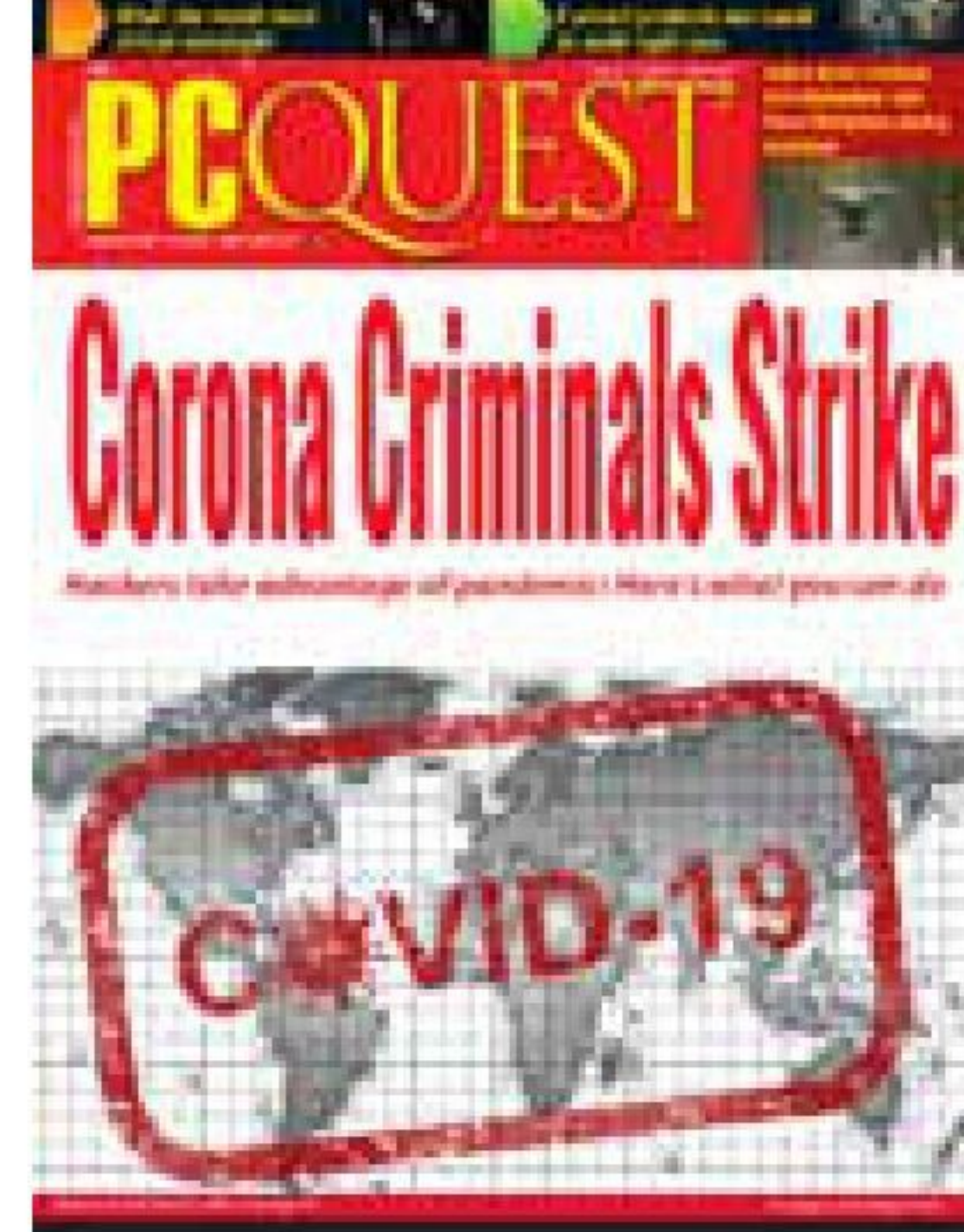
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7 TECH TRENDS WE'D LIKE TO SEE IN THE 2020S

The world saw technological acceleration in 2020 and many areas like Cloud, Work From Home, OTT, online education and others received a fillip. Here's hoping that tech pervades deep into other essential areas in 2021 and beyond

Sunil Rajguru
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AgriTech: Growing up in the 1980s we were told that 80% of Indians lived in rural areas. After that rapid urbanization took place and now that's heading towards a 50-50 type situation. While the cities can take care of themselves in terms of tech, there is a need to push it in the rural areas. The desktop and laptop revolutions gave Indian villages a miss, not so

with the smartphone.

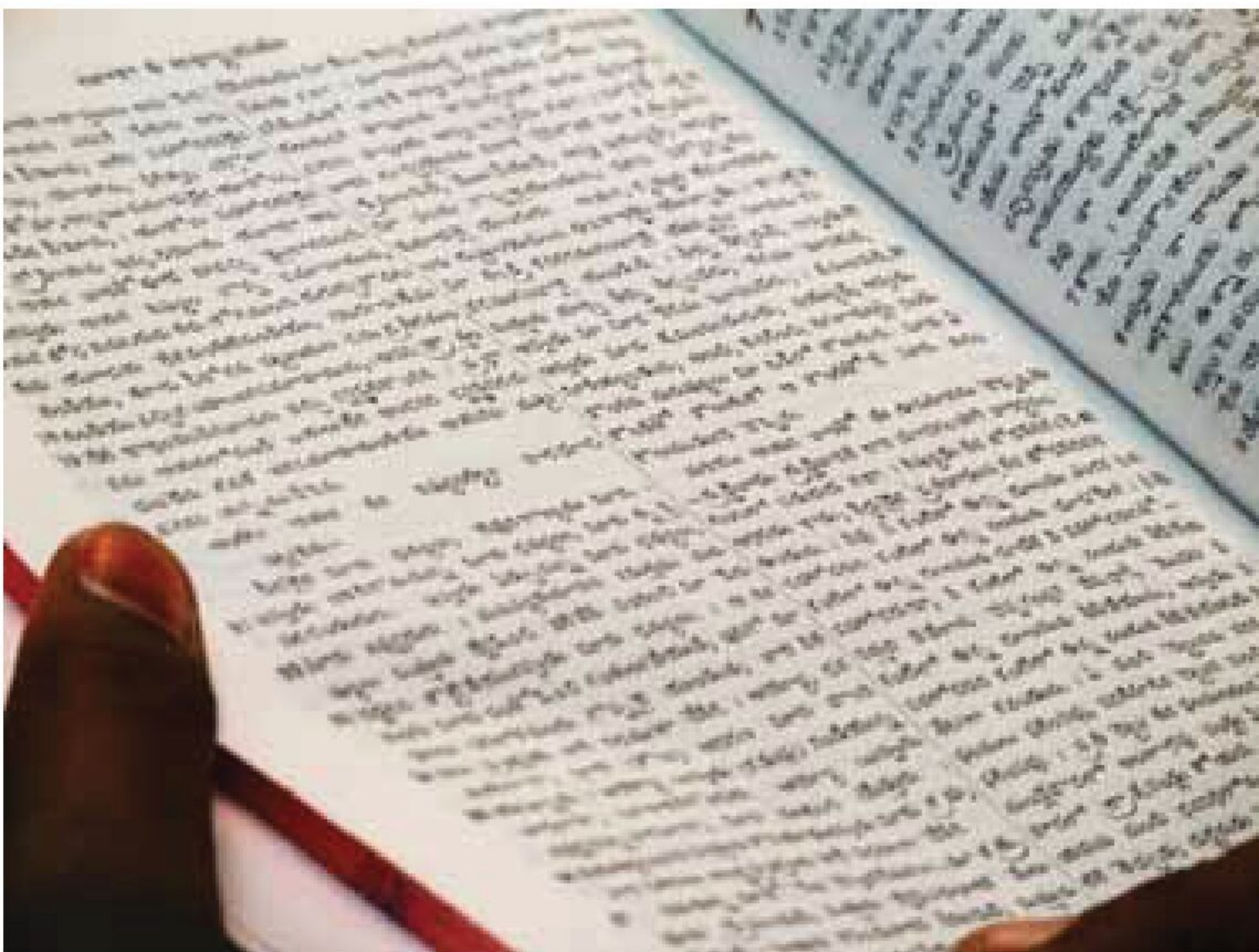
China and India are leading the mobile revolution in terms of usage and rural areas have seen a good usage of apps like WhatsApp and the now banned TikTok. Thanks to the Jio revolution, Indian mobile broadband rates are the cheapest in the world. It is now possible for the Indian farmer to get integrated

with the latest rapidly evolving technologies of the day.

The Internet of Things (IoT) can prove handy here. They are small connected economical devices which can mesh up to be a really powerful network. IoT devices embedded in things like tractors and water pumps paired with the farmers' mobile will go a long way. The government can come out with a super agri app that can help the farmer right from sowing, tending, reaping, selling and distributing their produce. Agricultural drones are another area of interest.

As it is a new agriculture policy has come and technology can help in maximizing results for the smallest of farmers. One survey said that India has barely scratched 1% of its agritech potential and that sounds about right. In this case, literally the sky's the limit. We need a surfeit of agritech startups to kick things along big time in the 2020s.

Regional languages integration: Google's \$10 billion investment in India also included MuRIL or Multilingual Representations for Indian Languages,



an AI-powered model that will address the issue of interoperability of Internet services in 16 Indian languages. It will help users switch a language during a Google Search and also get support in Google Maps. The revamped Instagram Lite introduced support for Indian languages. OTT has also become popular in regional languages and global players are scrambling to give full support in regional languages.

With the Make in India campaign gaining momentum in 2020, especially after the escalation with China, the aim should be to have all the Indian

apps in all the Indian languages. If major global and Indian players push for full inclusion, no Indian will be left out in all the tech revolutions that will take place in the 2020s.

The rise of Indian towns: While urbanization and megacities were the clear trends till the 2010s, the



Work From Home or Work From Anywhere paradigm may balance it out. Thanks to advances in online education, students from towns can avail of the latest cutting edge education and courses. With the option to work outside the office, it now becomes attractive for people to work in smaller towns where they can have a much higher quality of life for the same package. The tech modernization of towns in India in the 2020s would go a long way in solving the high density of population in our megacities.

Smart education in rural areas: It is difficult for small children to take to online education. It is even



tougher for rural college students without laptops, desktops and reliable broadband connections. The time is right to convert Government Schools into Smart Government Schools. It will be a one-time investment that will go a long way for India's future.

China introduced educational reforms in the 1980s which led to great dividends in the decades to follow. It is never too late to invest in the future and India can make this the Decade of Smart Government Schools. Since smartphone and mobile broadband penetration is already high in rural areas, we can piggy bank on that and transform Indian education.

Industry 4.0 for the SMBs: Small and medium businesses suffered during the Corona crisis-lockdown-recession. Factories struggled to introduce social distancing and no touch technologies. As a result many went out of business. This problem can be sorted out by Industry 4.0, which is also a one-time investment.

Deep Tech in government: The huge data related



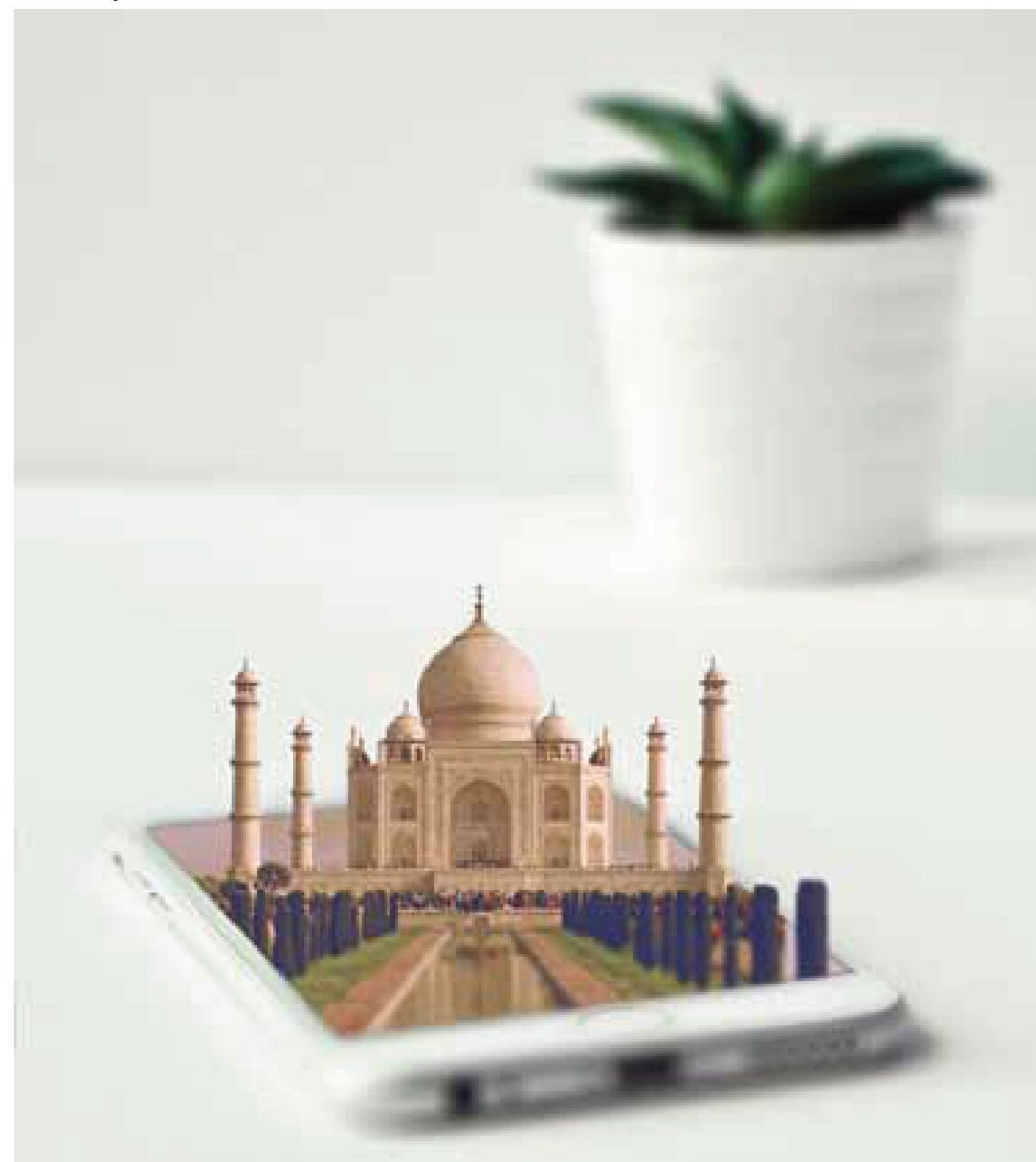
to 1.3 billion Indian citizens can be managed with the help of Deep Tech. India has introduced Aadhaar and Contact Tracing, but much more can be done. AI skills for government employees would help. Like Digital India, XR (Extended Reality = VR+ AR + MR) can form a Digital Reality India. The government should look at XR for training, simulations and knowledge transfer for police and government officials as well as responses to things like natural disasters.

With immersive technology, citizens can participate on a large-scale with things like city planning. It can be made part of e-governance. If every government office had a VR headset, then

it would be easier to view actual projects, plans and certain documents. Information from the top museums in India could be presented in the form of headsets for rural India and even tourism could be digitized.

Efficient AI chatbots across the myriad Central and State government websites would go a long way in solving time-consuming basic and widespread queries. Being on the right track, last year's Union Budget also proposed data center parks all over India.

5G's final arrival: Take many of the above concepts. IoTs. Better use of the mobile. WFH. Online



education. Industry 4.0... They can all be enabled by 5G. 5G is not an upgrade. 5G is not a mobile broadband service. It is in fact a whole new way of living. A whole new technology. A way of powering entire Smart Cities with all its components: Smart Factories, Smart Homes, Smart Cars, Smart Utilities etc.

Reliance Chairman Mukesh Ambani has said that his company can implement 5G in the second half of 2021. The government should come out with 5G licenses immediately. The implementation doesn't have to be nationwide immediately. Various players can take up various zones and that will give a big fillip for the 2020s.

DEFERRING THE TICKING E-WASTE TIME BOMB

India ranks fifth amongst e-waste producing countries, after China, Japan, US, and Germany. It's about time that we understand the e-waste hazards and combat them effectively

Krunal Shah



Electronic waste entails discarded computer monitors, mobiles, chargers, motherboards, and a lot more electronic gadgets. As per the Global e-waste Monitor 2017, India generates nearly 2 million tons of e-waste on an annual basis. It ranks fifth amongst e-waste producing countries, after China, Japan, the USA, and Germany. In the year 2016-2017, India treated about 0.036mn tons of e-waste.

Nearly, 95% of India's e-waste gets recycled with no formal set up in quite a crude state. As per a report on e-waste presented by the United Nations in the World Economic Forum on January 24th, 2019- it was seen that the waste stream ended up piling on to 48.5 million tons in the year 2018 and the figure is also expected to double up if no measures are taken in the current situation. Even in a more global scenario, only 20% of the global e-waste gets recycled. The UN report additionally mentions that due to the poor extraction techniques; the total recovery rate for cobalt from e-waste only lies at 30%. So, to elaborate further; let us look at the e-waste management laws, the threats, and the ways we can adopt to combat them:

E-waste management laws

The laws to manage e-waste have been around ever since 2011. However, they mandate that only authorized recyclers as well as dismantlers can collect e-waste. E-waste management rules were enacted on October 1, 2017. More than 21 products were included under the purview of this rule.

This rule also ends up extending its purview to consumables and components as well as parts that come under Electrical and Electronic Equipment. There is a concept known as Extended Producer Responsibility put in place, which is the global best practice and helps in ensuring the return of the end of life products. Also, a new arrangement known as the Producer Responsibility Organization has also been introduced to strengthen the EPR further. The producers generally need to meet targets, which should actually be 20% of the waste generated on their sales.

But the issue here is that despite the new rules that are in place, the hazardous material actually comprises 80% of e-waste. It consists of cell phones, old laptops, air conditioners, and cameras, LED lamps as well as televisions. These continue to break down at huge environmental and health costs and end up polluting soil as well as groundwater.

Potential threats of e-waste:

Most of the time, electronic devices can be reused,



KRUNAL SHAH, Co-founder, Qarmatek Systems

salvaged, or resold. Worst case scenario- they can even be recycled. But what really adds up to e-waste is when it gets disposed of. E-waste typically has quite a horrible impact on the environment. Here is some impact of e-waste on our environment and the potential threat it holds:

Most of the time, computers as well as electronics comprise toxic materials including zinc, lead, flame retardants, chromium, and barium. Specifically, with lead in picture, the release in the environment can cause disastrous damage to not only the environment but also impact the health by damaging kidneys, human blood, as well as peripheral and nervous systems.

When we throw away electronic waste in landfills, the toxic materials tend to seep inside the groundwater- which affects both- sea as well as land animals. This also affects the health of residents in developing countries as most of the e-dump ends up being dumped here.

As per a survey, only ten percent of cell phones go for recycling in the USA, and most residents get a new cell phone every twelve months to eighteen months. This ends up creating a lot more e-waste and then with the lack of recycling, the environmental issues keep increasing.

It was also found that in Guiyu, China; many resi-

dents show substantial digestive problems as well as neurological, bone and respiratory problems. This has become the largest e-waste disposal site in China and possibly in the world. Guiyu as of now receives a lot of shipments from across the globe.

Ways to combat e-waste:

Now, coming to the main point; there are plenty of ways to minimize e-waste. Here are some ways for you to do that:

Donate or sell working electronics

The easiest way to manage e-waste actually efficiently is by simply selling your electronics if they are in good working condition. There is a thriving refurbishment and repair industry in the nation that can use it. You can definitely consider your options for both and let the technicians do their magic before killing off something that can simply be put on a ventilator for a few days and put back to health.

Try doubling up your old devices

We get it. It is difficult to not keep up with the enticing technology that's introduced in the market every day. However, you don't actually need to throw off your old phone just because a sleek replacement awaits you. Instead of trashing it, use this in your car as a GPS device or even as a music player. Also, did you know that you can convert your old phones into remote controls which can be used for monitoring security cams.

Go for refurbishment and reusable electronics

As of now, the refurb and recycling industry is on a roll. Especially, by meeting the demand in the times of the pandemic, we can truly see the potential of this industry. It is best to give your favorite gadgets a fighting chance and send them for repair. Additionally, an expert would either be able to fix it for you or may be able to put it in a condition that can help him refurbish the product too.



Trust the experts

It is best to get your products recycled or repaired by a retailer or an expert that has a proper in-store online as well as drop off options. This helps in gaining trust and also shows experience. Additionally, you can also check the e-recycling centers in your state. It's better to donate or resell your gadgets or electronic devices to trusted sites, otherwise they just might end up in e-waste junks.

Store your data properly in an online setup

If you can reduce the usage of additional electronic devices, like a memory stick or hard drives; then that also works. There is plenty of cloud space available and you can store a lot of your data in these places now. Choose Dropbox or Google Drive. These services can provide you with extension to the space and also help you save up on pen drives, hard disks that are easily damaged and add up to the e-waste.

Key takeaways:

What we have learned is to understand, combat e-waste; it first actually helps in understanding the scope in proper detail. Now that we are acquainted with the holdbacks and the potential threat e-waste possesses, it is safe to say; that with these following ways to combat; we can definitely reduce e-waste in the long run.

The author is Co-founder, Qarmatek

PROCESSOR WARS HOT UP IN THE 2020S

Not just desktops and laptops, but billions of mobiles, tens of billions of IoT devices interacting with millions of data centres. This is the new cloud paradigm and the processing scene has seen a sea change in the last couple of years

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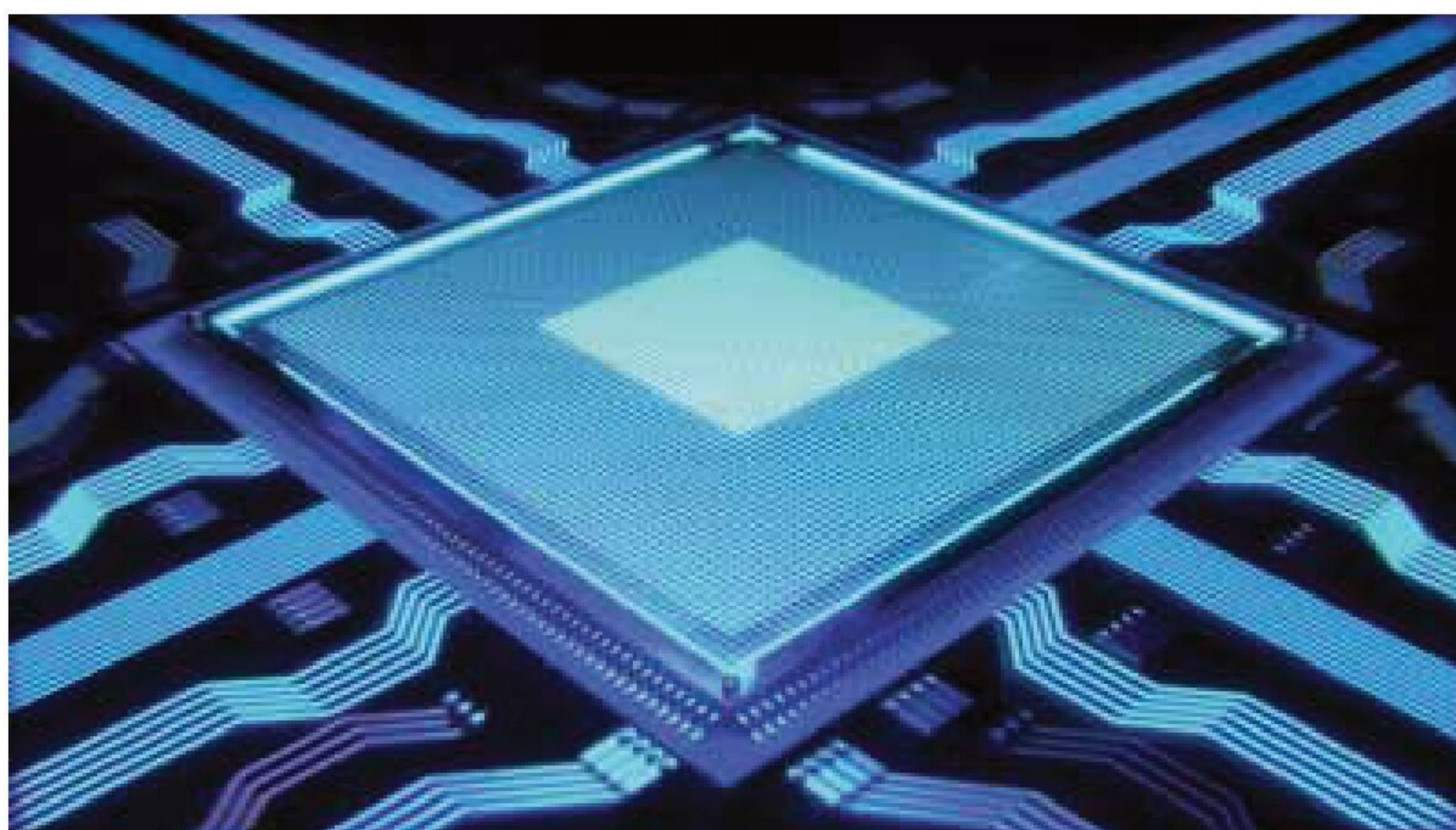
There was a time when the term Wintel (Windows + Intel) ruled the processing world. Microsoft had a monopoly in the Operating System and office software world while Intel had a monopoly in the CPU domain. There was Apple, but that never held enough market share to rock Wintel. This was absolutely true in the Desktop Era, but most of that dominance carried into the Laptop Era.

The real change came with the advent of mobiles where all attempts at a Microsoft mobile OS fell flat and it is nowhere in the scene. It was Google's Android that took over the monopoly in that domain. Intel however survived because Apple started using Intel chips for both Macs and iPhones. But even that arrangement has fallen apart.

The mobile workforce crossed 1 billion some time back and is now heading toward the 2 billion mark, further accelerated by the Covid Era. As a personal device, almost everyone on Earth has a mobile and it is the most successful gadget ever.

The smartphone is getting more and more processing power and endless apps. Thanks to the cloud, storage is not an issue, even though that is increasing on the device too. The mobile processor market is dominated by Qualcomm and Mediatek followed by Samsung, Apple and HiSilicon. There is no monopoly here and all of them are seeing ups and downs quarter to quarter.

Another fast growing market is the GPU (Graphics Processing Unit) one and it's not just about gaming. GPUs will play a big role in the world of XR—Extended Reality (VR-Virtual Reality + AR-Augmented Reality and MR-Mixed Reality) and subsequently fields like



automotives and Industry 4.0. Here the monopoly belongs to Nvidia with AMD as the challenger.

One thing that will queer the pitch is quantum computing. Here Google claimed quantum supremacy last year and the Chinese in 2020. There are a host of new companies that have dazzled in the game with oldies like Microsoft and IBM also in the game.

When it comes to CPUs it is also a fast changing market quarter per quarter. But even here AMD has narrowed the gap with Intel thanks to its highly successful Ryzen series. In the desktop scene they are going neck to neck and in the laptop AMD had breached the 20% market share after many years. Overall this was the first time in ages that the CPU market share fell below the two-thirds mark for Intel.

What this means is that there are many types of processors and many types of players and a total monopoly is unlikely. Fortunes are changing drastically quarter to quarter in a market that sometimes would be stagnant for years in the past.

All in all an exciting time and we will witness multiple processor battles in the 2020s!

TECHSODUS: HAS CALIFORNIA LOST ITS CHARM?

Recently billionaires Elon Musk and Larry Ellison announced their decisions to leave the golden state of California as did HPE. For decades, California has been the global headquarters for technology, but is that now changing? Some have already called it “Techsodus”

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In 1953 when William Shockley left New Jersey's Bell Labs (now owned by Nokia) for California's Silicon Valley, he spawned a revolution that has lasted till this very day. Whenever you read that a company is headquartered in Menlo Park, Palo Alto, Cupertino, Sunnyvale, Santa Clara, Redwood City or Mountain View, it's all Silicon Valley.

California's economy has been in the range of \$3 trillion, a figure which India recently is catching up to 70+ years after Independence. It is home to companies with a market capitalization in the range of trillions and boasts of the best tech brains of the world with amazing innovations.

The first billionaire to have a problem with Silicon Valley was "Paypal Mafia" don Peter Thiel whose Palantir had a high-profile IPO recently. But he still stayed in California, choosing to move to Los Angeles proper. Palantir moved to Denver Colorado. Then there's Amazon which is headquartered in Seattle. Jeff Bezos has many homes but his most high-profile is the one in Washington DC.

Trouble in paradise started with Musk. He had a high profile spat with the California government when he wanted to keep his Tesla factory open during one of the Covid lockdown regulations. He declared "Give people back their goddamn freedom" and used the term "Fascist". Musk has also repeatedly quoted high taxes and regulations as being cumbersome. He put up his seven California homes for sale and headed for Texas. SpaceX is already based out of Texas, but Tesla and the Boring Company may follow.

Bill Hewlett and David Packard started the famous Hewlett-Packard in a Silicon Valley garage in 1939. That split into HP Inc and HPE (the E standing for Enterprise). Well HPE is also now headed for Houston in Texas. In a blog post, Antonio Neri, President & CEO said...

"Houston has long been our largest U.S. employment hub, and construction has been underway since the beginning of the year on a new, state-of-the-art campus in the area. Houston is also an attractive market for us to recruit and retain talent, and a great place to do business. The most diverse city in America and the fourth largest, Houston provides the opportunity over time to draw more diverse talent into our ranks – a key priority for HPE as we work to be unconditionally inclusive."

After that came another high-profile announcement by Larry Ellison. Oracle too is headed to Texas while Ellison is relocating to Hawaii saying this will work in the new age of collaboration. Ellison said he

California has passed a law that grants a permanent worker type status with minimum wage, sick leave and other benefits to gig workers. That will grant special privileges to say Uber-Lyft drivers. Both these companies have said they cannot afford to do so and have moved the courts with a long-term threat to exit the golden state of California altogether. Another kind of exodus!

would use "the power of Zoom" to work from Lanai, an island he bought for \$500 million some time back.

There has been a lot of activity around Covid. Macy's shut down its tech centre in San Francisco. Financial Services giant Charles Schwab was also in the same city and moved to Texas. Dropbox CEO Drew Houston was one of the first to buy a house in Austin Texas.

There has been a homelessness problem in California and they have tents and public pooping on the streets. Many middle class citizens have already fled California over safety and other issues like drug addicts among the homeless. Californian politicians have increasingly talked of higher regulations and taxes related to businesses and inheritance. This has not gone down well with tech moguls and some have decided to quit the golden state.

But the trillion dollar question people are asking is whether Techsodus is a temporary blip for Silicon Valley or will it only get worse in 2021 and beyond.

THE ADVANCEMENT OF CONTACTLESS TECHNOLOGY

The demand of touch-less and IoT-enabled sanitizing devices to prevent transmission of germs from an infected to a healthy person is increasing day-by-day. These devices can be extremely useful for complying with good hygiene standards

Ashok Pandey
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The rapid spread of COVID-19 worldwide demands the need for maintaining proper hygiene, not only personal as well as at the public places. Hand hygiene is regarded as one of the most important elements and then you need to cover your nose and mouth with a mask or face shield to control infection.

Using bottled sanitizers becomes the most popular and easiest way to sanitize your hands manually. While on public places, it's one of the biggest challenges as like hand held temperature scanners which increase risk of cross-contamination because the process is manual and involves human intervention.

To avoid such human intervention researchers developed contact-less products. Touch-less devices facilitate infection prevention, there are many similar devices available in the market which include mini kiosks, automatic sanitizer dispensers which can perform automatic hand sanitization and contact-less temperature screening.

Let's have a look at some of the touch-less innovations –

CMED Health's Remote Patient Monitoring (RPM) – Using a mobile app now doctors can monitor their patients. The IoT-enabled health monitoring solution can be easily integrated with IoT-enabled smart medical devices. It sends all the measured data

to CMED's cloud server, which can be accessed and analysed by doctors.

Gauteng health services electronic Bed Management System (eBMS) – One of the major challenges of developing countries is lack of efficient visualisation of hospital capacity. To cater this, Gauteng health services introduced an electronic Bed Management System (eBMS). The solution identifies the availability of beds across multiple sites. It uses cloud-based technology and IoT sensors placed on the beds. It collects the data from each bed lying in hospitals and enable hospital staff to seamlessly identify the beds' availability.

IoT-enabled drones – To avoid human



intervention, the front line warriors used IoT-enabled drones for the delivery of tests, PPE, medicines and other vital medical supplies. Not only in supplies, drones also helped to disinfecting public spaces or detecting COVID-linked symptoms.

IIT Kanpur's SHUDDH – UV sanitization becomes handy when it comes to sanitize small to large devices as well as a room. Imagineering Laboratory department of IIT Kanpur developed an Ultraviolet (UV) sanitizing product named SHUDDH. This is a smartphone operated disinfector. It has six UV lights of 15 Watts each that can be individually monitored



from a distance. This can disinfect a 10x10 squared feet room in about 15 minutes.

Philips UV-C Disinfection system – Do you want to sanitize your vegetables, smartphone and keys?



Philips brings UV-C disinfection system that look like a microwave. The system has been validated to effectively inactivate SARS-CoV-2, the virus that causes COVID-19. UV-C Disinfection System comes with two light sources in enclosed space. Depending on the type of object, it takes approximately two to eight minutes for disinfection. It also depends on the object the size of the object.

OakterOakmist Plus – It is an automatic Sanitizer Dispenser by CFEES, DRDO. This mobile controlled automatic sanitizer spray machine is using the Mist Dispensing which is proven to consume less Sanitizer than normal Gel based Sanitizer Dispensers. One can easily control the machine using a mobile app to adjustable sanitizer dispensing timer & volume.



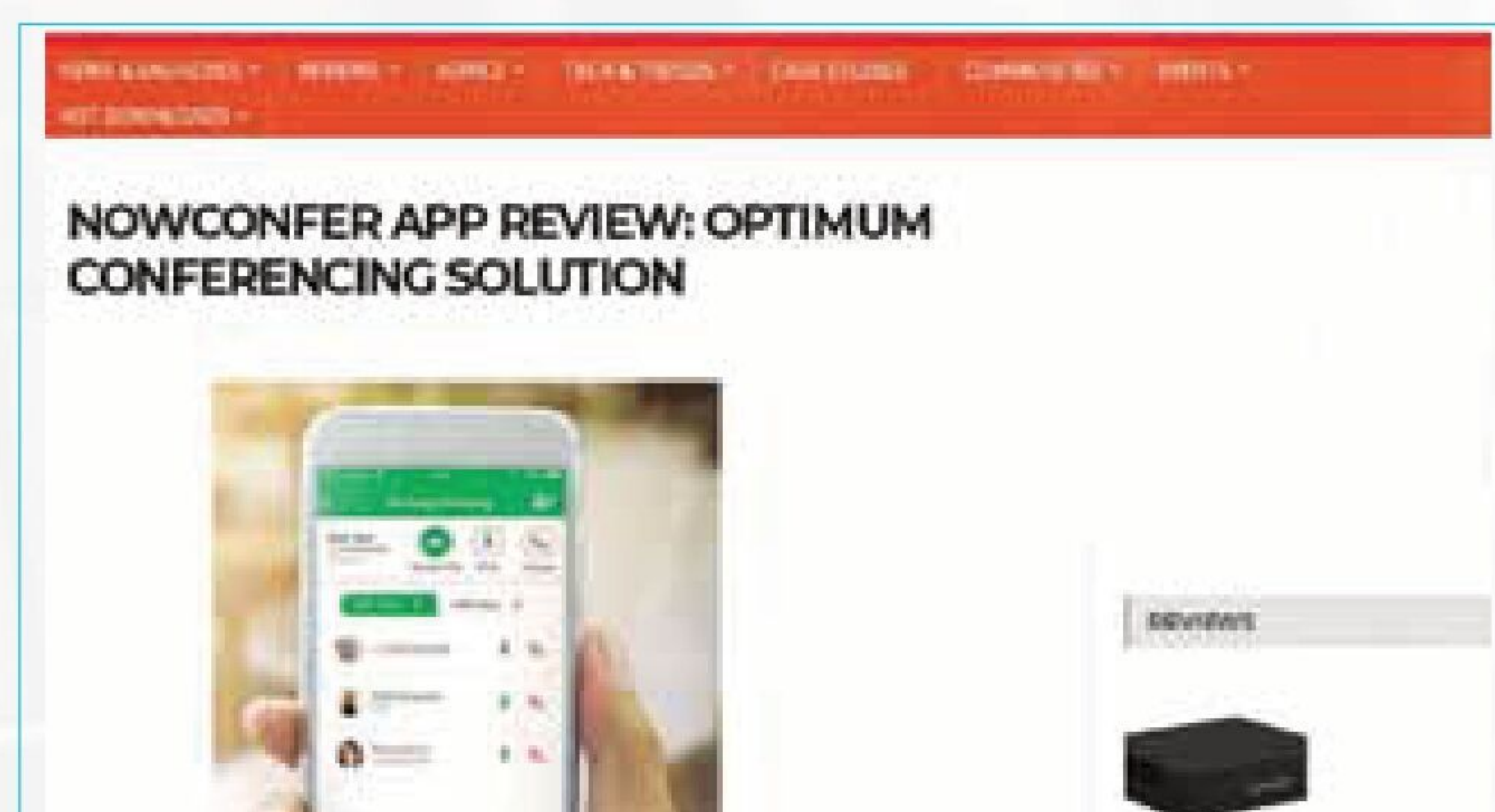
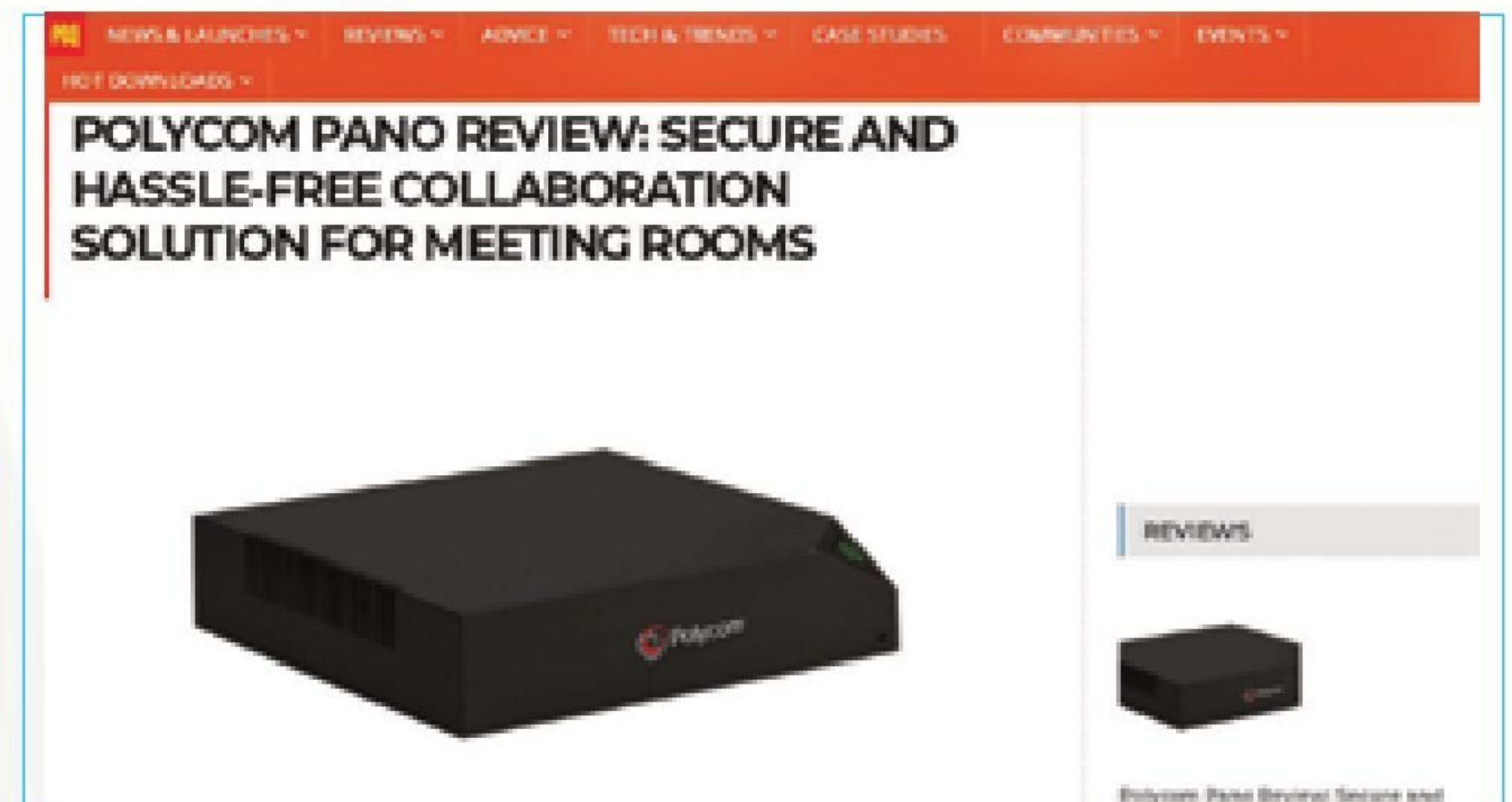
Drizzle Automatic Hand Sanitizer Dispenser – This automatic sanitizer and soap dispenser issuitable for public places to dispense Liquid soap, sanitizer, cleaner and so on. It is perfect to use at bathrooms, kitchens, office, school, airports, hospital, hotel and restaurant and other public places. It comes with a sensor which enables touch-free operation, the non contact Intelligence can avoid Bacteria cross infection.



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DELL PRECISION 5750 WORKSTATION

— Ashok Pandey
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What would you prefer – a powerful machine that can handle almost everything or a portable and stylish machine which is less powerful? Choices can vary depending upon what you do. A professional can compromise on portability but never on performance. For those who don't want to compromise of performance, Dell brings Precision 5750 mobile workstation.

Build and Features

Though it's a 17-inch workstation, yet it's quite thin. Dell uses the combination of aluminium and carbon fibre to build its outer shell, which makes it durable lightweight. The mobile workstation is customisable, so the weight will differ depending upon the configuration you choose, however that will be over 2.17 kgs.

There are two screen options – FHD+ (1920×1200 pixels) resolution and UHD+ (3840×2400 pixels) resolution. You can choose as per your preference and budget, surely the lower would cost less. You can also opt for touchscreen functionality.

The 5750 is powered by a 10th-generation Intel Xeon W-10855 processor coupled with 16 GB (up to 64GB) of RAM and 512 GB (up to 4TB) of SSD storage. For graphics, you get two options to choose from Quadro T2000 and Quadro RTX 3000.

It comes with a full-size keyboard with backlighting and a fingerprint reader embedded in the power button. The large touchpad supports 5-finger multi-touch. It has a 720p webcam, which is almost hidden in the top thin bezel.

The mobile workstation has four Thunderbolt 3/USB-C ports, an SD card slot and a 3.5mm audio jack. The unit comes with a USB-C adapter that has HDMI port for an external display, and USB-A for older accessories. It supports Wi-Fi 6 (a.k.a. 802.11ax).

Performance

My review unit comes with UHD+ display which is impressively bright and sharp. It produces vivid colours and supports HDR 400 and 100% of Adobe RGB, which makes it suitable for graphic design and photo-editing work. The 4-sided InfinityEdge display with 16:10 aspect ratio, and diamond-cut sidewalls and machined speaker grills, it is both vibrant and visually stunning.

As the workstation is designed for professionals, it is backed by a combination of powerful hardware. While using the PC for more than a month, I run various applications which we typically use to perform our day-to-day tasks. No doubt, it manages all the applications perfectly without any performance lag while surfing the Internet, watching videos and playing games.

It is built to deal with even more heavy applications, thus I loaded it with various high graphics-intensive apps, including Adobe Suite. We opened two chrome browser with 10 tabs in each with applications like MS Word, Excel and Adobe Photoshop and Premiere. While operating the machine with all these applications running on the background, we didn't notice any performance lag. We were able to switch between applications.

I used the PC to edit various images as well as videos. Also, I run some games that consume a whole lot of power, such as and



Price: ₹2.65 L + taxes

SCORE

Overall:

9/10

PRICE: 8/10

PERFORMANCE: 10/10

FEATURES: 10/10

KEY SPECS: 10th Gen Intel Xeon vPro processors, NVIDIA Quadro RTX3000 graphics, 16 GB RAM, 512 GB SSD

PROS: Workstation-class performance, slim profile, build quality, battery life

CONS: Could have a better camera

games like Shadow of Mordor and Theif. Though it's not a gaming machine, yet these games can help us to understand the real-world performance when a professional will use it with high graphics-intensive applications. The laptop did well, in terms of gaming performance as well. I didn't see any visible lag while playing games.

Further, I opened 20 Tabs in Chrome and Mozilla, MS Word, Excel, PPT, etc, plus run Adobe Photoshop, Premiere and CS. Even then there was no noticeable performance. We edited a sample video and rendered that then switched between apps, still no performance lag.

Dell added the IR camera in the laptop for ExpressSign-in, which identifies you when you walk up, waking your workstation and getting you ramped up quickly. It will also lock your screen when you walk away for an added layer of security. This also has a fingerprint reader, placed on the power button. The camera is snap, but the quality is not what we were expecting from Dell.

The Precision has Dual integrated high-quality speakers, Dual integrated noise-cancelling digital array microphones. It produces really great sound, you can enjoy the genre of music with it and while playing, you really don't need any external speaker or headphones. The mic is powerful enough to catch your voice clearly, making your online meetings more pleasant.

Bottomline: If portability isn't your preference over performance, then Precision 5750 perfect device. It has a large 17-inch screen, yet it is considerably lighter and provides superior battery life. The workstation delivers a great performance which is hard to beat.

BLUETOOTH EARBUD

BOULT AUDIO AIRBASS COMBUDS

If you are looking for affordable true wireless earbuds, then Boulton has a range of products for you. Earlier, we reviewed Boulton Audio ZigBuds and this time we got AirBass Combuds to experience its great bass. As its name, Boulton is selling it for its superior bass but is it really going to give you that experience at this price, let's find out in the review.

Design and feature

As like its previous TWS, the AirBass Combuds comes in a compact case. The charging shell has complete matte black finish on all sides with a grey colour inner portion. The grey colour also acts as a separator between the opening lid and the lower body of the case. The case Both earbuds are kept safely inside the charging case that has a clamshell-like design. The charging case can charge the earbuds up to three times from zero to full. The case is made of plastic but it looks and feels great. The outer matte finish ensures that no fingerprints are left on it.

Both earbuds are independent and come with an LED to represent Charging (red) and Successful connection (blue). The Combuds have a procedural oval curve shape with Convexo angular ear canals tube for audio output.

As like ZigBuds, the ComBuds also doesn't have any physical button to control various common functions. The earbuds come with touch controls, you can pause and play music, but these are quite sensitive. Even while adjusting the earbuds, the music went pause, which is a bit annoying. The buds are water-resistant and sweatproof (IPX5 rating) so you can enjoy your music anytime anywhere, during exercise, swimming, running etc.

Performance

Pairing the AirBass Combuds with your phone/tablet or PC is quite easy, simply get the buds out of the charging case, and turn on your device's Bluetooth. Look for the earbuds on your phone and click on pair. As mentioned earlier, both earbuds are independent of each other in terms of audio, they support Monaural sound reproduction. In mono, an identical signal fed to each of them, in reality, there are two independent speakers in each of our ears, a directional sound will be there with high-fidelity sound.

AirBass Combuds uses 9 mm dynamic drivers that produce a quite balanced and rich sound. It handled the lows, mids and highs quite well. While listening to heavy bass songs, the amount of bass it

Water and Sweat Resistant

IPX5



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Price: ₹1,499 on Flipkart

SCORE

Overall: **8/10**

PRICE: **8/10**

PERFORMANCE: **8/10**

FEATURES: **9/10**

KEY SPECS: Bluetooth v5; 9 mm driver; Noise cancellation; Play Time/battery backup up to 15 hours; 1 Year Warranty

PROS: Compact, Easy to fit design, Balance Audio, Battery backup, Price, Water Resistance

CONS: Mic

produces is really commendable, however, at full volume or above medium the vocals of the songs somewhere start getting gagged. I played songs of various genres in different file formats like FLAC, mp3, ALAC, and WAV. Therefore, we can say, AirBass Combuds are good at its bass production. The mids are detailed with the crisp vocals and clear sound, the lows were punchy too, at least enough to let us enjoy each and every song.

But you won't find it much suitable for calls. The mic is not as strong as it should be resulting in low voice capturing, therefore, the person on the other side couldn't hear me properly.

If we talk about the playback time in one single charge, the earbuds can go for beyond 5 hours of battery life in one charge. when on full volume. The charging case can give it juice for three times of usage, meaning it can stand for over 15 hours. The case takes around one and a half hours to charge fully.

Bottomline: At this price, the earbuds deliver really great sound at different volume levels and have good battery life. But disappointed with its Mic, so don't consider it if you are planning to have a TWS to handle your heavy call flows.

BLUETOOTH SPEAKER

VINGAJoy SP-6560 BLUETOOTH SPEAKER

— Ashok Pandey
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VingaJoy brings a tiny Bluetooth speaker for those who don't want to carry a large wireless speaker but don't want to compromise on sound. But is this tiny speaker can perform what it claims, let's check out in this review.

Built

This tiny speaker's outer shell is built with aluminium metal painted in glossy cherry colour. The speaker is only 1.5-inches tall and similarly has a cylindrical shell that houses the battery and speaker. On the top, it has a metal mesh and on the bottom, it has rubberised material for the grip. At both, you can find one USB and power button, along with a few LED lights.

Performance

Pairing the VingaJoy is quite easy, just push and hold the power button, it will automatically look for the nearest Bluetooth device. Confirm the pairing and you are done. The tiny speaker is only small in terms of size but not a loudness. It produces seriously impressive loud sound, which I wasn't expecting from this small speaker.

VingaJoy handled the lows, mids and highs quite well. Just at high volume, there was cranky sound and sometimes the sound was floundering. I played songs of various genres in different file formats

Price: ₹1,599

SCORE

Overall: **8/10**PRICE: **6/10**PERFORMANCE: **9/10**FEATURES: **9/10****KEY SPECS:** 400 mAh battery, Bluetooth**PROS:** Small, loud, battery life**CONS:** Audio cranks at high volume

like FLAC, mp3, ALAC, and WAV. It sounds well on low, mid and just high are not that great. It has maintained the balance between bass and treble, which you can notice at low and mid.

The battery life is quite amazing as well. In one full charge, it can stay with you for over 7 hours. Just Bluetooth isn't that powerful, obstacles can block the connectivity quite easy.

Bottomline: The small VingaJoy speaker has a small footprint, yet delivers a loud sound and has great battery life. But the price of the speaker could have been lower.

CLOUD HAS BECOME A FORCE MULTIPLIER

Post-Covid, nobody will be on the fence anymore when it comes to the cloud, feels Ashish Dhawan, Managing Director - Enterprise, Mid-market & Global Business, South Asia at Amazon Web Services (AWS). He feels that it has never been easier to collect, store, analyse and share data today thanks to the cloud, which has become a force multiplier for IoT devices

PCQ Bureau



Said Ashish Dhawan: "Going on in the future, learnings from the issues that came about due to the pandemic, are that people have realized that enterprises need to be digitally run businesses, therefore utilization of cloud is going to increase. Nobody will be on the fence anymore."

On how cloud is disproportionately important to supplement connected devices, Ashish said, "Over the next 10 or 20 years, it is likely that most companies on

premises footprint will not be servers. All the servers will actually move to the cloud. On premises footprint will actually be connected devices. Billions of these devices will be in your homes, your offices, your factories, your ships or trains or airplanes, agricultural fields..."

Check out the complete interview...

<https://www.youtube.com/watch?v=BzfjUiLIKsY>

COVID-19 HAS CREATED DIGITAL ACCELERATION

Srikanth Velamakanni, Co-founder, Group Chief Executive & Vice-Chairman, Fractal Analytics, talks about the Covid-19 crisis, what their company did to help and their learnings, Big Data analytics, Artificial Intelligence and what the future holds

PCQ Bureau

Srikanth feels that the good thing about technology is that we are always finding solutions to problems. Fractal Analytics in fact did help out the Mumbai municipality regarding the same early in 2020. On the topic of ever increasing data, Srikanth said, "The data explosion is huge. In 2014 machine to machine communication became bigger than human to human communication. We will have enormous amounts of data but the good news there is that storage has become very cheap. We don't have to discard anything. Processing has become much cheaper with cloud and other technologies."


"It's no longer a question of whether we have the infrastructure or processing capacity or not. The limitations will be human limitations... Human imagination will be taken to the next level. It will be tested rather than the processing capacity or the storage capacity. We need better algorithms that will tell you what you need to know, not just want to know."

On the topic of promoting AI in India, he said, "The AI opportunity in India is vast. One of the things that I propose is that India should make five introductory AI courses free for every citizen. Just teach that to

every single person in India. Get the greatest professors in the world, create those courses, develop an e-learning module. 5-10 years from now you will see that India would have really changed the world."

On the current pandemic: "Covid-19 has created digital acceleration like nothing else. It has really tested the boundaries of what is digitally possible. We had to reinvent ourselves to be relevant. People's innovation engines have really cranked out amazing stuff just to keep their businesses afloat. We now have to build upon this to the next level. People can digitally re engineer their businesses for the next 10-15 years."

Check out the complete interview at the hyperlink...

 <https://www.youtube.com/watch?v=AHW9uJtU4dw&t>





**LEADING TECH MEDIA
PLATFORM & NETWORK
SINCE 1982**



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20+
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Virtual Roundtables



9000+
Attendees Across Verticals



90,000+
People Influenced



COMMUNITIES

Technology Decision Makers - Enterprise and SMB, Telecom, Channel Partners, Start-ups, DeepTech, Functional Heads and many more



90+
Industry Leaders
& Tech Experts

MOVED THE NEEDLE DURING COVID-19 CRISIS

- From Survival to Revival
- Proactive Business Recovery
 - Changing Customer Expectation in Crisis
- Cyber-Sanitize your business
- Proactive Sales Strategies for faster business recovery
- New IT Priorities 2020

- CXO of the Week
- CiOL Live Video Series
 - Start-Up Circle
 - CiOL Cloud Burst
- CiOL Live Tech News

- Are There any Make in India IT Products for Us to Use?
- Cloud Adoption in Digital World
- Govt to Harness IT to Empower MSME Sector



**CREATING
HIGH IMPACT &
INFLUENTIAL
CONTENT**
IN THE LAST 230 DAYS



- **DO TECH TALK** Series
- Business Continuity Planning Series
- Dataquest Digital Indexing
- DeepTech (India's largest Virtual Conference)



- Secure Smart & Intelligent Network
- App Modernisation
- Collaboration in WFH environment
- DevOps
- **CyberMedia** Product Review



- Business After Covid
- TLF Dialogue Series
- 25 Years of Mobile Telephony India

and many more....

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