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DQ 38 YEARS

BOUNCE BACK AGAIN, WITH TECHNOLOGY AS SPRINGBOARD

Tip for year 2021 is the key take away from last year: during the epic crisis, innovation and technology helped many firms not just survive but prosper too

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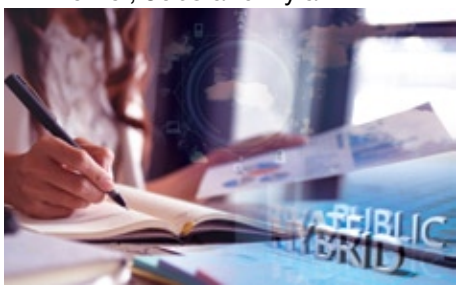

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Tip for year 2021 is the key take away from last year: during the epic crisis, innovation and technology helped many firms not just survive but prosper too

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Shubhendu Parth

Let's reap the benefits **of the new normal**

The year 2021 is not an ordinary year or just the beginning of a new decade. This January is also not meant for one to talk about resolutions and finalisation of FY 2021-22 plans. Rather, it's the time to think beyond and much ahead.

A freelance designer with no work, an automobile engineer who lost job, a grade 9 student taking online classes, and an octogenarian struggling to make both ends meet – they and many more are fast emerging as the new-age entrepreneurs. While the designer has tied up with an OEM to launch his own brand of electronic products and smart TVs, selling through ecommerce platforms, the engineer and his wife have ventured into cloud kitchen thanks to food-delivery channels. The student has kicked off a YouTube channel with DIY stuff, while the 80-year old running a roadside food stall has started a restaurant with funds flowing in after his plight was shared by a YouTuber.

The pandemic may have put restrictions on movement, bringing in uncertainty and impacting economic activities – the unemployment rate jumped to 24% in May and settled at 6% by September-end, according to Statista – it has pushed many to explore newer economic alternatives. To most, it was financial compulsion but for many it was also about better utilisation of the 'me time'.

The New Year marks the beginning of an era of entrepreneurship that will ride primarily on emerging technologies, 5G, and convergence of physical and digital worlds. This is also the time when trade bodies start to push for more 'sops' in the annual budget. Instead, it may serve us better if the Finance Minister focuses on steps, particularly long-term tax reforms, to support the plumule of the phygital economy. For example, the ecommerce sector is hampered by the tax department's definition of advertising, marketing and promotion expenditure as capital. There is also a lot of ambiguity around the new provisions of the Equalisation Levy (EQL). Similarly, there is an overlap in the provisions of Significant Economic Presence with withholding tax and EQL.

While the government needs to review these and other matters, it also a must create a comprehensive 25-year roadmap of Phygital India and sync taxes and policy frameworks with the strategic goals to achieve it. Let's allow people to reap what the new normal has to offer.

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BOUNCE BACK AGAIN, **WITH TECHNOLOGY AS SPRINGBOARD**

Tip for year 2021 is the key take away from last year: during the epic crisis, innovation and technology helped many firms not just survive but prosper too

Taken that oximeter test yet? For sure, you have. The year gone by spared no one the realitychecks of the new world. Just a year before not many people would have bothered to check the level of oxygen in their blood –unless you were in Delhi or in a yoga ashram. But look how health-savvy we have become in justa few months.

Resilience has been like oxygen for many businesses – and 2020 was the perfect year to take a check on this crucial capability. If that year was about whether your business survived or not, with or without tech-ventilators, 2021 would be about how much and how fast can you bounce back.

Business resilience is, thus, the oximeter test that enterprises should start taking as they enter a new year. They should. And they are.

REFLEX TO FLEX

In Forrester's reckoning, the pandemic has been a clarion call for business resilience. In a recent report on COVID-19, itoutlined how in a review of the Fortune 50's most current 10-K reports, none of them were found ready for the pandemic and its effects. What's even more interesting is that about 50% mentioned pandemic impacts in their risk profile for investors but classified them as an "act of God."

Forrester analysts Alla Valente, Stephanie Balaouras and Renee Murphy recommended that CEOs should stop looking at pandemics like a random lightning strike, and have a pandemic-specific plan. Some good ways are: Test the plan with a pandemic scenario, tailoring it to escalate as slowly or quickly as required. Adopt these risks and controls into the risk programme for continual monitoring. Build strong, trusted relationships with customers. Become a preferred employer that can easily recruit and retain the best talent.

NOT JUST AN AIR-BAG BUT ACCELERATOR

Business resilience is a'competitive advantage' in the opinion of Amy DeMartine, Vice President, Research Director, Forrester. Her definition of resilience is simple: business resilience is the ability of an organisation to deliver on its vision and brand promise, no matter what the crisis. She also stressed that it is a crisis that actually reveals character. "On-par practices help firms survive. Advanced practices enable firms to respond quickly and more flexibly. Differentiated practices help companies pivot to new opportunities."

She also noted in a recent virtual discussion that systemic risks are increasing in magnitude and frequency. "They are external to business, not within your control, and industry-agnostic. They also have a cascading effect. While that is true, 39 per cent of organisations never run plan simulations." In other words, businesses cannot afford to treat COVID-19 as a one-off punch in the face that no one expected.

Everyone is caught as surprised as a deer in the headlights during a crisis, it's what you do after – whether you sprint in time or turn into a road-kill – that's all about resilience, after all.

Notably, some enterprises were swift and smart enough to use technology as the quick springboard for the big jump.

Like what Mathew Chandy, MD, Duroflex shares about the last two quarters, specifically the end of Q2 and the beginning of Q3. He surmises that they have been

WE USED AUTOMATION, TECHNOLOGY-BASED FORECASTING AND DIGITISATION. OF COURSE, TECHNOLOGY PER SE IS NOT A QUICK-FIX. WE NEED TO MOTIVATE PEOPLE IN ITS USE.

— Mathew Chandy, MD, Duroflex

pretty good and a pleasant surprise from a business perspective. "The market has witnessed growth in health and home-improvement categories as consumers have become health-aware and are also looking for a reason to celebrate and spend after a tough stretch of six-eight months. So our category is doing well." But he also notes that not every business is doing well. Brands that invested in resilience and technology (and those that can deliver value to customer) are better off than small and unorganised players that are still disoriented with the setback.

He illustrates how Duroflex addressed disruptions in labour, logistics, raw material and supply chain that became the pain-points of the crisis for this industry. "We used automation, technology-based forecasting and digitisation. Of course, technology, per se, is not a quick-fix. We need to motivate and train people in its use. But businesses that have invested in creating new efficiencies due to the crisis are more efficient than before because of technology and data transparency."

Anees KM, CTO, iD Fresh Food, explains how technology played a key role during the pandemic. "The challenge was to ensure that our fresh products were always available to customers and analytics played a big role in business continuity, when other brands in the category were grappling with the crisis. This role helped us to grow business during this phase also. We innovated on alternative business models for supplies. The pandemic

Resilience tips

- Protect revenues and reputation during a crisis. A thorough, tested business continuity plan not only helps minimise the financial impact of disruption, such as lost revenues, damage to assets, or regulatory fines, but also helps companies increase their competency and confidence during the event.
- Crises can strengthen a company's reputation — or highlight incompetent or insensitive communications and actions that lead to long-term losses as customers flock to competitors.
- Recover quicker than competitors. A strong BCM function results in better risk identification, quicker responses, and a faster recovery time, all of which build trust with customers, suppliers, and third-party relationships.

Source: Forrester Report on COVID-19

WE INNOVATED ON ALTERNATIVE BUSINESS MODELS FOR SUPPLIES. COVID-19 BROUGHT ABOUT MANY CHANGES IN THE WAY WE OPERATE AND IN STRENGTHENING DISTRIBUTION NETWORKS.

— Anees KM, CTO, iD Fresh Food

has certainly brought about many changes in the way we operate and in strengthening distribution networks. We have learnt from our experience and we continue to create better business results."

"Initially when the pandemic was announced, there was some confusion for us – just like everyone else, but we stuck to our core values to support our customersand quickly ramped up our omni-channel abilities," shares Narendra Pasuparthy, CEO and Founder of Nandu's. He explains how and where heavy-technology adoption added to resilience. "Since we own the entire supply chain, there was no disruption. That continues. Our entire command centre has become virtual. Technology has helped us to scale up. It has taught us to be extremely resilient. We adopted technology with a clear vision. Today we are 43 stores – all operational, with no disruption in the chain. We are growing and this is possible because we relied on technology in an agile and dynamic way and adopted it quickly."

SUNNY SIDE UP

Whatever these businesses learnt during the crisis seems to get cemented and stronger as they roll over to the post-crisis buoyancy. Of course, that is where technology and new approaches would play a crucial role again.

In an earlier chat with CyberMedia, BabuThiagarajan, Country General Manager and Head of Technology, India at Fidelity International, addressed doubts about the relevance of new ideas like sustainable investing. "As capitalism develops, so will the approach to investing. Several characteristics of this new approach to investing are relevant to asset managers such as Fidelity, but chiefly it focuses on engaging with company managements and assessing their ability to create a business model that is

WE ADOPTED TECHNOLOGY WITH A CLEAR VISION. WE'RE GROWING AND IT'S POSSIBLE BECAUSE WE RELIED ON TECHNOLOGY IN AN AGILE AND DYNAMIC WAY AND ADOPTED IT QUICKLY.

— Narendra Pasuparthy, CEO & Founder, Nandu's

COMPANIES ARE NOW INVESTING IN DIGITAL INNOVATION THAT WILL ENABLE CUSTOMERS TO KEEP THEIR LIFE GOALS ON TRACK, IRRESPECTIVE WHERE THEY ARE.

— **Goutam Datta,** Chief Information & Digital Officer, Bajaj Allianz Life

built to last, to be integrated into the transforming world around them."

Similarly, Manish Israni, CIO and Executive VP at Yotta Infrastructure, talked about how CIOs were planning and making the companies ready for many new technological developments before the pandemic hit the world. He explained how, from then to now, concerns and priorities for CIOs have changed drastically. "As economic instability penetrates Indian and global markets, a CIO's range of focus has become wider – from supporting remote working to using cost-efficient methods to decreasing capital expenditures. As the current situations affecting business are changing quickly, CIOs are required to be agile while making critical decisions with limited information."

Tech investments will happen across the board – and to make business more efficient, customers more empowered to purchase, and service their policies, in a seamless manner, seconds GoutamDatta, chief information and digital officer, Bajaj Allianz Life. "The pandemic has had a huge role to play in transforming how we live, work, engage with each other, and so on. These changes have brought in some permanent changes in insurance industry as well. The pandemic has fast-tracked digitisation across the industry, while meeting the changing demands of the customers. Companies are now investing in digital innovation that will enable customers to keep their life goals on track, irrespective where they are."

ABOUT-TO-TURN

Vivek Iyer, Partner and National Leader – Financial Services – Risk, Grant Thornton, augurs that Q2 of the upcoming year will manifest a significant uptick in activity. "As Q4 of this year shows signs of good news on the vaccine front, the sentimental boost will help in reviving the business for sure. Of course, access and administration of vaccine will take time but initially the fillip would be enough for positive activity."

Iyer notes that while Q1 of the year ahead would be all about plans; Q2 is when we will start witnessing the impact of these plans. On the technology front, he opines that the world has, anyway, woken up to value that IT brings. "Remote-work and remote-tech will continue their momentum and with that, we will see an uptick in cyber-security investments as well."

"Looks like resilience delivers, whether it is about surviving or healing faster than others. In fact, you cannot just survive but also reach customers that you never reached before – that's possible with the right resilience practices," De Martine of Forrester weighs in.

Overall the economy and market has shrunk, cautions Chandy of Duroflex. But he is optimistic. "I hope that it will bounce back. We are definitely on a good growth curve as a company. Our bet on resilience and technology is paying off. Businesses that bothered to keep running and keep the lights on will see the gains of the hard work for sure."

Yes, keep the lights on. Keeping the blood pumped with oxygen – as resilience is the best bet against COVID-19. It's time to take a deep breath and enter a fresh-new year. Stay above 90 on the meter and head for 100 on the business growth pulse. Time to bounce!

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Hybrid cloud, with an **application first strategy**

The new normal requires CIOs to re-imagine the data center and adopt a hybrid cloud ideology

The global pandemic has dramatically changed CIO priorities across businesses of all sizes. Advanced technology interventions have made way for newer, more flexible strategies that need to mitigate the twin challenges of lower costs and flexible, robust deployments. CIOs today need to deliver agility to their business while unlocking new revenue streams, within the constraints of containing costs. First priority is to keep the lights on, before businesses evolve to disrupt, innovate and look for growth.

SETTING THE PREMISE

The forced lockdown has made businesses around the world adopt a WFH culture, and this inadvertently has led to digital transformation and cloud adoption at a scale the world hasn't seen so far. Multiple surveys reveal that most businesses have decided that when life comes back to normal too, a major chunk of the workforce will continue to work from home. But to guarantee a consistent and seamless flow of work and business output, businesses are facing the challenge of secure, agile and flexible IT and data management. Firstly, they have to deal with the dynamics of volume. Previously, around 20% of the workforce was travelling and their IT departments enabled them with corporate apps and VPNs, so they could continue working from any location. Suddenly, this percentage today stands at more than 90%. While the same apps and technologies might still work, businesses now need to extend them securely to almost 10 times the number of workers. Also, earlier, productivity data was generated from secure networks, such as a hotel room, a business center or an airport lounge. Today, the global workforce is accessing devices from their own home networks, putting additional stress on their corporate IT

IN THE NEW NORMAL, YOUR BUSINESS IS DISTRIBUTED, YOUR EMPLOYEES ARE DISTRIBUTED AND CONSEQUENTLY, YOUR IT BACKBONE SHOULD ALSO SUPPORT THE NEW DISTRIBUTED NORMAL.

networks, amplifying the need for security and consistent network performance. This is a sudden departure from operating on traditional IT systems that were created with the assumption that users will be situated in a single, unified location. The corporate network just became more complex, and this complexity has led to the rise of hardware equipment that can ensure business resiliency and business continuity. Multiple hardware vendors, multiple cloud providers and multiple software applications to manage and monitor data – all of these need to be unified, centralized and access needs to be provided to the right personnel at the right time.

NEW-AGE MANTRA FOR BUSINESS TRANSFORMATION

To mitigate these new-age, pandemic-driven challenges, Cisco has created solutions, by merging software, cloud and hardware with one fundamental aim in mind – enable businesses to embrace flexible working, and prepare the technology backbone to enable them to recover and transform.. Security in an integral component that runs alongside both product development and data management of every Cisco solution.

RETHINKING IT IN A WFH WORLD

CIOs now have to make informed choices starting with fundamental building blocks of any IT implementation. Basic questions like which software development ideology to adopt, waterfall or agile, need to be rethought along with managing the sudden deluge of data, both at the edge and the cloud, owing to a high number of employees working away from the office. In other words, the data center needs to be re-imagined.

UNWRAPPING NEW-AGE IT WITH BUSINESS RESILIENCY

Before CIOs begin to contemplate new-age, hybrid data centers, it is important for them evaluate business goals, which may be different in today's scenario. For instance, the IT infrastructure of a business needs to not just look at keeping the ball rolling, but also move along the path of business resiliency, with the twin aim of mitigating risks as well as innovating for growth. CIOs need to understand that the changes they make today will help manage the uncertainty of tomorrow. So, as organizations re-imagine their business, CIOs have to re-imagine IT to support the business.

To this end, many of the bespoke new-age solutions are built on three core philosophies – firstly, the need to ensure that there is no compromise in safety, security, productivity and customer experience across a distributed hybrid environment. Secondly, the need to achieve the flexibility to scale and shift capacity, capability, and resources, having understood where maximum demand lies. Finally, there is a pressing need to develop and automate new capabilities to be agile and future-proof. Cisco encapsulates these three philosophies around robust business policies as well as a resilient operating model.

THE NEW NORMAL OF DISTRIBUTED IT

In the new normal, global business is distributed, employees are distributed and consequently the IT backbone should also support the new distributed normal. In CTO language, this translates to distributed infrastructure and applications. The biggest lesson businesses can learn from the current pandemic is that there could be more roadblocks along the way, and they must do everything possible, to ensure that they are able to navigate sudden interruption or change, at any time. In compute terms, this translates to building a cloud-first infrastructure that helps employees work securely from anywhere, collaborate from any device and for the operations and IT teams, be able to securely manage from anywhere with the right ammunition – automation and analytics.

WE ARE ABLE TO ACCELERATE OUR CLOUD ADOPTION VISION WITH CISCO'S HYBRID CLOUD. IT HELPS US INTEGRATE SECURITY, NETWORKING, MANAGEMENT AND ANALYTICS.

— **Rajesh Ram,** GM IT & CIO, Bank of India

THE PUBLIC VS. PRIVATE CLOUD PARADOX

There has never been a better time to have discussions around both public and private clouds. While public clouds provide flexible SLAs, and the ability to manage varied data sources, they are often looked upon with suspicion for lack of watertight security. Private clouds, on the other hand, give nightmares to the CIO, to ensure smooth integration with apps and productivity software that are proprietary to the business. Multiple surveys across the globe have revealed that cloud implementation decisions are influenced by a list of common considerations – data, privacy, security, redundancy, flexibility and future-readiness. All of these considerations are enveloped by a basic need for flexibility, visibility, better data monitoring and a tight handshake between the public and private cloud data. Even before the pandemic wreaked havoc on businesses across the globe, the idea of hybrid clouds started gaining popularity. Today, it makes even more sense to deploy a hybrid cloud, albeit with a slight difference.

HYBRID CLOUD SOLUTIONS – THE WAY FORWARD

Backed by vast experience in networking, cloud, security and collaboration technologies, Cisco offers a wide portfolio of solutions to help businesses achieve automation, visibility and AI-powered insights, securely with a zero-deficit security backbone. The solutions help you reimagine your business with technologies ranging from SD-WAN to hybrid cloud to world-leading endpoints, among others.

To keep the lights on in the new, improved normal, and to brace for business boost in the coming months, hybrid clouds need to be built with application first, and not a cloud first philosophy. Cisco has been one of the frontrunners in evangelizing the adoption of hybrid clouds across the globe, and offers a range of solutions to help businesses embark on their hybrid cloud journey. From Hyperflex, which is the building block hybrid cloud, allowing businesses to run applications consistently and securely both on-premise and on the cloud, to Cisco Intersight, which is a SaaS infrastructure management

WE ARE REDEFINING OUR DATA CENTER ACROSS THE CORE, CLOUD AND EDGE, WITH UNIFIED SOLUTIONS THAT ARE HELPING US UNCOVER NEW BUSINESS OPPORTUNITIES.

— **Mahanthesh KA,** Managing Director, TeleIndia Group of Companies

platform, Cisco offers hybrid cloud implementation and management solutions end-to-end.

The Company is helping customers simplify application resource management for hybrid cloud by continuously optimizing critical IT resources, ensuring workload performance, and lowering operational costs on-premises and in the cloud with Cisco Intersight Workload Optimizer.

Businesses in India have already started exploring hybrid cloud solutions to brace for post-pandemic growth. Speaking about their own revised IT strategy, Mr. Rajesh Ram, GM IT & CIO, Bank of India, said, "We are able to accelerate our cloud adoption vision with Cisco's Hybrid Cloud. It helps us integrate security, networking, management and analytics, while proving a flexible and seamless model that is fit for future growth. We are able to achieve cost mitigation and better visibility of our cloud networks, which is helping us boost business."

With partnerships with Google Cloud, Amazon Web Services and IBM Cloud, customers have been extending their cloud frameworks, and in many cases, changing their cloud topology, with exclusive DevOps platforms, automated network connectivity, workload optimization, and robust application monitoring. To help businesses embark on the journey of hyperconvergence, Cisco offers solutions from the core, to the edge and also to multi-cloud deployments. By integrating with SD-WAN, businesses are now able to optimize the networks that interlink cloud operations, while ensuring a secure, seamless and actionable flow of data. Cisco® Cloud Application Centric Infrastructure (Cisco Cloud ACI) is a comprehensive solution for simplified operations, automated network connectivity, consistent policy management, and visibility for multiple on-premises data centers and public clouds or multicloud environments. The solution captures business and user intents and translates them into native policy constructs for applications deployed across various cloud environments.

MULTI-PRONGED BENEFITS ACROSS INDUSTRIES

From modernizing factory operations to providing high performance computing to universities to enabling smart cities, Cisco hybrid cloud solutions have helped businesses across verticals, worldwide. By lowering costs, increasing flexibility, and integrating networking, security, management and analytics, hybrid clouds are proving to be the answer to overcome the current stress and prepare for a brighter future.

Certain industries, such as telecom, have the challenge of increased compliance and the need for on-demand as well as real-time visibility of data dynamically from both public and private clouds. Secure data of this nature needs to be retrieved from the right source and presented in a user-friendly manner to the right personnel within the business, in order to speed ahead post the pandemic. As Mahanthesh KA, Managing Director, TeleIndia Group of Companies explains, "We could navigate through these turbulent times by adopting a hybrid cloud architecture. We are redefining our data center across the core, cloud and edge, with unified solutions that are helping us uncover new business opportunities while keeping the lights on for existing tech."

As the world recovers from a global slowdown of sorts, the focus is keeping the lights on, but businesses are beginning to realize that they need to look at it as an opportunity to re-imagine their IT and re-think their cloud strategies. Without reasonable doubt, hybrid cloud is the way to go.

Roy is Director Sales - Data Centre & Cloud, Cisco India and SAARC

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SUDHIR NAYAR
Managing Director, Commercial Sales,
Cisco India and SAARC

NEW CONSUMPTION MODELS DROVE EA SALES BY 100%

The pandemic has been one of the most disruptive yet transformational events for businesses across the globe. At Cisco, the focus has been to help customers, partners, and the industry stay up and running during this time. As companies start operating in the next normal, Cisco is enabling businesses to become more resilient and agile as they accelerate their digital transformation. In an interview with Dataquest, Cisco India and SAARC's Managing Director for Commercial Sales, ***Sudhir Nayar,*** *explains how the company is transforming its business model, pivoting a majority of its portfolio to be delivered as a service to help future-proof businesses in the new world. Excerpts:*

The pandemic has led to a business continuity challenge at an unprecedented scale. How are players like Cisco enabling businesses to become resilient in the post COVID-19 world?

In the new normal, the ability of organizations to pivot and adapt their business and workforce models will determine their success. Recognizing this, small to large scale enterprises are exploring a new way to conduct business – they are looking at a hybrid work environment, virtualizing their workflows, moving their processes to the cloud, automating their supply chains, etc. In this journey, organizations need to prioritize developing an agile and flexible infrastructure and recalibrate for changing employee and customer experiences. The aim, ultimately, is to build a resilient digital enterprise, where three things are crucial:

- No compromise on employee/customer safety, security, productivity, and experience across a flexible distributed working/business environment
- Flexibility to shift and scale IT capacity, capability, and resources where the demand lies and as the market environment evolves
- Ability to develop and automate new capabilities in an agile manner as the business need arises

To help make this transition easy and seamless for our customers, Cisco is bringing the capabilities of a resilient technology infrastructure that can help them work from anywhere, collaborate from any device, manage from anywhere (automation, analytics, assurance, and policy), and maximize experience and productivity, by serving distributed workers and things with distributed applications and cloud services, with security at the front and center of it all, because the threat landscape has not only widened but become far more complicated.

Clearly, there are new business challenges in the new normal. What have you learned from this, and how is Cisco enhancing its solutions portfolio to help businesses mitigate new-age challenges?

A year ago, it was hard to envisage having board meetings, industry events, and selling to customers virtually. The most significant learning is that anything is possible with the right mindset and innovative technologies. I frequently interact with my colleagues and teams across India, Bangladesh, and Sri Lanka. Today, I efficiently do this from my virtual home office setup. The transition has been seamless, thanks to a renewed mindset and the disruptive technologies that enable the adoption of new ways of working.

The pandemic and the digitization it spurred has also been a great leveler. Businesses and individuals are leveraging flexible lifestyles to innovate and experiment, leading to improved productivity and output. This, however, does strain the IT systems, networks, and teams.

Another meaningful learning is that technology needs to be able to scale up 100X or scale down as needed quickly and securely. For example, at Cisco, when our Webex usage surged rapidly at the beginning of the lockdown, we promptly made the necessary provisions within the

> WE MIGRATED OVER 135,000 OF OUR EMPLOYEES TO WFH WITHIN THE FIRST EIGHT DAYS. WE TOOK ALL THE LEARNING AND PUT IT INTO A RESILIENT DISTRIBUTED ENTERPRISE (RDE) PLAN.

backend infrastructure. This enabled us to manage the challenge of operating on dispersed systems and meet the sudden and massive demand.

Technology today needs to be adaptive and simple. We are striving to simplify the management of complex infrastructure to make it flexible and scalable for our customers. Be it on-premise, hybrid, multi-cloud, or even a private cloud environment, Cisco customers today enjoy unparalleled control and visibility of their optimized infrastructure, end to end.

How is Cisco helping businesses achieve business resiliency in a secure and agile manner?

Businesses need a solution that helps them manage their apps seamlessly and securely across hybrid environments. To enable this, we have created a new solution called Intersight, which syncs on-premise and cloud data/apps for easy access and monitoring. Intersight also allows the switching of apps between cloud and on-premise infrastructures.

Additionally, we have created a new security platform called SecureX, a broad cloud-based security platform connecting the breadth of our portfolio and our customers' security infrastructure by providing unified visibility and automation across applications, the network, endpoints, and the cloud. The SecureX platform solves key use challenges leveraging tools like Security Orchestration and Automation (SOAR), Extended Detection and Response (XDR), and custom-built Forensics and Integration tools. With SecureX, our customers can reduce the time taken to identify a breach by 81%.

Between Intersight and SecureX, our customers can fast-track their journey towards building an agile and resilient business.

How about hardware and software licensing?

Today, the SecureX platform is free for our customers, and they can quickly deploy and start using it. Today, the SecureX platform is free for our customers, and they can quickly deploy and start using it.

We have also launched enterprise agreements for almost every segment of our architecture. At Cisco, we are now thinking like a software company and new consumption models powered by Cloud have increased our Enterprise Agreement sales by 100% just the Commercial Business segment for India and SAARC.

By providing the ability to integrate everything and put it in a simplified enterprise environment, we aim to enhance customer experience and add tremendous value to our offerings.

What brought about this change in the mindset?

The pandemic has forever transformed the way we work and do business. These changes have triggered a massive and rapid shift to remote/hybrid operations and automation, catalyzing a transition to an 'everything-as-a-service' consumption model. Regardless of size or industry, businesses are looking at crafting a digital version of their business model, where everything is cloud-managed or cloud-delivered.

Cisco's new "as-a-service" move is driven by the acceleration in the consumption of technology as a service that we've seen in the last fiscal year. 51% of revenues came from software and service in FY20. We now have 78% of our total software revenue sold as subscriptions, surpassing the target of 66% we had set.

We are transitioning a majority of our portfolio to an as-a-service consumption model, building on our increased focus on software, services, and subscriptions.

What other solutions does Cisco offer for businesses that want to explore hybrid cloud?

Cisco started the hybrid cloud journey around three years

> INTERSITE ALLOWS THE CUSTOMER TO SEAMLESSLY MANAGE THEIR APPS ACROSS ANY CLOUD, AND ON-PREMISE. IT ALSO GIVES YOU A VIEW OF THE RESOURCES THAT ARE BEING UTILISED.

back. We made several strategic investments, including a critical one in the area of customer success.

We have an entire portfolio of solutions that businesses can use. For instance, HyperFlex an innovative software-based platform that enables the data center to operate seamlessly and transparently. Other solutions include Intersight, our all-inclusive data center platform, among other auxiliary solutions.

Do you have any specific solutions for small businesses across industry verticals?

As they strive to recover quickly and accelerate growth, most small businesses in India recognize that digitally disrupting themselves is critical. At Cisco, our goal is to enable MSMEs to capitalize on the opportunities that the pandemic is shaping and create a level playing by giving them access to top-notch, easy-to-use technology solutions.

In these efforts, Cisco is doubling down its focus on serving small businesses through Cisco Designed, a suite of simple, secure, and flexible solutions tailored to small businesses. The Cisco Designed portfolio comprises offerings that have been curated for small businesses and address their networking, security, collaboration, cloud, and internet connectivity needs.

Can you tell us about the Internet2Network Catalyst product line and partner solutions?

Let me start with Catalyst. The idea was born when we were exploring various options of creating a software layer over the networking switch. We developed solutions that intelligently learned customer patterns over time. Catalyst manages, virtualizes, and evolves continually. For a large company with a few thousand locations, any modification would typically take at least three months. With Catalyst, this can be done in almost real-time. We also have a video solution where 99% of the background noise can be muted. Users can also record the call, translate, and transcribe on-the-go.

The Webex system is critical during challenging times like these. Powered by AI, it acts as a virtual secretary that takes notes or pointers from meetings. You can speak to the technology and tell it what to do. Teams is a part of Webex. Everything is integrated with Teams, where you can communicate with your internal and external stakeholders. We believe these are some of the many reasons for the massive growth of Webex this past year.

What have you learned from the Webex outage incidents, the bombing issues, and innovations brought by other players?

The key learning is that everything is hyper-scale. When we think about any platform, we think of hyper scaling by 5-10X. We have integrated security throughout Webex – from the endpoint to the network, devices, data center, and beyond. We are also investing more in R&D. We believe that innovation has to be relevant, fast, and future-proof.

How are you countering competition from SD-WAN appliances?

At Cisco, we understand that the most important channel of interaction for a customer – both internal and external – is applications. Hence, apps need to be agile, seamless, and easy-to-use. This is precisely what AppDynamics provides – an intuitive dashboard for app performance.

Given that security has become a top priority for businesses, we also integrated Cisco SD-WAN with Cisco Umbrella, helping customers evolve toward a SASE (Secure Access Service Edge) architecture.

This future secure networking model, which delivers security and networking services together from the cloud, is intended to enable organizations to securely connect any user or device to any application with the best experience.

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Reading 'hybrid' tea leaves with Toffler, Jobs and Dylan

The COVID-19 outbreak defined the year gone by. Its aftershocks will continue to shape technology, business, innovation and policy

Since Alvin Toffler had condensed the concept of "too much change in too short a period of time" into a two-word phrase –'Future Shock' – inhis 1970 bestseller book bearing the same title, it has been invoked time and again for many aphenomena. These included but are not limited to the fall of the Berlin Wall in 1989 and the 9/11 terror attack on the World Trade Center in 2001.

Arguably this applies most aptly to the world besieged by the COVID-19 pandemic as it led to a fundamental metamorphosis of the global psyche spanning individuals, enterprises, countries, communities and societies in the year 2020.

Admittedly not a futurologist like Toffler, I would still attempt to make sense of the jumbled tea leaves, each pointing to a different direction. Without any clearly

JUST LIKE THE INTERNET OF THINGS GAVE WAY TO THE INTERNET OF EVERYTHING (IOE), 'WORK ANYWHERE' WOULD BECOME INCREASINGLY MORE COMMONPLACE.

discernible pattern, there are a few likely scenarios even as the mix of flavours instils themuch-needed cheer to a weary – teary world waiting with bated breath for the 'New Normal' as if the pre-COVID world was really 'normal'!

Hopefully, the 'New Normal' would transcend the promise of vaccine in the 'New Year'. 2020 was indeed a shocker to show us how little our physical needs are even as the technology optimists and business leaders were also shocked to see the insatiable demand for data notwithstanding the economic downturn.

Let us explore the emerging 'hybrid' trends in the technology space.

HYBRID WORKPLACE

There is a sense of vindication with the government finally liberalising the policy for work from home (WFH) that I had urged way back in October 2004 in an article published by Dataquest's sister publication Voice&Data.

While many employees are itching to get back to their offices, more often than not WFH would become normalised, adopted and accepted rather than seen as a rare case of 'exception'. Moreover, just like the Internet of Things (IoT) gave way to the Internet of Everything (IoE), 'work anywhere' (WA) would become increasingly more commonplace.

HYBRID CLOUD

While some enterprises have been aggressively using cloud computing for years, others kept avoiding or evading the issue notwithstanding the fact that almost every enterprise, whether in public sector or in the private one, has been using some cloud services – often times, without even realising so.

Just conduct a 'shadow it audit' of your enterprise and don't be surprised if the number of shadow IT services through your enterprise is 10 or 20 times than what you think. For WFH it could even be 100 times or even more!

All the same, hybrid cloud would become an accepted norm with enterprises combining the in-house IT infrastructure with private cloud and public cloud infrastructures. Keeping the confidential data on the cloud with requisite security, backup and access controls would be more sensible than leaving the singular copy unencrypted on the device at home.

HYBRID ENTERPRISE

The very nature of enterprise is undergoing a paradigm shift as flexible, part-time and project-based work quotient goes up. On the other hand, new types of relationships and networks would keep emerging and evolving with increasing speed of change and complexity amidst blurring boundaries.

HYBRID CLOUD WOULD BECOME AN ACCEPTED NORM WITH ENTERPRISES COMBINING THE IN-HOUSE IT INFRASTRUCTURE WITH PRIVATE CLOUD AND PUBLIC CLOUD INFRASTRUCTURES.

bpOrbit

Prevailing Hot Buttons

Being in the time zone that we are in, many BPO outfits would like to share common infrastructure for domestic and international operations. However, just a handful of BPOs would meet the eligibility criteria for this purpose. The least that the government can do is to permit all BPOs to do so, subject to the furnishing of a reasonable bank guarantee.

In the case of domestic call centers, BSNL and MTNL continue to charge an annual levy of Rs 15,000 over and above the rental (usually around Rs 3,000 per annum) for every telephone line. Besides, 1-600 and 1-900 numbers are inaccessible more often than not while dialing from any mobile phone.

The situation is not any different when one tries such numbers from the fixed lines of a private operator. This is in gross violation of the National Numbering Plan 2003 as well as the prevailing orders and regulations of TRAI.

Internet telephony has been permitted since April 2002 except for the specific restriction that there be no termination on the domestic PSTN. However, even for an international call center, which does not need to connect to domestic PSTN, the regulations do not permit it to work using only an Internet only connectivity. This takes away a big opportunity from everybody where the agents can operate out of their homes, using Internet only broadband connections.

While outgoing facility is freely available to international call centers through leased circuits, the domestic call centers do not enjoy the same privilege.

This leads to a situation where, while an international BPO can lease a line from say Delhi to Mumbai for connecting with say a co-location in London, the BPO cannot have a co-location in Mumbai to call up its Mumbai-based customers.

Although a BPO can lease the circuits for enabling Mumbaikars to connect with a call center in Gurgaon, the Gurgaon-based call center agents themselves must make an STD call to Mumbai to speak to the customers in Mumbai, or else the company must have a physical setup in Mumbai from where another set of agents can communicate with the customers there. Either way, the cost of carrying on the operations goes up.

An individual or a firm cannot offer BPO services since it is compulsory for the service provider to be a registered company. This implies that professional firms and SOHOs would not qualify to participate in this opportunity. This restrains, for example, a radiologist to engage into BPO on his own, for a few hours a day—depriving him of an enormous economic opportunity.

Use of encryption with key pair exceeding 40 bits on Internet is not yet freely permitted in the country. This is a major hindrance in attracting high-end BPOs to the country since the IPR holders perceive that the encryption of 40 bits is insufficient.

The Path Ahead

To realize the enormous potential that the BPO opportunity offers, some fundamental changes are required in our policy and regulatory framework. Any entity should be able to offer BPO services, irrespective of its structure—albeit subject to certain basic conditions.

One should be free to interconnect and share the infrastructure of domestic and international call centers and make outbound calls from domestic call centers. In case one wants to set up a BPO using 'Internet only' or connect the agents from their homes through broadband, let it be so. Use of at least 128 bit encryption keys should also be permitted freely.

TRAI must link some basic QoS to the tariffs of leased lines, besides restraining BSNL and MTNL from charging Rs 15,000 levy per line annually. TRAI should also ensure that access to toll-free and premium services is accessible in a non-discriminatory manner across the country, irrespective of the type of phone or the operator.

One cannot overemphasize the urgency or the crucial nature of these measures since it is not one single Indian BPO company competing with another Indian BPO out there, rather it is a case where India as a country is competing with others pitching for this booming business!

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Snapshot of Voice&Data October 2004 article advocating liberalisation of the policy for work from home (WFH).

In such an environment, keeping track of data is important – not just the 'personal data', 'non-personal data' or 'meta data'. The bits and bytes of this article's online version are also a data artefact. Hence, dictionary, vocabulary, syntax and norms of data governance would have to be evolved accordingly.

In addition, more businesses would adopt the hybrid business model of Freemium while also leveraging 'Artificial Intelligence' and 'Robotic Process Automation' as revenue drivers in their quest for digital transformation.

HYBRID REALITY

Leveraging Virtual Reality and AI with real-time feedback loop would enable us to visualise newparadigms and enhance simulations. Add 3-D printing and digital twins for a headier mix.

HYBRID SECURITY

It may seem uncanny but as someone said, 2020, otherwise a bad year,was actually a relatively better year for security. After all, security is somewhat countercyclical. Sales of insurance policies spike after every disaster despite rate hike.

Perimetric security was never sufficient even as it often did give a misplaced sense of comfort and confidence to the enterprise security teams. However, the WFH is the straw that broke the proverbial camel's back.

Instead of BYOD (Bring Your Own Device), the teams suddenly had to deal with CYOD (Choose Your Own Disaster), especially when the same device at home is used for enterprise work as well as for communication, education and entertainment by the family – at times, in parallel sessions.

End-point security and security of the data and document and devices throughout their lifecycles need a fresh look. On the other hand, SolarWinds attack have once again proven that there are only two types of organisations – those that have been hacked and those who don't know.

HYBRID SKILLS

In the so-called New Normal, importance of soft skills like interpersonal interaction, critical thinking, system design and communication would gain even as every child in the country is being exhorted by some celebrity or the other to become a coder, as if that is the one and only

INDICATIONS ARE THAT THE JOINT PARLIAMENTARY COMMITTEE WOULD LOOK AT NON-PERSONAL DATA BESIDES, OF COURSE, THE PERSONAL DATA PROTECTION BILL, 2011.

technology to master. Technical skills may be necessary but are insufficient by themselves.

HYBRID POLICY ENVIRONMENT

Policy calendar is likely to be quite busy over the next couple of years at least.'Vocal for Local' may have to co-exist with 'Vocal for Global' thereby making the hybrid 'Glocal' a more likely scenario that India would champion in its upcoming G20 Presidency in 2022.

First and foremost, it would be best to have a clear articulation of the Unified Digital Policy Framework at the level of the prime minister's office (PMO) encompassing broad vision and principles while delineating specific objectives, deliverables and accountabilities of the respective ministries, departments and agencies in their own remits. Sans that, the chaos, confusion, cracks and overlaps would keep multiplying.

Indications are that the joint parliamentary committee would look at non-personal data besides, of course, the Personal Data Protection Bill, 2011. National Cyber Security Strategy and National Strategy for Artificial Intelligence are also on the anvil.

Public procurement norms should be more accommodative of leveraging cloud and the state must become a role model in terms of making reliable and real-time, legally validated data sets in the public domain as per the National Data Sharing and Accessibility Policy, 2012.

The government should also undertake a sensitisation exercise with capacity building and commensurate investments to make government websites, apps and databases accessible to people with disabilities, as per the National Universal Electronic Accessibility Policy, 2013.

State governments can and must do their own bit in enhancing and amplifying the benefits of the technology, especially in terms of using local languages. Considering digital divide across various dimensions like geographies, genders and generations governments need to intelligently leverage Universal Service Obligation Fund and other such instrumentalities for spurring demand rather than focusing only on supply side initiatives or using regulatory diktats to drive adoption.

Public policy development and implementation is never a linear process with a singular obvious best choice as it does entail trade-offs. It also necessitates conceptual clarity and contextual familiarity. Hence, public policy and regulations need to evolve in a more open, inclusive, deliberative and iterative process through wider public consultations and reliance on empirical evidence whether it isfor healthcare, education, fintech, agriculture or something else.

'REALITY DISTORTION FIELD' IN 'CHANGIN' TIMES'

Steve Jobs was known for influencing people through'reality distortion field', a heady concoction of charisma, charm, hyperbole, perseverance, persistence engendered within an environment of self-confidence, alignment and empowerment that lead to extraordinary discovery, design, development and deployment.

It is up to us to envision the tech-enabled future that we want and then, go on to realize that vision with a vengeance. Remember Bob Dylan's 1964 classic 'The-Times-They're-a-Changin'? Only, they're changing much faster now in this 'hybrid world' and yes, heuristics would help.

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Watchwords for 2021: AI, privacy, low code, serverless

Thanks to unprecedented rise in digitalisation and net access, improving service delivery will be the key. At least four tools will shape the development arena

The future of app development, like so many tech disciplines coming out of 2020, will be greatly impacted by COVID-19. Businesses have fast-tracked their digital transformation processes to remain relevant during the pandemic and also to future-proof themselves. Moreover, the increased availability of the internet and smartphones around the world is prompting individuals to adopt a highly digitised life out of convenience. This, in turn, will bring forth a myriad of software requirements – both B2C and B2B, which will drive the tech developers to review and streamline their devops strategies to improve service delivery.

In 2021, AI, privacy regulation, low-code adoption for business users, and serverless solution growth will all be key factors for devops.

AI WILL HELP AUTOMATE DEVOPS

AI-driven application development will become ubiquitous in the next year or two. Many aspects of devops can be automated and, over time, made more efficient using AI capabilities. These are the key areas where we expect to see significant growth:

- AI-assisted development, which includes entity and workflow suggestions
- Data modelling and auditing
- Data cleansing and maintaining integrity
- Search functionalities across an application ecosystem with NLP
- Automated testing suite with a focus on security and data privacy
- Intelligent data extraction and processing via pre-modelled operations, predictive services and forecasting tools
- Process management and optimisation

DATA PRIVACY WILL PLAY A LARGER ROLE

With the recent passing of Prop 24 in California, GDPR in Europe, even LGPD in Brazil, privacy regulation is on the rise worldwide. While developers are concerned about users' privacy for the applications by default, they will need to be cognisant of privacy policies for services they integrate with and share information with as well. For example, integrating an SDK into a developer's application can provide value for both the developer and the user, but the integration carries obvious data privacy and sharing concerns. Apple, for their part, will be unrolling a new iOS 14 privacy feature for the iPhone and iPad sometime next year that requires developers to ask users for permission

> APPLE WILL UNROLL A NEW IOS 14 PRIVACY FEATURE THAT REQUIRES DEVELOPERS TO ASK USERS FOR PERMISSION TO TRACK AND COLLECT THEIR DATA ON WEBSITES AND MOBILE APPS.

to track and collect their data on websites and mobile apps. Increased regulation will change the types of applications developers look to build in the coming year.

Additionally, remote working increases data privacy and security risks, especially in highly regulated industries. Data access controls, privilege management and authentication forms will play a critical part in mitigating these risks.

SHIFTING BUSINESS LANDSCAPES WILL INCREASE LOW-CODE ADOPTION

The low-code development market has already been growing steadily over the last several years. In 2021, however, low-code adoption will accelerate precipitously because of changing business conditions. For the past eight months and counting, companies have restructured their businesses and sought out new growth strategies that leverage the digital platform because workforces are more distributed than ever.

Increased demand for process digitisation results in a huge pipeline (backlog) of application development requests, making the ability to respond to market demands sluggish. Now more than ever, organisations need to be nimble, which is not easy in a traditional application development setup.

Good low-code platforms strike a balance between abstraction and control. They empower business developers to build and update applications (adding functionalities or workflows) faster, without compromising the quality, complexity or scale. For this reason, low-code app development and low-code platform adoption will skyrocket in the coming year. It is difficult to predict which industry verticals will see the biggest boost in adoption, but by looking at the user breakdown of Zoho's own low-code platform, Zoho Creator, certain sectors stand out.

Over the past 14 years, we have seen slightly more interest from verticals such as manufacturing, logistics, education, and professional services, where the contribution of custom processes as a differentiator is greater when compared to other verticals. In addition to these, in 2021, we also see organisations from industries with accelerated digitisation due to COVID-19 leveraging low-code applications as a strategic tool to survive and gain an edge against competition. One obvious example of this would be the demand from developers to build custom-fit communication and collaboration applications to support remote workers.

SERVERLESS SOLUTIONS FOR EFFICIENCY

While container solutions will continue to be a key aspect of development in 2021, serverless computing will also see growth that will outpace the already established containerisation model.

As with anything, it will come down to the core requirement. Containers will work well for complex, large-scale, long-running mission-critical applications, which need constant care and support. They can also be a perfect ally in legacy modernisation. Serverless, on the other hand, gives developers elasticity or dynamic scaling, such that resources can be increased or decreased based on demand. This leads to cost savings, which will be a prime motivator for serverless adoption in the coming year. The key consideration here is the speed of development and cost of maintenance. The development environment in 2021 may include both approaches working hand in hand, complementing each other's strengths and weaknesses.

In 2021, we will see devops rapidly adopting new methods due to the unforeseen impacts of 2020. With app development needs skyrocketing, we can expect an explosion of new devop solutions and methods to create efficiency and impact.

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Five data-centric trends to watch out for in 2021

The beginning of a new decade promises to be the time to consolidate and build on the gains of widespread digital transformation we witnessed in 2020

From the accelerating shift in digital transformation to a deep realization of the need for a greener future, the COVID-19 has disrupted everything, reorienting the way we work, play and live. As we progress towards the new beginning, it's an opportune time for enterprises to look back and connect dots.

The disruption is here to stay and that calls for transforming this crisis into the new normal. As the year 2020 comes to an end and we welcome the beginning of a new decade, here are the five trends to watch out for in the year 2021.

SHINING A LIGHT IN THE DATA LAKE

The new year would see more enterprises shining the light in their dark data lakes to not only improve their business but to stay ahead in the industry they operate. This can be done by faster adoption of new-age tech tools like AI and analytics to garner insights from the deepest corners of their data lake. The enterprises would accelerate the usage of the vast amount of data that they have which is sitting idle so far. While the pandemic has moved teams across the globe into the momentum of having data protection as a priority, it is high time to leverage this placid data lake intelligently.

BACK UP-AS-A-SERVICE (BAAS)

As digital adoptions remain a priority for organisations, the next step for them would be to improve efficiencies

> AS OUR REMOTE WORKFORCES DEAL WITH SENSITIVE DATA ON A DAILY BASIS, FOCUS TOWARDS SECURING ENDPOINTS WILL BE HIGH ON THE IT PRIORITY LIST.

across the spectrum, including operations, finance and of course the human resource management.

The SaaS dynamics has changed completely with the pandemic as we now know the benefits of subscription-based models. Infact, the Indian SaaS revenues have grown 30% and are at $3.5 billion in FY20 alone, according to a recent report by NASSCOM. This momentum is expected to grow even when we look at data management paving way for Backup-as-a-Service (BaaS).As enterprises will strive to empower their agile workforce with a secure, fast and reliable data ecosystem, keeping a federated view and control of their data will ensure that their IT infrastructures remain protected, compliant and cost-effective.

THE ENDPOINT PROTECTION ARMOUR

Remote working became the new normal for all progressive enterprises, shifting the mindsets about working from home and showcasing benefits at large. One thing is for sure, while our world might not stay all-virtual, remote and flexi work is the future. The policy support from the government (by relaxing the norms for the IT sector) also indicates the prominence of agile workspaces all the more.

As our remote workforces deal with sensitive data on a daily basis, focus towards securing endpoints will be high on the IT priority list. Another reason why we will see increase in enterprises adopting end-point protection is because when the workforce works remotely the control over data protection is low, while the regulatory compliances are high.

And let's not forget the looming dark cloud of cyberattacks, especially ransomware. While there is no surefire way to prevent vulnerability to cyberattacks, integration ofnewer technologies like AI and intelligent data management will not only armour enterprises against these threat vectors, but also enable them to detect any anomaly in the vast cloud infrastructures and nip it in the bud.

THE 5G FUTURE

While India gears up for5G adoption in 2021, the concerns around network and data security are also looming large. From the user point of view it could not be a better time as many of us would be working from home and a faster internet would be a boon. However, 5G is not just about consumer mobile services as it will reset the order ofinternet-based services as well.

Being an all-encompassing transformative technology, once 5G will be set in motion with optimum application, it will soon be the oxygen to our hybrid virtual ecosystem across industries. This is so, simply because the technology is dynamic and versatile in nature and can fuel internet of things (IoT) and intelligent use and management of data even more superiorly.

However, once we have the fundamentals in place for 5G and IoT, then we will be able to extrapolate the benefits of this technology from the economic, environmental to societal points of view.

CLOUD NATIVE APPLICATIONS

The increasing adoption of cloud and digital technologies will push the demand for container applications as well. Given the focus on agility, this acceleration will be driven by cloud native applications across environments.

These will not only help eliminate constraints from IT teams but also abridge the path to business gain, with a one-stop view of their infrastructure enhancing the quality of services from IT teams to the fullest. Cloud native applications are critical to the digital enterprises of today and will set businesses up for success in both IT and devopsfront in the time to come.

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Operational efficiency, agility to drive tech in 2021

Focus of technology investment will be on two areas: Customers whose expectations are up, and employees who are working from home. Efficiency will be the key

As 2021 begins, we are looking at the new year with a mix of optimism and uncertainty. While the steady stream of vaccines becoming available is causing optimism, the pandemic is still ravaging in full steam and the 'second wave' is bringing lockdown back in many countries. The pandemic's impact on the business environment has created a few unmistakable trends. Visibility is low and there is uncertainty about demand in many industries. This has accelerated the move to digital.

Companies are investing in cloud technology, online training, digital delivery, e-commerce, logistics and customer success initiatives. The focus for new investments is on improving operational efficiency, improving agility and ability for people to work anywhere. Here are some of the trends expected in 2021.

#1

EMPLOYEE ENGAGEMENT, HR TECH BECOMES ESSENTIAL

Even before the pandemic, the move to digital was driving executive decisions to reshape their workforce. The pandemic has accelerated this trend. Companies are investing in digital marketing, customer experience and sales. Remote work has increased the need for employee engagement and HR tech to facilitate employees and managers get things done.

As more jobs have moved 'virtual', the applicant pool has surged. HR sometimes is receiving 10 times the number of applicants they used to receive previously. We expect investment in AI for recruitment to increase in 2021. Candidate sourcing and candidate rediscovery are two areas where AI is expected to play a key role.

#2

LOCALISATION IS A CRITICAL REVENUE DRIVER

While COVID-19 pulled us apart, technology brought us together. Worldwide, millions of people went online regularly for their work, shopping and entertainment for the first time. Research reveals that 90% of online shoppers prefer to use their native language when available and 72.1% of internet users prefer to dwell on websites translated in their native language. No wonder companies are rushing to invest in localisation to improve their prospects with consumers.

#3

DISTRIBUTED CLOUD LAYS THE FOUNDATION

For many of us, the pandemic meant a sudden shift to remote working. We started plugging into the cloud, collaborating

> EXPECT INVESTMENT IN AI FOR RECRUITMENT TO INCREASE IN 2021. CANDIDATE SOURCING AND CANDIDATE REDISCOVERY ARE TWO AREAS WHERE AI IS EXPECTED TO PLAY A KEY ROLE.

online, and switching on our webcams for the first time. Once the infrastructure had been set up and the inevitable problems fixed, the speedy switch to life online proved not only workable for many people, but highlyvaluable.Gartner defines 'distributed cloud' as where cloud services are distributed to different physical locations, but the operation, governance and evolution remain the responsibility of the public cloud provider. Distributed cloud is becoming the technology backbone for companies going digital.

#4

LEARNING TECHNOLOGY INVESTMENT SURGES

Online education has exploded during the pandemic. As a big chunk of workforce is expectedto continue remote work,investment in immersive learning technologies is signalling potential for virtual reality (VR) in education. Use of augmented reality (AR)in education is also expected to increase, as the trend of gamification in learning is getting established. Overall, ed-tech and learning investments are surging.

#5

BLOCKCHAIN TRANSFORMS THE SUPPLY CHAIN

Customers love same-day delivery. However, it can be quite challenging for logistics. Thus, blockchain technology in supply chain management becomes important. Vendors, customers, logistics firms and shipping lines can all collaborate using a single platform. Information is stored in a single location in the form of blocks. They are kept secure using encryption. A time-stamp ledger linking new information to the existing chain ensures traceability.

In addition to being safe and limiting fraud, blockchain systems are economical, transparent and fast. The supply chain can be completely paperless.

#6

CUSTOMER SUCCESS TECHNOLOGY COMES TO PROMINENCE

During pandemic the role of 'customer success (CS) vs sales' came into limelight. During stressful times people preferred doing business with known vendors rather than starting new relationships. Companies are expected to sell customers' desired outcomes instead of products and features.

Great CS technology can provide your customer success initiatives with the necessary customer analytics, tracking product usage, cross-functional communication, and much more. Internet of Things (IoT) can today notify key information about customer behaviour. Soon AI and ML will be transforming customer success. No wonder customer success firms are being acquired billion-dollar valuations this year.

#7

OKR ADOPTION ACCELERATES

Objectives and key results (OKRs) have long been the favourite execution system of Silicon Valley elites like Google, Facebook, LinkedIn, Apple and Twitter. There is a surge in adoption of OKRs beyond the tech world as companies and teams discover that OKRs are perfect to improve focus, align teams towards the overarching corporate goals, aim and achieve stretch targets. Companies are investing in OKR software to improve collaboration and teamwork while achieving ambitious goals. A good piece of OKR software integrated with a performance review system also helps HR to make performance management a continuous process and improve employee morale.

The connecting thread between all these trends is clear: They are driven by raising customer expectations as they have been exposed to the conveniences of digital during the pandemic and the need to bring in laser-like focus to execution as companies have limited resources to focus on the most important goals.

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5 disruptions that will **power digital finance**

Fintech firms are applying new tech tools like AI, ML and blockchain to banking and other financial services, improving their business and customer experience

Financial technology (Fintech) has come a long way and the pandemic has certainly helped it gain exposure by creating a need in banks and financial services organisations to adopt innovative technologies to drive more business and generate better return on investment (ROI). Fintech companies help financial services (finserv) organisations in their digital transformation journey to create a digital footprint across tiers and build a truly digital marketplace. Here are five disruptive technologies that will drive the next wave of digital finance.

#1

DIGITAL LENDING

One of the key areas that has managed to bring more business and underwritings than any other channel

> DIGITAL TECHNOLOGIES HAVE HELPED FINSERV ORGANISATIONS TO PENETRATE EVEN THE MOST RURAL PARTS OF INDIA TO ACQUIRE NEW USERS AND EXPAND THEIR LENDING FOOTPRINT.

is digital. Digital technologies have helped finserv organisations to penetrate even the most rural parts of India to acquire new users and expand their digital lending footprint. Digital lending has helped both the lender and the recipient by reducing obstacles and optimising the lending process. Some finserv organisations have started accepting digital underwriting as well. Digital lending has certainly helped bridge the gap between the organisation and the customer, helping the organisation in faster 'go-to-market' and the customer in a seamless digital experience.

#2

PRE-APPROVED LOANS (CREDIT WORTHINESS WITH AI/ML)

Fintech companies are helping lending organisations to identify and segregate users on the basis their demographics, income, risk appetite, credit score, etc. to accelerate 'go-to-market'. Fintech companies are using AI and ML to study user behaviour, interests, social engagement, etc. to identify user risk and credit potential. This has helped organisations to introduce a new service known as 'pre-approved loan', which is a set amount approved and offered based on the user's history, credit score, risk, etc. This helps the organisation to 'go-to-market' faster, reduce operational redundancies, and process more loans.

#3

PAYABLES/RECEIVABLES CONSOLIDATION

A lot of trending mobile applications and web-based SaaS companies are offering payment/account consolidation to their users. These companies consolidate all your payables and receivables in one place, helping you with better visibility across your finances. Receiving payments with one click, sending notifications, reminders to your payers and linking your bank account with a UPI ID for seamless payment processing are some of the features offered.

#4

NEO-BANKS

Neo-banks are a result of the new generation's preference of convenience over loyalty, and the cut throat competition between banks to acquire every customer and leapfrog over each other. Neo-banks are digital-only banks that offer the same set of services that their brick-and-mortar brethren do. Unlike a traditional bank, the customer on-boarding, engagement, offerings and other banking services of neo-banks are completely digital and involve no in-person engagement whatsoever. If neo-banks are any indication, in a few years, they will soon replace their physical counterparts, and all transactions will become digital, thereby making ATMs redundant and obsolete.

#5

BLOCKCHAIN

Fintech companies have adopted blockchain to help financial services organisations build a robust and secure foundation to their existing payment systems. Fintech companies are helping finserv to create a secure infrastructure with the help of blockchain to facilitate the next big wave of digital payments.

Fintech companies have leveraged trending innovations such as AI, ML and blockchain to enable financial organisations to 'go-to-market' faster, optimise their operations, and provide a safe, secure and seamless experience to their customers. This will certainly help finserv to build the next wave of digital financing.

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Fintech segments that are **poised to prosper in 2021**

As more users, pushed by pandemic, use technology for financial transactions, savings and investment management, at least three segments stand to benefit

Global economies have taken a beating in 2020 of once-in-a-lifetime proportions. However, a few sectors have benefitted immensely due to their ability to leverage technology to promptly replace services offered by businesses hampered by limited physical interaction during COVID-19. Edtech, pharmacy and grocery ecommerce and OTT media are clearly among the lucky few that shall look back at 2020 as the year of opportunity.

Fintech players, on the other hand, have had a mixed bag with transaction volumes dropping at the start of the pandemic but recovering ground in the latter half of 2020 due to an expanded user base. As per the 'The Global COVID-19 Fintech Regulatory Rapid Assessment Report' by the World Bank Group and the University of Cambridge, a survey showed that 65% of respondents from central banks and other financial regulatory authorities in emerging and developing economies reported an increase in digital payments and remittances after the onset of COVID-19.

In India specifically, as per a survey by venture capital firm Matrix Partners and consultants McKinsey & Company, 60% of digital payments firms were expecting to achieve pre-COVID volumes by September 2020.

COVID-19 has probably enabled fintech companies to acquire a key piece of the jigsaw – an enhanced user base. In India, the puzzle has been built over many years with pieces such as Aadhaar-based identity, digital payment enablers in the form of UPI and RuPay, and government actions resulting in financialisation of savings and financial inclusion. As we enter 2021, fintech companies in a few segments seem to be well positioned to ride a wave of sustained growth assuming regulatory support is forthcoming. Here are those segments.

> THE CHALLENGE LIES IN THE NON-AVAILABILITY OF BANKING LICENCES FOR NEOBANKING FIRMS AND THUS THE DEPENDENCE ON PARTNERSHIPS WITH BANKS AND FINANCIAL INSTITUTIONS.

NEOBANKING ON THE RISE

Expectations are running high from the relatively new kid on the block. Firms like Jupiter, Open and Niyo have raised over USD 100 million just between themselves. Neobanks are digital banks without physical branches that utilise technology to do away with the operational inefficiencies that exist at conventional banks. As per Finnovate Research, globally customer acquisition costs for conventional banks are USD 200 compared to USD 1-38 for a neobank. Reduced operational inefficiencies result in faster turnaround times, favourable customer experience and also more attractive investment solutions for customers due to lower costs at the neobank.

The challenge lies in the non-availability of banking licences for these firms and thus the dependence on partnerships with banks and financial institutions. This poses an omnipresent risk of substitution by traditional banks themselves or innovation that supersedes the current technology. Nevertheless, the use case is too hard to ignore. MSME payments, collection and payroll management, convenient banking services for blue-collared workers and card solutions for teenagers and young adults are examples of use cases that are large enough for the next unicorns to emerge from the neobanking segment.

DIGITAL PAYMENT SURGES AHEAD

Unlike neobanking, digital payments have been around for much of the past decade and hence the segment has already experienced the phase of launch of numerous startups, massive funding (~USD 5 billion over the last five years), intense competition, and regulatory changes. The onus is now likely to shift to market consolidation and customer monetisation.

The pandemic has aided in accelerating consumer comfort with digital payments, but consumer stickiness in the event of monetisation is yet to be validated. It is likely that 2021 would witness digital payment companies launching new services that can contribute to revenue generation by leveraging existing database of registered users.

WEALTHTECH IS THE FUTURE

Investing and personal finance are a big facet of ever adult's day-to-day life. In a country historically obsessed with gold and real estate as investment avenues, demonetisation and the 'Mutual Funds Sahi Hai' campaign paved the way for emergence of financialisation of savings. The value of assets held by individual investors in mutual funds has increased by ~20% year on year over a five-year period to reach Rs 14.3 lakh crore in August 2020.

As per a Boston Consulting Group report, the number of customers purchasing mutual funds online grew seven-fold between 2016 and 2019. Also, ~60% of urban mutual fund investors have had digital influence in their purchase of mutual funds and ~30% of them have purchased digitally.

The startup community has thus been focusing on capturing the evolving investor. However, immense competition has now precipitated an urgent need for innovation. 2021 could witness a trend wherein the evolving investor seeks advice as opposed to just ease of investment. Hybrid models could emerge that juxtapose the benefits of ease of investing through tech-enabled platforms with human acumen and insights. For the high net worth individuals segment, one-stop technology solutions for wealth management could eat into market shares of traditional wealth managers as diminishing distribution margins is putting pressure on business profitability.

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Future of insurance is now, **thanks to these five tech tools**

Solutions as diverse as AI, blockchain, big data, social sensing and predictive analysis can help insurance firms improve efficiency and customer experience

Technology has unleashed a modern era forthe insurance industry. Gone are the days when paper-based processes, including insurance application, claims management and policy servicing, dominated the industrial landscape. With the advent of technology, insurers are leveraging digital tobring efficiency and agility into their processes, bolster fraud detection and risk management, and deliver superior customer experience. Here is a glimpse intofive advanced technologies that have become an integral part of the insurance industry.

ARTIFICIAL INTELLIGENCE

AI has been a critical enabler for revamping insurance companies' interactions with their customers, claims settlement, and new product development. Let us look at some of the AI applications in the industry.

Faster claims settlement: AI-based online portals are more efficient at analysing claims requests by cross-referencing data with the existing customer information, thereby bolstering fraud detection. Virtual claims adjusters can settle claims quickly through the online interface as well.

Usage-based insurance: Connected devices and internet of things (IoT) can provide critical information to the insurers, allowing them to modulate the premium price based on a user's lifestyle. For example, people who drive safely will need to pay less for auto insurance and people who lead an active lifestyle will likely pay less for health and term insurance

Digitised customer requests: AI-based chatbots can interact with customers and help insurers automate common processes, including policy application initiation, claims request, and servicing for straight-through cases.

> CONNECTED DEVICES AND IOT CAN PROVIDE CRITICAL INFORMATION TO THE INSURERS, ALLOWING THEM TO MODULATE THE PREMIUM PRICE BASED ON A USER'S LIFESTYLE.

Personalised customer experience: AI can enable a seamless buying experience for customers, deliver personalised interactions, and offer product recommendations by accessing their data and historic information. This can also allow insurers to customise their product offerings based on the customer's exact requirements.

BLOCKCHAIN

Blockchain, with its decentralised ledger technology and smart contracts, can help insurancecompanies combat fraud, verify customer authenticity and make the process more transparent. Blockchain's ability to capture data in real time can help eliminate duplicate or fraudulent transactions. Furthermore, insurers can make their policy underwriting and servicing processes more secure and efficient through self-executing smart contracts. With an automated system in place, insurance companies can optimise their operational costs while ensuring data security and risk management.

BIG DATA

Big data and connected devices have revolutionised the insurance sector by providing insurers with real-time information related to policyholders. Insurers can use the information gathered from data sources – telematics and wearable devices – to create a risk profile for a customer and suggest a suitable policy and premium price.

With telematics gaining prominence, usage-based auto insurance, including pay-as-you-drive and pay-how-you-drive pricing models, is on the rise. Telematics-based insurance can even positively influence a person's driving habits by rewarding them for safer driving and making improvement suggestions by analysing their driving patterns.

DIGITAL AND SOCIAL SENSING

Social media has evolved from serving just as a marketing tool for insurance companies into a platform that offers manifold benefits to the modern insurer.

Risk assessment: Social media makes it easier for insurance companies to understand their current and potential customers better. Insurers can analyse data obtained from a person's social media presence and utilise it to create a risk profile for them, bolstering their risk management capabilities in the process.

Fraud detection: Insurers can leverage data from social media to efficiently authenticate claims and filter out the fraudulent ones. Social media activities can be monitored as part of the investigation process to keep an eye out for any red flags.

Customer engagement: Customers can instantly connect with insurance companies through their social media profiles and AI-based chatbots. This can help insurance companiesin expediting the handling of customer service requests and query resolutions, saving their time and resources.

PREDICTIVE ANALYTICS

Insurers today can leverage predictive analytics to assess the current and evolving market conditions for anticipating the upcomingtrends in the industry. Additionally, analysing data and patterns can help insurers identify outlier claims, triaging claims, customers at risk of cancellations, and possible fraudulent activities.

Leveraging these cutting-edge capabilities can act asa differentiating factorfor the insurance companies, enabling them to not only stay ahead of their peers but also deliver the best-in-class customer experience.

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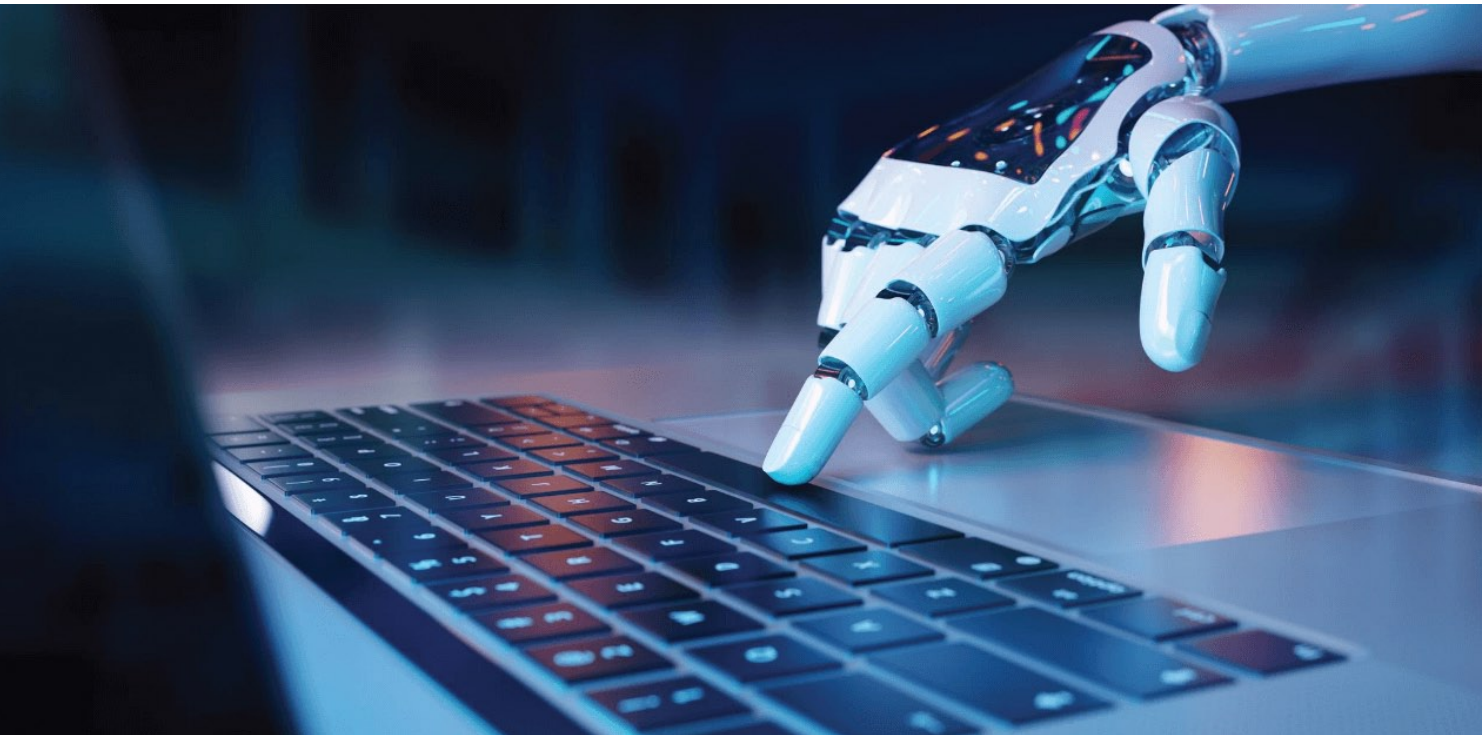
How Intelligent Automation will evolve: **8 predictions**

To sustain and also profit from digitalisation, IA shows the way, making business processes seamless. A look at coming trends in its evolution



The pandemic has acted as the force behind widespread digital transformations, many of which are propelling industries into the future. As industries are racing to adopt digital workplaces, there hasbeen an uptick in the use of Intelligent Automation (IA) to equip and sustain such digital business processes.

The spotlight is on enhancing customer satisfaction and improving the success of businesses, both in terms of financial as well as non-financial ROI. To become a part of this revolution, organisations need a roadmap that will enable them to adopt the trends likely to mark the shift to IA.

EFFECTIVE USE OF IA

IA has the potential to catapult the Indian economy to USD 5 trillion by 2024-25, according to a study by Automation Anywhere. Each time an organisation simplifies and optimises an existing business process, there's great scope for IA to make it more seamless and effective.

In the Indian business landscape, industries in the IT/ITES, BFSI, manufacturing, and education sectors are already ahead of their peers in terms of automating applications. With around 63% of the IT/ITES industries relying on machine learning (ML), it is the most sought-after automation tool in this sector. Around 44% businesses in the BFSI sector consider robotics, ML and automated

IN INDIA, INDUSTRIES IN THE IT/ITES, BFSI, MANUFACTURING AND EDUCATION SECTORS ARE ALREADY AHEAD OF THEIR PEERS IN TERMS OF AUTOMATING APPLICATIONS.

data analysis as the golden trifecta that enables seamless automation and delivers expected results, according to a PwC survey.

THE EVOLUTION OF IA: EIGHT PREDICTIONS

Judging by the current scope of IA across various industries, it is possible to connect the dots and trace out a possible course for the evolution of automation. In this regard, here are eight key predictions to watch out for.

#1

A shift in focus from technology to value addition: The focus may currently be on the kind of tools to integrate into a business process, but once businesses get better at that, the emphasis will move to more important territories like identifying IA solutions that deliver direct value to both businesses and their customers.

#2

Integrated platforms that combine multiple tools: When it comes to automation, there is no super-tool that can do it all. The sooner businesses understand this, the easier it becomes for the real solutions to be applied. That is when integrated platforms will surface, facilitating the combination of various tools like AI, blockchain, and IoT.

#3

Smart leadership that strikes the right balance: Automation solutions can be large-scale applications that optimise core business processes, or they can be smaller solutions that make ancillary processes more effective. Both are important, and smart leaders in the future will understand and embrace the value on either end of this spectrum.

#4

A boom in low-code and no-code platforms: Low-code and no-code platforms are becoming increasingly popular, particularly in the startup ecosystem, where users with no specialised coding experience can leverage these products to develop solutions that add value. In the coming years, we will be seeing more of these platforms, with organisations perhaps even entering into profit-sharing agreements with these tool providers.

#5

IA becomes integral to digital transformation: At the threshold of digital transformation, automation may not be the sole focus. However, it will inevitably take the centre stage to drive widespread digital transformationin various industries where businesses will no doubt be tapping into innovative IA-based options to derive enhanced value.

#6

Increased prevalence of citizen development: If the rise of low-code and no-code platforms is on the cards, it goes without saying that citizen development will naturally follow. Over time, citizen development will also end up encompassing AI, blockchain and BPMS tools amongst others. While this may be a positive development in many ways, it is still essential for organisations to build IA platforms and to implement and enforce a robust governance framework, so that automation remains on the right side of the line.

#7

Pre-built/trained automations in marketplaces: Depending on the purpose for which they are developed, such automations will either enable verticalised solutions

> TESTING IA TOOLS ON A YEAR-BY-YEAR BASISGIVES AMPLE TIME TO UNDERSTAND SCOPE, STRENGTH AND LIMITATIONS OF A PARTICULAR LEVER OF IA FOR YOUR BUSINESS PROCESSES.

tailor-made for each industry or deliver horizontal tool integrations that can be used across industries to accomplish similar end goals.

#8

Autonomous orchestration of automation: Lastly, the important element to look out for is autonomous orchestration of automation processes to cohesively support faster delivery of value and ROI, both financial and non-financial, across organisational divisions.

MAPPING THE FUTURE OF IA

IA is still evolving. There is no certain way to predict which tools will emerge at the head of the race. Nevertheless, the secret to achieving the twin goals of business success and customer satisfaction is not to use the most popular IA tools, but to integrate the automation solutions that deliver the best results for the organisation's specific needs.

A roadmap is the spark that can get your organisation started on the journey to identifying the optimal IA tools it needs. There is an extensive range of alternatives to choose from: process re-engineering, low-code tools, robotic process automation (RPA), digital analytics, ML and so many more levers of IA.

Most organisations like to begin with RPA, which dominates the automation toolset. Process optimisation and business process management (BPM) follow closely after. To create a roadmap for an organisation, it is a good idea to test and adopt (or reject) IA tools on a year-by-year basis. This gives the company ample time to understand the scope, strength, and limitations of a particular lever of IA in the context of your business processes.

MANAGING DATA: THE KEY TO FUTURE OF DIGITAL INNOVATION

Some industry leaders and business forerunners may place greater emphasis on data than otherswith the belief that the future of digital innovation lies in data management.

ML has been a huge enabler of more efficient management of data. When data is handled more efficiently, business leaders will be better equipped to make accurate and informed decisions. This has the potential to single-handedly make it possible for organisations to enjoy business success as well as drive customer satisfaction. The key to the future of digital innovation is data managementcombined with the usage of multiple automation tools to deliver direct business and customer value.

The success of IA lies in a fine balance between the expected use-case outcomes for the customers, the technology solution and the return on investment for the business. This requires discipline and goes back to the basics of program and project management. IA, therefore, is a combination of these basics, plus a careful orchestration of data and latest technology.

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Six desktop-as-a-service trends CIOs should follow

DaaS has come a long way from a niche solution to a flexible and affordable way to replace physical desktops wholesale, offering a host of advantages

Desktop-as-a-Service, or DaaS, is not a new concept. However, new trends are emerging as the DaaS market grows and more vendors begin offering the service.

Here is a look at key trends within the DaaS ecosystem that CIOs should know about when considering whether to migrate from physical PCs to DaaS as well as when evaluating different DaaS platforms.

#1

SIMPLIFIED ACCESS TO CLOUD DESKTOP ENVIRONMENTS

In the past, users may have needed Remote Desktop Protocol (RDP) client or other special software to log into their cloud desktops. Today, however, most of the modern DaaS platforms make it possible to access cloud desktops using a browser. The remote desktop environment itself is displayed inside the browser, eliminating the need to run external applications to interact with it.

In addition to simplifying access, DaaS platforms that provide browser-based login options can also improve security. There is no need to worry about securing standalone login applications or the risk that DaaS users could be tricked into installing malware posing as a DaaS app.

#2

FLEXIBLE OS LICENSING

One of the conventional barriers that prevented many organisations from moving to DaaS was the need to purchase new operating system licences to migrate. Not only was this a waste of money because it meant that the capital already invested in on-premises software licences was wasted, but it was also logistically challenging to acquire new licences and apply them to individual cloud desktops.

> ZERO IT ELIMINATES THE NEED FOR COMPANIES TO ASSIGN THEIR OWN IT TEAMS TO MANAGE CLOUD DESKTOPS. VENDORS PROVIDE THAT EXPERTISE AS PART OF THE DAAS SERVICE.

Today, leading DaaS vendors have simplified this process. They allow organisations to reuse their existing Windows licences for their cloud desktops if they wish. At the same time, the vendors offer built-in licensing options that make it possible to acquire licences as part of the DaaS service, which simplifies licence purchasing and deployment logistics.

#3

FLEXIBLE CLOUD DESKTOP HARDWARE CONFIGURATION

DaaS vendors are also working to simplify the process of choosing which type of virtual machine instance to use when setting up a cloud desktop. Instead of requiring users to navigate long menus of VM instance types themselves, the vendors offer preconfigured options that are tailored to different types of use cases – such as general-purpose office productivity, graphics and design work and high-performance desktop computing.

With this approach, there is no need to become an expert in cloud VM instance offerings to take advantage of cloud desktops. As a result, the barrier to entry is lower for the typical organisation.

#4

ZERO IT: BUILT-IN SUPPORT SERVICES

In years past, DaaS platforms usually provided just a cloud desktop environment. It was up to users to manage it.Today, the DaaS ecosystem is trending toward an all-inclusive model that packages ongoing support and management services alongside cloud desktops.

This approach, which is sometimes called Zero IT,eliminates the need for companies to assign their own IT teams to manage their cloud desktops. Nor do they need special experts on hand who know the ins and outs of cloud desktops; instead, the vendors provide that expertise as part of the DaaS service.

#5

MULTIPLE USERS PER DESKTOP

One key advantage of cloud desktops is the potential for multiple users to share a single desktop instance. This can be especially useful for companies with employees in different time zones, who can use the same cloud desktop at different times of day.

Today, some DaaS vendors allow for flexible, multi-user access to a single desktop, without charging additional fees. This trend means that DaaS users can get more value out of their investment.

#6

FLAT PRICING

Like many other types of cloud services, cloud desktops in the past sometimes came with complicated pricing models. Vendors charged based on metered usage, and there were add-on fees, which made budgeting difficult.

This type of pricing complexity is no longer a major hindrance for DaaS users in most cases today. Instead, organisations can choose DaaS platforms that provide simple, flat fees based on the number of desktops they use, without paying extra for things like data usage or additional users.

WHAT'S AHEAD?

Viewed as a whole, the trends mentioned above make DaaS a simpler, more user-friendly solution than it was in years past. The barriers to entry have been lowered, along with the costs. While DaaS was once seen as a niche solution that made sense only for certain companies or employees, it is now flexible and affordable enough to replace physical desktops wholesale.

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Achieve customer delight with digital adoption platform

DAPs facilitate guidance to make users navigate apps or websites better. In the battle for customers' attention, this can give a business the much-needed edge

As digitisation takes centre stage in the increasingly contactless economy of today, organisations have been forced to reimagine how they engage with customers. Over the last few months, organisations have been swift in deploying technology to offset the harsh blow of the pandemic and to better connect with their customers. Brick-and-mortar retailers pivoted to m-commerce, virtual healthcare consultations were made available, and the adoption of chatbots for customer service increased. However,

> DIGITAL ADOPTION PLATFORM MEANS EASY AND STREAMLINED CUSTOMER ONBOARDING, LETTING BOTH THE TECHNOLOGY AND CUSTOMERS REACH THEIR MAXIMUM POTENTIAL.

> CUSTOMERS' IN-APP OR WEBSITE BEHAVIOUR, LANGUAGE PREFERENCE, SITE VISITS AND TIME SPENT ON A PAGE CAN BE AUTO-DETECTED TO POWER PERSONALISATION CAPABILITIES.

introducing new applications or tools is not enough. Customers and even employees need guidance and training on how best to use them so that organisations can maximise returns on their technology investments.

Back in 2006, when Microsoft had released Office 2007 Beta 1, the 'View' features were located in a menu at the bottom of the window. While this made the feature highly discoverable, it was not as learnable as it was expected to be. A test user who initially indicated that she liked the location of the feature, soon said that she was frustrated because she was unable to find the 'split window' option in this menu.

This turned out to be a key piece of feedback that led to the now-familiar location of the 'View' features in a tab at the top of the window. While it is difficult to imagine having the 'View' tab anywhere else, it is worth considering the difference that contextual and personalised in-app guidance could have made in increasing user adoption. Imagine the impact that knowing and utilising all the features an application has to offer can have on productivity and efficiency! A digital adoption platform (DAP) helps with just that.

AI-LED PERSONALISATION OF CUSTOMER EXPERIENCE

DAPs are software overlays that guide users through tasks and functions so that users can quickly learn how to interact with an application or website. They help users navigate through new software and tools so that they can achieve the end goal in the most effective manner possible. For example, if a user needs to apply for a loan online, the DAP will walk the user through all the steps of the application in real-time.

Intuitive self-support can go a long way in creating an engaging user experience and fostering customer loyalty. As customers get familiar with new applications and learn how best to use digital tools, they gain a sense of competency. For organisations, this means easy and streamlined customer onboarding, letting both the technology and customers reach their maximum potential. As every business turns digital and competes for the customer's attention, personalising the customer experience is more important than ever before.

DAPs open up innovative new possibilities to improve customer onboarding and adoption. With the help of artificial intelligence (AI), DAPs can be customised to provide tailored assistance based on an individual customer's needs. The navigational content on websites can be made more engaging and personalised. Customers can be targeted based on their location, past support tickets, and stage in the funnel. Their in-app or website behaviour, language preference, site visits, time spent on a page and other characteristics can be auto-detected to further power personalisation capabilities. For recurring customers, a part of their onboarding journey can even be automated based on this auto-detected data.

The introduction of new technology often accompanies the need for a mindset change. Organisations must think beyond technology deployment and focus more on software adoption for a smooth user experience. Every industry is experiencing digitisation at a rapid scale, and leveraging the tools that can increase user adoption is critical in making the most of your technology investments. Through DAP-driven personalised guidance and engagement, organisations can improve customer experience and achieve customer delight.

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New threats to **data security need new approaches**

Four steps that can help organisations protect data in the perimeter-less digital enterprise environment and new normal

No sooner did companies move to a digital model by digitising their processes, the COVID-19 pandemicnot only accelerated this process but also pushed companies to move their business operations into the cloud. Technology was being pushed to deliver solutions overnight. One such impact was on security when companies were forced to adopt work from home. Security managers did not have time to build resilient security architecture and had to live with the insecurities that came in along with this new culture.

It is predicted that by 2021-22, over 83% of enterprises workload will move to cloud infrastructure and we have seen this shift already since March 2020, with an increase in the utilisation of data centres and cloud application facilities. In all this, threats have evolved too. They have become more data oriented as we have seen an increase in data breaches and attacks centredarounddata during this period. Companies were exposed suddenly and now had to fend from attacks over multiple frontiers. Attack surface increased and what was supposed to be a zero-trust network became open for all network.

Security walls were crumbling and operations which were being followed for years started showing cracks. Enterprises soon realised how vulnerable they were by not following a data security approach. With the move towards digitisation, companies forgot the traditional approach: you keep your most precious things in a safe locker. Security solutions were no longer enough. A complete change in approach was required and it was time to bring the data right at the centre of risk and security management.

Understanding the threat vectors to valuable data and build a protection against them has become the key to building a secure enterprise. Security engines are now required to gain visibility of data and control over each and every piece of information leaving this un-bordered network.

Let's look at steps that will help enterprises to protect their data in this perimeter-less enterprise's digital environment.

NEWER, BETTER DATA SECURITY APPROACH

The traditional approach to security – to gain application visibility and prevent them from being used as a threat surface – was falling short in securing an enterprise. It lacks visibility on data context of transactions beyond layer 7, essential for preventing data exploitation.

The answer to this is to switch to a data security approach that takes security beyond just the perimeter and applies security to the data itself. The data security approach provides a detailed, granular and deepest possible data-level visibility. It collects information on each transaction and ensures that every piece of information that is transmitted to, from, and within the organisational digital work network along with its source and destination (e.g., URLs, email IDs, body content, subject, attachments, the content of attachments, etc.) of every inbound and outbound communication is analysed for security breach and logged.

This allows the organisation to deep dive into the granular details of the transaction to generate reports, helping setup data security policies at a granular level to ensure data security and maintain enterprise's data security health.

MANAGING INTERNAL THREATS

Threats today involve both external as well as internal actors, creating a complex threat surface for enterprises security. While external threats can be managed using a strong security solution, it is the internal threats that become a challenge for the security team to handle.

Internal threats in general include intentional and unintentional data leaks, creating a gateway and acting as one for threats and more on platforms that

> DATA SECURITY APPROACH ALLOWS DEEP DIVE INTO THE GRANULAR DETAILS TO GENERATE REPORTS, HELPING SETUP DATA SECURITY POLICIES AT A GRANULAR LEVEL.

are essential for business operations. Enterprises must gain complete visibility on their actions, monitor and control their entire threat surface that the users interact with. This will enable enterprises to be informed on their vulnerabilities but also help protect from them while providing valuable insights to strengthen overall enterprise security measures and ensure maintained enterprise's overall security.

BRINGING REMOTE USERS UNDER SECURITY INFRASTRUCTURE

With the COVID-19 outbreak, we saw a rapid adoption and increase in remote work culture, making it a 'new normal' work environment. While this was enforced to maintain business continuity during the lockdown, rushed implementation resulted in creating loopholes for both enterprise data and network security. These unsecured users have access to the enterprise's data and internal network for business operations, acting as a vulnerable threat entrance.

The solution is to bring these unsecured users under the enterprise security infrastructure using WFH client/ solution that enforces their entire internet traffic through the security infrastructure and implement security policies allowing enterprises to gain visibility and control on all communication sent and received by these users. This enables the enterprise with the power to control the use of data on business and non-business application while also limiting and restricting access to these applications with their security policies.

Moreover, not all employees use office assets, many use their personal devices to access the enterprise's network and data. These devices must be authenticated using a zero-trust security model to prevent threats by verifying and validating the access using more stringent and secure authentication to avoid unauthorised access.

THE 'ALLOW BUT MONITOR AND CONTROL' MECHANISM

With the shift to cloud and extensive use of cloud and SaaS applications for ease of access and business operations, security teams face a challenge with gaining visibility on the use of these applications once allowed to be used by their users. For these reasons, security teamsusea traditional allow/block security mechanism. This mechanism either allows the use of applications but blinds the enterprises with its usage or blocks the access to applications, affecting the business operations.

In contrast to the allow/block mechanism, the 'allow but monitor' approachallows the use of these applications but completely monitors how they are being used, controls the use of sensitive data on the applications and blocks misuse of the applications and critical data on the applications. This increases productivity while maintaining adherence to the enterprise's data security initiatives.

Data today stands as the most valued asset and it is evident with the recent trend in data breaches. It contains sensitive information like customers personal data, business intellectual property, anonymised customer data, business critical information/strategies, employees' personal data and more. If fallen in wrong hands, it can result in both financial and non-financial losses like loss of business, partnership exits, loss in customer trust and compliance fines, with an average data breach cost of USD 3.86 million.

Data security is a primary corporate responsibility for enterprises that handle personal information; they have to ensure its safety and security from being exploited. Enterprises must shift from security just at the perimeter to a data-centric security solution in alignment with the transforming environment on both technology and threat front.

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New GIS roadmap to transformation

With the pandemic, geospatial industry is poised for a skyrocketing growth. Low-code platforms can help the sector navigate better and with more ease

India has been on a 'digital-first' trajectory for quite some time now. Since the onset of the pandemic, Digital India has gained increased pace, as technology is not just pervasive but also an indispensable part of our day-to-day lives. At the heart of this journey is the rise of geographic information systems (GIS) that is helping governments and businesses alike to leverage spatial solutions to recalibrate citizen outreach, supply chain, fleet management and workforce security strategies.

As per industry estimates, the Indian geospatial industry currently stands at USD 4 billion and is expected to grow into a USD 20 billion market by 2025. With this, there is greater demand for skilled cartographers, GIS analysts, GIS experts and so on. For technology enterprises, this means an enhanced demand for 'industry-ready developers' who are ready to creatively ideate and build location-embedded solutions and apps to address the 21st century's challenges.

On the other hand, despite being home to the world's second-largest developer base, India still battles with the absence and shortage of highly skilled and niche geospatial developers with critical spatial reasoning knowledge and accompanying skills and also be able to apply the spatial insights in larger business settings. Against this backdrop, a low-code approach to building spatial products and solutions can empower developers to build at scale and speed while staying agile in responding to the changing business and customer needs at reduced costs.

> LOW-CODING PLATFORMS CAN HELP GEOSPATIAL DEVELOPERS AND DESIGNERS IN MAKING MAPS THROUGH DECLARATIVE AND VISUAL TOOLS THAT DESCRIBE WHAT THE APP SHOULD DO.

THE RISE OF LOW CODE IN GEOSPATIAL

A recent report by Gartner on market demand for app development estimates it to grow through 2021 at least five times faster than the IT capacity to deliver it. Therefore, it is inevitable that more organisations are looking for ways to simplify time-to-value, reduce operational costs by the way of redesigning and optimising business processes.

In the coming years, most new business applications are expected to be created with high-productivity toolsets, such as low-code and no-code application development platforms. On a more strategic level, it is easier for companies to engage the services of a lesser skilled developer since it does not demand profound coding skills and it is easier to perform the tasks and track their efficiency in a team setting, thanks to its powerful visualisation capabilities. Using low-code tools, developers can thus make a significant contribution to an organisation's digital transformation initiatives.

In a nutshell, low-code technology means anyone without the code-writing abilities can build a map. For companies with time and budget restraints, its visual development components, one-click deployment, interoperability with a broad range of applications and third-party, open-rendering services can accelerate their time-to-market speed, increase their IT output, all while optimising IT productivity. For GIS specialists and professional mapmakers, it affords the ability to manage geospatial data at scale. All of this without the need to build ad-hoc tools for using or publishing live geospatial data and without the need for special setup.

MAP MAKING, SIMPLIFIED

Although fundamentally scientific, map-making is a visualisation in action. While coding is a buzzword and high activity involvement in many professions of the spatial industry, it is the pursuit of communication and design that is significant. And low-coding platforms, with little hand coding, help geospatial developers, technologists and designers accomplish making maps through declarative and visual tools that describe what the app should do. Additionally, developers can use an open-source intuitive visual interface with drag-and-drop capabilities to design visual models of an app's business logic.

Alternatively, most of map-making is time spent wrangling and managing geospatial data. Low-code, HD cloud platforms can solve this by delivering the prerequisite building blocks for data management and map publishing. With this, the compilation and deployment of the code are also automatic, enabling more rapid, iterative, and collaborative development and change of software implementation.

More importantly, the benefit of using low-coding technology is that it can allow map-makers to spend their time and expertise building the solution rather than spending time explaining to a third-party or clients what they are trying to achieve.

To put things in perspective, let us look at how this could work in an in-the-supply chain industry. Let us suppose an organisation wants to relook at their battered supply chain strategy in the aftermath of COVID-19. The first and foremost concern for the company would be to ensure employees' and partners' safety and health on-road, while keeping costs in check.

Using an intuitive and low-code, cloud-based app or portal, the company could build a map by picking from a variety of open static datasets into a live, interactive map detailing out the current status of each hotspot area and safety regulations to be followed, thus preempting any potential delays in delivery to the end customer, including weather conditions, traffic congestion and fleet damage in realtime.

Savla is Director Engineering, HERE Technologies

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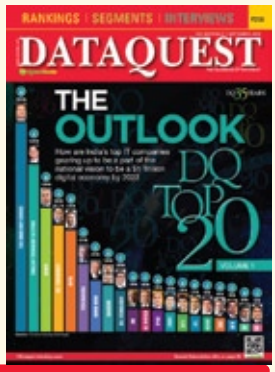

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MANEESH JAIKRISHNA
Vice-President, Indian Subcontinent, Dubai, Eastern and Southern Africa, SITA

WE ADOPT END-TO-END APPROACH IN INTRODUCING NEW TECHNOLOGY

In response to the distancing requirements enforced by COVID-19, the aviation industry has made great use of technology to ensure passenger safety while also following pandemic safety norms. As a result, the air travel experience has changed dramatically, and the technological transformation is set to continue in 2021. Biometric checkpoints, self-service kiosks, distancing-friendly processes and self bag-drop stations will be familiar sights even after COVID-19, says ***Maneesh Jaikrishna,*** *Vice-President, Indian Subcontinent, Dubai, Eastern and Southern Africa, SITA. In this interview, he also speaks about privacy worries, pointsolutions vs. common-use solutions, industry standards and stakeholder role. Excerpts:*

How much has the travel and aviation industry changed on the technology side since thepandemic hit the world?

The pandemic has increased the drive for greater operational, and cost, efficiencies and a focus on sustainability and health. There is a lot of industry innovation occurring, using facial biometrics, in response to the pandemic and designed to build confidence among travellers and governments, support a safe and low-touch airport experience, and enable borders to open safely.

What big shifts or adoptions can we see in the 'New Normal'? How many of them are incremental and how many truly disruptive?

We see an acceleration of interest in deploying our existing Smart Path solution, given the more significant need for a touchless airport experience. Reducing waiting times and congestion, in particular, are more critical than ever before since these are not merely a matter of passenger comfort but also a safety issue as we endeavour to help promote best safety practices like social distancing and decrease the spread of COVID-19. Biometric checkpoints, self-service kiosks, and self bag-drop stations are likely to see an increase in adoption even after COVID-19.

What is you strategy to address this new air-scape?

SITA has also developed some new applications to support the industry's COVID-19 recovery and the new safety measures. Some of these solutions integrate facial biometrics with other technologies like mobile self-service to deliver a safe and seamless journey before travellers reach the airport, through the airport, and on arrival and beyond. For example, our new Health ETA (electronic travel authorisation) application, part of SITA's travel authorisation solution, uses biometrically-enabled, secure mobile technology for governments to verify digital health declarations via advance passenger information (API) before travel. It paves the way for a seamless and touchless contactless arrival process through immigration and customs.We anticipate that more airports worldwide will accelerate their digitalisation and biometric technology-adoption strategies in response to passengers' changing requirements in the recovery and the post-COVID world.

What areas would these be, if you can specify?

Distancing would be a key area.Using real-time monitoring technologies along with predictive analytics, SITA can ensure appropriate distancing between passengers at key points across the airport. Predictive analytics will also support more proactive planning. There is also an opportunity to extend the boundaries of the airport where key steps such as check-in and bag-drop are managed before arriving at the terminal through a passenger's mobile. Then we have hygiene and sanitation as another important area.SITA is helping to reduce the risk of infection by avoiding contact at key touchpoints.

> MORE AIRPORTS WORLDWIDE WILL ACCELERATE DIGITALISATION AND BIOMETRIC TECHNOLOGY-ADOPTION STRATEGIES IN RESPONSE TO PASSENGERS' CHANGING REQUIREMENTS.

Using a combination of biometric and mobile solutions, passengers no longer have to touch a kiosk or surface, managing their journey from their phone.

Can we see health checks integrating deeply in this space too? What's the new role for technology here?

In addition to integrating health or thermal checks into key touchpoints such as check-in kiosks, governments will – by leveraging SITA's risk management solutions – be able to use pre-boarding check (advance passenger processing) and perform analytics on passenger journey data to identify and mitigate potential health risks.

Digital technologies and automation will be critical in ensuring a smooth, efficient and safe flow of passengers while keeping in mind social distancing-friendly passenger experience. Now more than ever, the industry needs to work towards the vision of an entirely mobile-enabled journey. Through technology, the passenger journey will become increasingly 'touchless'. Contactless, self-service technologies at every step will facilitate passenger flow, cutting queues while ensuring a social distancing-friendly passenger experience.

As airports get ready for mask-aware, contactless and swipe-free modes, how do we balance being frictionless and swift with being non-invasive and privacy-aware?

Keeping the current pandemic in mind, SITA offers a number of mask-aware, contactless and swipe-free modes of solutions.In implementing these new technologies that promote safer, and more automated, travel; SITA has been very conscious of the need for transparency in the use of data, and respecting the data privacy of passengers. We only support the legitimate use of data and at all times promote the appropriate management of sensitive biometric data. SITA actively participates with organisations working in this area including the International Organization for Standardization (ISO), the International Air Transport Association (IATA) and its OneID programme, Airports Council International (ACI), World Travel & Tourism Council (WTTC), and the International Civil Aviation Organization (ICAO).

Any security issues or risk-prone areas that are significant to consider as we embrace the 'New Normal'?

In the rush to innovate, we have seen that some vendors are pursuing solutions which help move an airport towards a touchless environment, but which may only work for one specific airline. In other words, they are point solutions and not focused on the core principle of common use, which is for the benefit of all airline customers.

SITA's low-touch solutions preserve the ethos of common use, and are also heavily tested to ensure they are robust and do not introduce vulnerabilities into the network. We also need ensure that any solutions that are introduced are maintainable and supportable, so that if there is an equipment failure it can be rectified easily. We adopt an end-to-end approach when it comes to the introduction of any new technology.

Is the industry warming up to this shift?

We've seen a growing passenger demand for automation and contactless technologies that give passengers more control over their journey. This level of automation also eases the operational burdens for airports and airlines and has accelerated the adoption of contactless technology and digital transformation over the last years.

Most airports have their infrastructure in place. The challenge comes in integrating new processes and technology into an existing environment. But, because SITA Smart Path is based on industry standards and designed to integrate with existing airport common-use

USING REAL-TIME MONITORING TECHNOLOGIES ALONG WITH PREDICTIVE ANALYTICS, SITA CAN ENSURE APPROPRIATE DISTANCING BETWEEN PASSENGERS AT KEY POINTS ACROSS AIRPORT.

infrastructure and airline systems, it is straightforward for us to deploy.

Stakeholder coordination, including airports, airlines, governments, is critical to ensure that the technology meets fundamental business needs; and that, operationally, it functions and is coordinated. Data sharing protocols among stakeholders also need to be fully worked through and, of course, be compliant with relevant legislation.

What's your opinion on the concept of a 'health visa'? How practical, ethical, well-integrated and long-term can it be?

It's crucial for governments to approve travel and boarding based on current information regarding a passenger's health status to implement travel bubbles and corridors, using the visa or electronic travel authorization process with health checks built-in. It means that governments can check digital declarations before trips, which minimises hassle and queuing at airports, and ensures a level of safety and health at the border.

Governments with API can pre-clear a passenger to fly in real-time, at the point of check in, or they can deny boarding of a passenger who is deemed high risk, or who may not have completed mandatory health declarations. With these steps completed successfully, there's no need for excessive queuing. The border agency can handle low-risk passengers in a seamless, low-touch way using biometrics, whether using biometric-enabled e-gates or traditional checkpoints at the border.

Can you tell us the strategic and market impact side of some of your recent strides, like AAI projects, the Mumbai airport kiosk project, the BARIG handshake and the TS6 ABC kiosks?

SITA, being a trusted IT partner to the Indian air transport Industry, has proactively engineered a comprehensive suite of solutions and processes enabling the 'low-touch' airport experience for domestic air travel while ensuring compliance with the guidelines. The critical elements to make the passenger processing operations 'low-touch' are already deployed by SITA at most of the Indian airports.

We support 51 airports across India. For example, Mumbai international airport uses airport management system (AMS), common use terminal equipment (CUTE), common use self service (CUSS) kiosk, baggage reconciliation system (BRS), self bag-drop and e-gates to help better manage passenger flow. SITA manages CUTE, CUSS, BRS at the 45 AAI airports. SITA has also deployed its next-generation airport management solution (AMS) across 12 AAI airports in addition to Bangalore international airport; Chandigarh international airport, Cochin international airport, Kannur airport and; Nagpur (MIHAN) airport.

Can you elaborate on any one of these use-cases – like that of Mumbai airport?

Mumbai's Chhatrapati Shivaji Maharaj International Airport introduced nearly 50 of SITA's mobile-enabled kiosks, becoming one of the first airports in India to deliver a completely contactless way for passengers to check-in for their flight. The technology allows passengers to use their mobile device to interact with kiosks. This significantly reduces the need to touch surfaces in the airport and meets the ministry of civil aviation's new passenger processing guidelines aimed at reducing the risk of spreading COVID-19 infections.Developed in response to rapidly-changing passenger requirements as a result of the COVID-19 pandemic, the application is a cost-effective alternative to significant investment in new low-touch infrastructure. The solution leverages existing common-use kiosks and does not require changes or modifications to airlines' existing IATA CUSS standard check-in applications.

> SITA's LOW-TOUCH SOLUTIONS PRESERVE THE ETHOS OF COMMON USE, AND ARE ALSO HEAVILY TESTED TO ENSURE THEY DO NOT INTRODUCE VULNERABILITIES INTO THE NETWORK.

With this technology, travelers passing through Terminal 2 of the airport can now simply scan a QR code on their mobile phone or tablet to operate the kiosks. After scanning the QR code, they can use their mobile device as a trackpad to control check-in and self-bag drop kiosks to print their boarding passes and bag tags.

What are the other interesting projects or innovations that SITA is working on?

We are moving processes off-airport, such as travel authorisation, bag-drop, mobile check in and arrival at the terminal.Passengers can arrive checked and 'ready to fly'. For example, for Health ETA we use biometrically-enabled, secure mobile technology. Governments check digital declarations before trips – minimising hassle and queuing at airports. SITA's mobile-enabled landing card solutions now include passenger health declarations. We can extend service beyond the airport to make passenger journeys smoother and safer, with our next generation cloud-based platform (SITA Flex) to help deploy industry standard passenger processing at any location off-airport.

We also enable airports to check passenger documentation digitally as part of contactless approval to enter the terminal, while governments can check 'approval to travel' before departure. SITA border management checks a passenger's border security status when they check-in, via advance passenger processing (APP). SITA is making it possible for governments to approve boarding based on health status to implement 'travel corridors'.

And 'faceless travel' is the big runway ahead?

SITA is delivering 'Your face is your boarding pass' using biometrics and mobile technologies, thanks to SITA Smart Path. This is the industry's most comprehensive whole-journey identity management solution, which easily integrates biometrics into existing common use airport infrastructure and airline systems. Importantly, we support automatic biometric boarding gates and 'face pods', reducing the need for physical contact and allowing the boarding process to be controlled to avoid clustering. In addition, SITA is making its biometrics 'mask aware', and at kiosks, bag drops and face pods we are integrating temperature sensing into the touchpoint workflow. For example, at Los Angeles airport, we have self bag-drop units which will incorporate biometrics.

Anything from international skies that you can share here?

Looking outside of India, SITA also recently announced the launch of the TS6 automated border control (ABC) kiosks, a smart border solution to facilitate the implementation of the new European Union Schengen Zone border controls. SITA's next-generation solution uses the biometric data captured at its ABC kiosks to expedite processing at the ABC gates, reducing congestion and improving passenger flow while providing high-quality data to governments and border agencies.

These solutions address the entire border control ecosystem – enabling governments and border agencies to leverage passenger data, conduct risk assessment, and manage traveller identities across the full-spectrum of border control operations. With SITA border solutions in place, arriving travellers in the Schengen Zone will be able to confirm their registration in the Central EES system at the kiosk, update their travel record with any new travel document or visa details, confirm their biometric data and make declarations specific to their journey. The biometric data can then be used to identify the traveller at the ABC gate – enabling them to proceed directly through the gate by facial recognition alone. This innovative approach is expected to significantly improve processing times at border crossing points for arrivals compared to traditional processing.

Users' Choice

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

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Product Categories : Nationwide Survey

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Data centre dynamics: **Foretelling the future**

Amid the focus on digital transformation, the key piece of action is data centre. At a Dataquest webinar, industry experts discussed its challenges and prospects

Enterprises are experiencing more pressure than ever to undergo digital transformation (DX) in order to stay competitive and data centres are being configured to be used effectively now and in the future. This has got further fillip due to the COVID-19 that has started to drive rapid digitization leading to drastic change in the IT infrastructure dynamics.

According to the experts at the Dataquest-STT GDC India webinar on Data Centre of the Future, operators are looking at revamping their existing data centre architecture while data security is becoming paramount. The experts also said that since the same devices are with the employees 24x7, patching them in the low bandwidth environment was challenging. Power availability was another challenge and organisations were exploring options of providing virtual working environment in the cloud.

FACING MAJOR DATA CENTER-RELATED CHALLENGES

There were many data-related challenges, when people had to visit the data centres physically, manage backup and so on. There were operational challenges. Some of the workload was also on the cloud. Umesh Pandey, Senior Director, IT, Radisys Corp said, "We had a lot of access in the hybrid cloud environment, take permissions, etc. Being in the cloud would have helped a lot."

Harish HS, CISO, HanvikInfosec said, "We work in the IT infrastructure background, and IT advisory and security services. There are two types of clients they came across. Some were ready to do WFH, but not at full capacity. Some of the clients were not at all ready. Those who are not ready have put all stops to the employees' residences. Another category was semi-ready, but not to the full capacity. They have a challenge to scale up.Another category was where some companies had already implemented virtual desktops in the backend of their cloud. They were able to scale up quickly. Creating virtual desktops did not take much time. They were in good shape. Going forward, everything will move to the data centre so that managing and scaling would be easy. They can also scale back when people start returning to the office."

Ashok MN, Director - Strategic Sales, STT GDC India shared his views from a solution perspective. STT GDC managed and maintained the operations of all data centers globally. There was focus on standard operation and management, disaster recovery, etc. "Most of the engineers provided 24x7 comfort to the data centre users to maintain and manage critical infrastructure. On scalability, with high demand for computing and digitalisation from most of the customers, we managed to get all scalability requests, and maintained and provided. There was not much of man movement."

> WHILE DESIGNING A DATA CENTRE, WE LOOK AT THREE FACTORS: AVAILABILITY OF POWER, AVAILABILITY OF THE CARRIER NETWORK, AND AVAILABILITY OF PEOPLE MOVEMENT.
>
> — **Ashok MN,** Director - Strategic Sales, STT GDC India

GOING FORWARD, EVERYTHING WILL MOVE TO THE DATA CENTRE SO THAT MANAGING AND SCALING WOULD BE EASY. THEY CAN ALSO SCALE BACK WHEN PEOPLE RETURNTO THE OFFICE.

— **Harish HS,** CISO, HanvikInfosec

Of late, data services have come under the essentials category. “We managed to get all IT equipment in the data centre. We also extended support to the increased demand for the IT services. We catered to the requirements of customers.A sudden surge of the Internet also happened at that time. We managed to get a high level of internet penetration into our data centre. We distributed loads across multiple cities. We work with multiple clients to cater to their expansion plans. We managed during the lockdown and pre-lockdown eras. We built in redundancy and resiliency.

CIO CHALLENGES

Ashok said there was the scalability aspect. Do we have enough space available in the data centre? Another was the internet penetration. Was the data centre capable of managing the sudden surge in data and internet? There was also the logical security, besides the physical security. We looked at how to mitigate the logical security aspects.

FUTURE REQUIREMENTS

Now that we are moving towards the 5G era, perhaps, the bandwidth challenges can be sorted out in tier-1 cities and villages. Organisations now need to reimagine the data centre play. How ready are the enterprises to meet the future requirements?

Pandey said, “There may be infrastructure challenges that may not be in our control. Especially in creating a good broadband connection or having a good broadband network! There are certain things we also need to be thinking about, such as how to utilise machinery and systems 24x7. We need to ensure there is a lot of distribution and infrastructure availability. We also need to scale up, as needed. If there is less demand, how can we contract our infrastructure? We have to be ready to meet all of these, going forward. We may have limited space and limited challenges. If we can get good support from the government, the challenges will be much easier to handle. Security scaling and we are compliant, we have to be ready.”

As part of the expansion plans, some people have already moved to the cloud, and some others are on the public cloud. Due to the availability of cloud, it is easier to migrate to the cloud. The challenge is whether we have the skillsets and the competency to migrate the load, and to secure the systems, and the data. CSPs take the security responsibility, but security is always a shared responsibility. Many clients are yet to be ready to upskill their employees to secure their infrastructure, systems, and data, and be compliant to the regulatory norms. The challenge lies in their competency.

Key ingredients for the data centre of the future are people, capital and availability of resources, as per Ashok MN. There are also factors like power, land availability and internet. The government has a data centre policy that enables us to provide more digitalisation. Recently, many MoUs were also signed. “Hence, we have got good support from the government. On the capital side, we are committed to invest more. We are geared up to provide an enhanced capital infrastructure capability for the Indian data centres. We will be doubling our capacity in India over the next couple of years. We may be getting a little challenged on the skillsets. We are trying to make use of the best technological skillsets available. That will enable us to fulfill timely HR requirements.We are also looking at operational excellence.”

Regarding the reimagining of the data centre, Subrat Kumar Kanungo, Director & Head IT, Samsung Semiconductor India said, “The world is changing,we need to adopt and adapt. There is a huge demand for hybrid data centres. How do you manage workloads? Connectivity plays a very critical role. How your data centre is connected to the outside world plays an extremely critical role. If you look at telecom carriers, one sector of initiative is how

> IT IS IMPORTANT WHERE YOU CO-LOCATE YOUR DATA CENTRE WITH CARRIER COMPANIES. THERE ARE DATA CENTRE CO-LOCATION PROVIDERS TOO. YOU HAVE TO STRATEGISE YOUR PLANS.
>
> — **Subrat Kumar Kanungo,** Director & Head IT, Samsung Semiconductor India

toconverge the traffic and give it back to customers. It is important where you co-locate your data centre with carrier companies. There are data centre co-location providers, as well. You have to strategise your plans.

"Next, you also decide about your end points. There are sensors, browsers, cloud services, etc. Another part is security. How the data centre architecture is in the future does gain lot of importance? We also need to partner with the right people."

Harish said WFH will continue andwe need to concentrate on the connectivity and scaling up the data centre infrastructure.

PURE-PLAY PROVIDER VS. CARRIER-BASED PROVIDER

Experts like Pandey believe that in some cases, a carrier-backed data centre can be a better choice. "There will be different kinds of support and bandwidth. Not all data centres will need a carrier-grade data centre. Including public and private, there is the need for all kinds of data centres today. This will also include co-location services. We will need quality infrastructure."

Ashok added that both parameters are required. Data centre as a priority and carrier aspect, both are very important. "While designing a data centre, we look at three factors. These are availability of power, availability of the carrier network, and availability of people movement. We also prefer a scalable option. We can expand the IT load as we need. Most of the enterprise customers prefer having a carrier-based data center."

"Next, there will be an increase in demand for cloud portfolio, and intrinsic demand for the data centre. We need to be ready with scalable options for each and every data centre. We need to be ready with power. We have been ready with all this from the pre-COVID-19," he said.

Talking about power consumption for data centers Pandey stated that the world is now looking at running them at room temperature. "There should be 20-27 degrees C. Managing the cooling is a key aspect of the data centre. We are looking at managing air flow. We are also looking at low-power requirements for the equipment. We are looking at how we don't spend too much money on power."

Agreeing that data centre power and cooling are sensitive subjects, Kanungo said that the power consumption per rack that earlier used to be at an average 4kVA has gone up to 32kVA. "Companies design their racks from 12-16kVA. Large companies, such as Intel, may go up to 32kVA. The moment you go for 12kVA and above, there is a need for hybrid cooling. This can be followed by precision cooling."

"We use hybrid cooling, keeping in mind the HPC nature. It is important that you don't run out of cooling when you aredoing HPC. These cooling systems are adaptive in nature. It is important that you design this with the right kind of architect. Schneider is very good, for example. We use hybrid cooling."

"Most clients belong to the SME segment. We had lot of challenges regarding skillsets. We are slowly moving to the hosted data centres. Either we move the servers to the hosted data centres, or we move the work floor to the shared data centre. Our challenge right now is to upskill the engineers. Most of our clients have also moved to the public cloud," Kanungo said.

How is STT GDC dealing with helping the data centre challenges?

Ashok said that one challenge is power. "We are getting highly renewable energy in place. It is also green. Next, there is redundancy in each aspect – power, carrier network, etc. Getting redundant power to the data centre is very important. We ensure there is no single point of failure present. There is a highly redundant architecture built across. Another is the cooling aspect. We can cater to higher requirements. Earlier, hosting 5-6kVA in a data

THERE IS THE NEED FOR ALL KINDS OF DATA CENTRES TODAY. THIS WILL ALSO INCLUDE CO-LOCATION SERVICES. WE WILL NEED QUALITY INFRASTRUCTURE.

— **Umesh Pandey,** Senior Director, IT, Radisys Corp

center was a challenge. For the last three-four years, we started building high-density data centres across the country. Our data centres are capable of running loads from 3kVA to 18kVA. You can mount equipment in 30-35kVA. The public data center is as good as a plug-and-play model. There may be slight customisation required.

"Third, the data centre provides SLA on power and cooling, and other parameters. We try to cover as many temperatures as possible. We also adopt cold air containment. Power and cold air containment allows us to maintain high PUE. Some data centres are built around 1.5 PUE and they can go up to 1.65 PUE. We have power and renewable power availability, and provide the best cooling. This means we are able to provide the best PUE possible in the Indian environment condition."

DATA CENTER OF FUTURE

Ashok made a presentation on data centers. ST Telemedia is headquartered in Singapore. Since establishment in 2014, STT GDC has expanded its portfolio significantly. The global platform spans five geographies comprising over 110 data centres and 1.2GW of IT load. It has 10 data centres in the UK, 16 in India, 78 in China, 7 in Singapore, and 1 in Thailand. It is also looking to expand in the USA.

India's share is at ~2 percent of the world, and is projected to double in 18 months. The Indian DC market size is expected to be worth $4.5 billion during 2020-25. India is at ~250MW designed capacity today, which will double in 18 months and reach 1000MW in four years. USA added ~500MW last year. China is growing at least 4x-5x times vs. India. India is the second largest DC market in APAC. The world co-location market is growing at ~12% CAGR, while India is at 23% CAGR.

Regarding growth drivers in India, there is growth in e-commerce with 220 million online shoppers in India. There is greater preference for OTT platforms. 50% traffic (video and e-commerce) are from tier 2 and 3 cities. There will be 31.3% rise in the demand for cobots in future. There is an increase in social media users, with 400 million users. There is rapid digitisation of services across industries, with 64% organisations in India now needing cloud computing.New opportunities in the Indian market are that 92% of companies are seeking to change their business models. There is 33%+ CAGT cloud growth. $5 billion has been forecast in the Indian cloud market. 73% of outsourcing will be on the cloud. There will be 20% growth in co-location services in next five years at 23% CAGR. The market size has been corrected from Rs. 3500 crore to Rs. 10600 crore from FY20 to FY26.The public cloud market will grow 19% in 2020. There will be 8.9% growth in cloud-based telephony and messaging growth. Post pandemic, there will be 8-19 first timers doing video calls, 13X jump in video calling and conference apps downloads, 60% consumers will opt for paid platforms than the free streaming or DTH/cable TV. Also, a third of India's population will be active social media users.

Several shifts are set to define the future of data centres. There is demand to move from captive to co-location and IaaS-based offerings. There will be 22% CAGR growth for expected co-location revenues over FY19-26. There will be 490MW projection of operational capacity to be added over the next three-four years.Players are also moving to lower-rung cities owing to space constraints, high rentals in top four cities, and large international players acquiring local players to foray into India. ICT companies are the major investors in renewable energy. There is a shift to newer, more efficient technologies. 20% DC hardware switches will be procured via as-a-service model by 2025. Automation in DCs has increased with cloud, AI and VR. DC owners are increasingly using micro data centres in their infrastructure. Eco-friendly technologies have also gained momentum. Co-location benefits include flexibility and scalability, lower Opex and Capex, better DR capabilities, lower cooling and power costs, etc.

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Watchful eyes that will **secure your organisation**

From a Dataquest webinar on Smart Surveillance Solutions for Enterprises, insights on new advances in technologies to safeguard all industries

Dataquest along with Axis Communications recently organised a webinar on smart surveillance solutions for the enterprise. Welcoming the participants in the opening remark ShubhenduParth, Editor, Dataquest and Voice&Data said that the new normal has made it imperative for organisations to constantly monitor and safeguard physical assets. "This is where smart surveillance systems play a big role. Such security solutions are able to optimise bandwidth and other resources," he said.

Speaking at the webinar, Jose Thomas, National Sales Manager, India and SAARC, Axis Communications, shared insightson innovations fora smarter and safer world.He also highlighted the role played by Axis in the space. "Founded in Sweden in 1984, Axis has a local presence around the world through an extensive partner network. It had sales worth USD 1.3 billion in 2019. Since 2000, Axis Communications is market leader in IP surveillance. It has been adding new dimensions such as network video solutions, access control and audio systems to build innovative and integrated security solutions for different industries," Thomas said.

Axis has over 220+ cameras in their portfolio. It is expanding the addressable market. Axis boasts of around 1,100 partners today. Axis has a long-term commitment to create a smarter, safer world.Axis India SAARC has 27 peopleacross different roles. Headquartered in Bangalore, it has a five-city presence to reach every

AXIS SOLUTIONS ARE COMPLETE AND EASY-TO-DEPLOY THAT MEET CUSTOMER NEEDS. WE DELIVERTHE GREATEST IMPACT FOR THE CUSTOMERS. WE OFFERSOLUTIONS FOR ALL INDUSTRIES.

— **Jose Thomas,** National Sales Manager, India and SAARC, Axis Communications

market. There are over 2,500 channel partners and over 1,000 enterprise-class customers. Axis also has local tech support and RMA Centre. Axis strives to be a trusted advisor and recognised solution of esteemed enterprise customers.

THE STRATEGIC PILLARS

Axis has five strategic pillars. These are: long-term focus, quality, cyber security and data protection, sustainabilityand partnership. There are five R&D centres that test products. "We have been trying to keep the products with less carbon footprint. Sustainability is critical for continued growth and we are also looking at recycling products as they come in.We are providing solutions for any business. There are three markets – enterprise, with over 100 camera systems; medium, with 10~100 camera systems; and small, with less than 10 camera systems," Thomas added.

"Axis solutions are complete and easy-to-deploy that meet customer needs. We are delivering the greatest impact for the customers. We are offering solutions for all industries, such as transportation, manufacturing, education, government, healthcare, critical infrastructure, safe cities, retail, etc."

Axis has validated end-to-end solutions. These are for entry management, monitoring, control of equipment, audio for security, analytics, and single point of support. Axis is offering network cameras, recorder solutions, security and business analytics, visitor management, access control, control of other equipment, audio for messages, alerts, and music. "So far, we have not yet launched the cloud computing-based platform in India. We are in talks with a telecom provider in India to help us do the launch," he added.

THE AXIS DIFFERENCE

"Axis is a great brand with passion.We are a trusted technology leader in network video/audio solutions. There is focus on cyber security, along with TCO. Quality is everything for us. There are open systems, ease of integration, and world-class support."

Regarding TCO, there is difficulty for people to make the right choice. There is the product price and the installation cost. The product price includes the system design, training and education, documentation cost, and deviation cost. The installation cost has the operating cost, maintenance cost, system failure cost, system redesign cost, and downtime cost built in.

TCO comparison was explained with an example. Axis has an innovative technology called Zipstream. Axis Zipstream technology preserves all the important forensic detail you need, while lowering bandwidth.

Cybersecurity has three layers of protection: security management, vulnerability management, and learning and collaboration. "Quality is embedded in everything that Axis does. There is meticulous attention to detail, such as design, testing, components, and production. We focus on quality, in terms of image usability, specific purpose and specific requirements. We have a cyber security focus, and have strong partner collaboration, with good technical support," Thomas said.

Some of Axis's customers in India include Mahindra, Fortis Hospitals, PowerSoaps, Reliance Industries, JSW Cement, Tatas, CEAT andGharda Chemicals. KIA, Hyundai, and Cummins are among the regional customers.

INNOVATING FOR SMARTER, SAFER WORLD

Githish Mathew, Senior Sales Engineer, Axis India SAARC, spoke about innovating for a smarter, saferworld. "Axis's

AXIS'S CORE OFFERING IS THE BENEFITS THAT WE PROVIDE TO CUSTOMERS BY OFFERING PRODUCTS THAT ARE A MAJOR PART OF THE CUSTOMER'S INTEGRATED SOLUTION.

— **Githish Mathew,** Senior Sales Engineer, Axis India SAARC

core offering is the benefits that we provide to customers by offering products that are a major part of the customer's integrated solution.There were lot of analog cameras already installed in the market. We developed video encoders for this. We started developing more types of cameras and encoders. We also developed the access control systems. We also have audio products that are IP based. Network is the future. There are network-based products. Analog has lot of limitations.

"We developed recording solutions, as well as accessories. These accessories are going to cover or protect our products. We have video management solutions (VMS) for multiple sites. Customers are also looking at how they can evaluate the cameras in multiple scenarios. Which are the areas that customers are focusing more in the retail stores, for instance,or, which are the days where there are more customers? The video and audio surveillance systems can also be used for business analytics," he said.

"We also have perimeter defender that can notify, when the need arises. That way, a lot of intrusions can be detected and prevented. We also have industrial-based analytics. We have customer support 24x7 for five days a week. Warranty for all products is for five years, but support for the products is for long."

Axis's extended offering is the added value it provides to meet the needs of the individual customer. It is tailoring the offering with relevant services and support. It is working on starting the cloud-based solution in India. ACAP is a feature that helps you install third-party apps on either the camera or speaker. Axis has built a complete portfolio with our products and solutions.

Axis has entry-level cameras to network cameras. There is fixed bullet, fixed box, fixed dome, PTZ, positioning, panoramic, onboard, thermal, cameras, etc. It also hasa modular camera that can be placed practically anywhere. It is useful for industrial monitoring, etc. There are specialty cameras for unique needs and scenarios. These models are designed to be ligature-resistant (or anti-ligature) to help prevent self-harm.

There are stainless steel cameras as well. For example, the Axis Q3517-SLVE is for extreme outdoor environments. It is resistant to the corrosive effect of sea water, detergents, and other chemicals. "We have also developed the Axis P37 series network camera that has four lenses. You can monitor the entire area with lesser investment. We have the latest Q61 series PTZ camera series. It can cover 20 degrees more," Mathew said.

There is the speed dry function. The dome vibrates at high-speed breaking the surface tension of the water. It removes the drips, providing sharp images in rainy weather. It enables efficient dome cleaning methods, such as high-pressure cleaning.

Thermal cameras are meant for reliable detection and verification. There are images based on the heat from objects, vehicles, and people. There are explosion-proof cameras that prevent sparks or explosions from escaping and igniting vapours, gases, dust or fibres in the surrounding atmosphere. Axis has also launched the radar system in the camera for early detection of intruders. You can detect and follow the moving objects. The advantages includewide area coverage, reduction in false alarms, works in various weather conditions, and is GDPR compliance.

"We are also keen on cyber security. Encrypted data gets transmitted from one location to the other. A company that develops and manufactures own products retains full control. At Axis, everything is done in-house," he added.

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Technology in education: **learning curve has gone steeply up**

With COVID-19, tech has made the most visible push in classroom. Here's gist of discussions from a webinar on Transforming Higher Education through Technology

The world is changing rapidly and so are the knowledge and skills that educational systems need to deliver. With schools, colleges and universities shut, millions are forced to learn from home. This creates a necessity for innovative forms of virtual learning, which is where edtech comes in. AI, ranging from chatbots to voice recognition software, has long been a feature in the edtech industry.

Dataquest recently hosted a webinar on Transforming Higher Education through Technology along with Dell Technologies and Fortinet. It deliberated on the evolving education landscape, digital readiness of educational institutes, the pedagogy suited for the digital world and related issues. It also discussed the National Education Policy 2020, which underlines bi-directional relationship between technology and education at all levels.

CATALYST FOR ADVANCEMENT

Venkat Sitaraman, GM and Corporate Head, South India, Dell Technologies India said the pandemic has been the

THERE WERE THREE DEGREES OF MATURITY REQUIRED – ONE, EXPERIENCE IN EDUCATION; TWO, THE TECHNOLOGY ADOPTION CURVE; AND THREE, HOW HAVE YOU TREATED INNOVATION?

— **Vijay Thadani**, Co-founder and Member, NIIT University, and Vice Chairman and MD, NIIT

catalyst for advancing education. "We have partnered with the government in crafting the National Education Policy 2020. Dell, along with the Atal Tinkering Labs, has set up training centres. We are enabling teachers to be trained on modern, emerging, IT technologies."

Pradeep Gupta, CMD, Cybermedia, said that with the lockdown students and teachers could not come to the campus, yet all teaching and learning continued virtually.

Dr. Madhu Chitkara, Pro-Chancellor, Chitkara University said, "For the last four years, we have been in online and offline mode. We have been digital from day one. Around 80% of our teachers were already in the online mode. Within a week [of the lockdown], we moved to fully online mode."

Dr Ramesh Mittal, Director, National Institute of Agriculture Marketing said, "We have fulfilled all of the requirements by providing online classes and internships. Initially, final placements were done physically. By sitting at home, they were doing lot of assignments, from HR, marketing, operations to finance, etc. The average salary offer received by students was Rs 8 lakh."

Vijay Thadani, Co-founder and Member, NIIT University, and Vice Chairman and MD, NIIT noted that while the NEP laid the foundation, COVID-19 provided the opportunity for digital transformation and education reforms. "In our 38-year journey, we trained 36 million learners across 40 countries. There were three degrees of maturity required – one, experience in education; two, the technology adoption curve; and three, how have you treated innovation? On March 14, we started WFH, and all operations shifted to home. By March 24, NIIT Digital and NIIT University were on fully digital platforms."

Puneet Tanvar, President, Technology, Upgrad, said people looked at where they needed to upskill themselves. "We are an online business. We have seen a huge increase in traffic over the last six months. The trend will accelerate. The NEP will only boost it further.For us, it was how we scale, and which are the courses students are interested in."

TECH READY!

Gupta asked Sitaraman how Dell intends to make the institutes technology ready. He said Dell helped the institutes understand the technologies they need to adopt. "First, infrastructure and access for connectivity. Next comes teacher training. Students need to have access to

DELL, ALONG WITH THE ATAL TINKERING LABS, HAS SET UP TRAINING CENTRES. WE ARE ENABLING TEACHERS TO BE TRAINED ON MODERN, EMERGING, IT TECHNOLOGIES

— **Venkat Sitaraman,** GM and Corporate Head, South India, Dell Technologies India

STUDENTS SPEND 140+ HOURS A WEEK WITH THEIR DEVICES.83% FEEL TABLETS WILL TRANSFORM THE WAY THEY LEARN. THE GLOBAL EDUCATION MARKET IS SET TO GROW 17% PER YEAR.

— **Valan Sivasubramanian,** Manager, Systems Engineering, Fortinet

content. Third, we outlined scientific industrial research around important areas. Research activity is paramount. A new, hybrid environment is evolving. We are moving forward in the digital era."

Valan Sivasubramanian, Manager, Systems Engineering, Fortinet said their solution allowed 80-90% employees to connect. Fortinet decided to provide free training to the public. "We could see there was a huge lag in cyber skillset. Today's students spend 140+ hours a week with their devices. 72% of students connect at least two devices to the campus network. 40% of higher education students would like to use mobile technologies more often. 63% of higher education institutes look at cloud options first. 83% of students feel that tablets will transform the way they learn in future. The global education market is predicted to grow 17% per year."

With increased digitalisation, there is increase in cyber threats too. "We need to protect against new threat vectors. We also need to secure the digital environment. Fortinet suggests broad, integrated solutions, which are also automated. Key fabric pillars are zero-trust network access, security-driven networking, dynamic cloud security, and AI-driven security operations. There is a need for an alliance ecosystem."

EMERGING TECH

Gupta asked the panel to name some of the emerging technologies. Dr Chitkara said the future will be an era of higher education. There has been adoption of digital technologies. "Parents are looking at how technology is being given to students, and how we are preparing students for the new normal. We upgraded our library. We also partnered with AWS, who talked about cloud computing and virtualisation."

Stressing on personalisation, Tanvar said students should be able to access learning on any device. The learning platform should be light weight, work on several devices, and network conditions. "We have implemented AI in certain steps of the process. We ensure that learners get the right outcomes that they want. We have a career portal where learners can apply for jobs and recruiters can post jobs. We are using AI to find the best available jobs for learners. There is a lot of scope for AI/ML to personalise course content."

Gupta asked Dr Mittal how they handle engagements. He said they are also providing advocacy and policy. "The agriculture ministry has 29 incubation centres. Virtual incubation centres are working across the country. A two-month training programmetook place through this platform. There are 59 startups from the National Institute of Agriculture Marketing. Smart agriculture concept is also used countrywide. Many are using IoT."

Commenting on the NEP, Sitaraman said that it outlines digitisation and top priority should be given to technology providers. While Sivasubramanian said that the country should not miss out on the need for change and stressed that security should be a top priority, Dr Mittal said that time has comme for education institutions to talk more about digital infrastructure. "The complete value chain can be integrated via blockchain," he stated.

Tanvar said we need to give infrastructure a strong push. "There should be democratisation of education. We need good infrastructure for devices and connectivity."

According to Thadani, the government should allow flexibility. "The education sector has to lead via thought leadership. We need to redefine the framework of education."

During COVID, don't let your **guard down – against hackers**

How do you safeguard against hacking and ransomware? Takeaways from a Dataquest webinar on Standard-based Defence-in-Depth Security for Critical Manufacturing

Hackers never sleep! And they got the once-in-a-lifetime opportunity in what can be described as a once-in-a-lifetime crisis for humanity. Hackers have pushed videos offering emergency supplies, surgical masks, and medical equipments. Phishing, malware and ransomware have increased during the pandemic. The attacks moved from the network layer to the app layer. Every device had to be protected. The threats have increased manifold. Right infrastructure with appropriate tools and controls are required in the offices and homes. There were well-defined response guidelines.

These and more such security issues and threats in the new digital normal were discussed at the recently hosted Dataquest webinar on Standard-based Defence-in-Depth Security for Critical Manufacturing. The webinar that was supported by Fortinet also saw industry leaders share rich experience across enterprise IT, operational technology and cybersecurity, as well as deliberate on the steps and processes of the Defence in Depth (DID) approach to securing the digital infrastructure.

5G, INDUSTRY 4.0 WILL CHANGE EVERYTHING

We need to build cyber resilience. Going forward, 5G and Industry 4.0 will change everything. There are smart cities, smart factories, smart cars, smart utilities and all-pervasive IoT devices. The Internet of People is like desktops and laptops. Today, we already have more IoT devices than people on earth.

Aasef Iqbal, Senior Specialist, OT Cyber Security Fortinet, emphasised that it is going to be an interconnected world, and there are going to be ripple effects for the attacks. Not just the infrastructure but the complete connected ecosystem is going to be targeted. He also outlined the threat landscape and the Industry standards.

EXPAND AND BEEF UP SECURITY

The advanced threats are continuing to adapt. Even advanced threats continue to rely heavily on social engineering. Garmin has issued a statement on a cyberattack that happened on 23 July 2020 in which some industries were affected and so was the connected infrastructure that Garmin provides. People were not able to utilise the GPS in aviation, automotive, fitness and marine fields. Five days of business was lost. The executable was able to decrypt sample files encrypted on the WastedLocker. The hackers demanded USD 10 million.

Another issue is RaaS or ransomware-as-a-service. You can buy ransomware online. Following the Garmin incident, there was a ransomware attack. A US travel management

> IT'S AN INTERCONNECTED WORLD, AND THERE'RE RIPPLE EFFECTS FOR ATTACKS. NOT JUST INFRASTRUCTURE BUT COMPLETE CONNECTED ECOSYSTEM IS GOING TO BE TARGETED.
>
> — **Aasef Iqbal,** Senior Specialist, OT Cyber Security Fortinet

> THERE ARE SOPHISTICATED DACOITS, AND YOU HAVE TO PROTECT YOURSELF. THIS IS HAPPENING ALL ACROSS THE SOCIAL FABRIC. THEY ARE ABLE TO COME UP WITH CERTAIN EXAMPLES TO HACK.
>
> — **Farhan Khan**, CIO, RadicoKhaitan

firm was hit with a Ragnar Locker ransomware. The company agreed to pay and handed over USD 4.5 million in bitcoin. Hackers also recommended some updates for the company.

If such an attack happens on the IT/OT infrastructure of a company, the destruction will be huge. The loss incurred to the business due to service outage and damage done to the brand reputation. The trend is becoming more common attacks. The hacker ecosystems revolve around opportunity, intent and capability. Hackers have the currency. They have an efficient and anonymous communication channel. They are masters of their business. They also know the victim's weaknesses.

As many as 34% organisations outsource aspects of the ICS/SCADA security, and 58% organisations have had at least one OT security breach in the past 12 months. Only 10% report never having had an OT security breach.

There are best practices in protecting Industry 4.0 environments. There is the next-generation air gap. Each system and sub-system is limited to performing a specific job, applying control. Specific security objectives need to be in place. One should know who is lurking on the system, andcover for vulnerabilities and threat vectors.

Finally, one must assume that the system has been compromised: That's the best approach to take. Also, one must adopt a holistic approach to safety, reliability and security;rely on the industry best practices, policies and standards;have best practices and guidelines.

Fortinet recommends following ISO/IEC 27001: 2013, ISA/IEC 62443 standards series and NIST cyber security framework for governance, risk and compliance. The approach should be holistic, consistent and gradual. For security architecture, follow TOGAF, PERA, SABSA and EISA.

Fortinet offers a standards-based platform approach. Fortinet uses the Fortinet Security Fabric platform that conforms to the industry standards and offers standard-based defence in-depth cyber security. It has a platform approach to cyber security. There is security-driven networking and zero-trust network access.Fortinet also provides dynamic cloud security and AI-driven security operations.

It is advisable not to rely on assumptions. The digital attack surface is perpetually growing with the connected digital infrastructure. It is better to identify the weaknesses in one's digital infrastructure. Apply risk-based approach. Devise a holistic cyber security strategy by following industry standards. Choose a platform approach, rather than point products. Cyber security does not end with security zones and conduits –it is a lifecycle. You are recommended to audit your security implementation using industry standard compliant frameworks to identify gaps in the implementation, and for continuous improvement.

Sunil Rajguru, Executive Editor, PCQ & CIOL said that every device has to be protected. "Threats have increased manifold. Right infrastructure with appropriate tools and controls are required in offices and homes." He also wondered whether this was a passing fad and asked the experts what was the way out of this.

Farhan Khan, CIO of RadicoKhaitan, said there are sophisticated dacoits, and you have to protect yourself. This is happening all across the social fabric. They are able to come up with certain examples to hack. Khan noted that attacks have increased during COVID-19.

Are ransomware attacks not happening in India? Are the Indian IT professionals able to deflect the attacks? Khan said there are attacks happening in India. There was a server that was attacked. "We just cut it off, and that was it."

Indeed, no country or industry will remain to such threats, everyone can be targeted. Sudden move to digitisation will also lead to more attacks. Data needs to be updated and stored at safe places. The attacks have increased in multiple ways.

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SAP to invest ₹500 crore **on multi-cloud offering in India**

German technology firm SAP today announced that it would invest Rs 500 crore in India to localise and offer customers a multi-cloud choice. The company will make its multiple cloud solutions available in India data centres.

"SAP's commitment to supporting India's growth vision remains a top priority and we are determined to achieve this with deeper collaboration with our customers, ecosystem and the government," said Scott Russell, President, SAP Asia Pacific Japan. "Our investment in India is toward accelerating the nation's digital agenda and our customers' transformation in the cloud."

According to the company, customers are looking to move at an accelerated speed to the cloud for greater resiliency. With state-of-the-art technology and deep market expertise, SAP is prepared to respond to local market requirements and help enterprises harness their data faster to become future-ready.

"Today, customers are seeking scalability, faster deployment, data compliancy and cost-effective solutions to enable innovation and achieve prompt business outcomes," said Kulmeet Bawa, SAP Indian Subcontinent President and Managing Director. "SAP intends to advance the vision of Aatmanirbhar Bharat by leveraging an agile and scalable cloud technology that is co-developed in India and now made available in local data centres to help Indian enterprises recalibrate their businesses to run better," he said.

The company has diverse business-to-business cloud portfolios in India and is aggressively working toward addressing local customer demands. "SAP has further fortified its commitment to enterprises with the benefits of integrated cloud technologies to deliver the greatest flexibility and be data compliant under the upcoming Personal Data Protection Bill," the company said in a press release.

Trend Micro announces cloud-native file storage security

Trend Micro has announced the world's first cloud-native, fully serverless file storage security tool for organisations building applications in the cloud. Trend Micro Cloud One – File Storage Security is designed to mitigate threats across the cloud environment and support strict compliance requirements, the company said in a release.

The explosion of cloud-based file and object storage presents a new attack vector for threat actors to target with malicious files. The security tool provides automated anti-malware scanning to keep information safe and ease compliance needs. The tool supports various compliance requirements that call for anti-malware scanning of cloud files while maintaining data sovereignty.

"Global organisations are increasingly looking to public cloud providers to drive IT agility, cost savings and business growth. But while the provider deals with security of the cloud, the customer is responsible for everything inside their cloud environment," said Mark Nunnikhoven, Vice President, Cloud Research, Trend Micro. "This is a highly scalable, automated scanning tool that's fast to deploy with no added infrastructure, allowing organisations to confidently store cloud files and data associated with their cloud applications."

The tool that blocks known bad files and looks for hidden or changing malware variants, itself is a lightweight, cloud-native serverless function that's designed for minimal operational overhead. This architecture enables fast, seamless deployment and flexible integration with organisations' existing custom workflows for added value.

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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	
Chitkara University Institute of Engineering & Technology	Rajpura	
R.M.K. Engineering College	Chennai	
Reva University	Bangalore	
DIT University	Dehradun	
Koneru Lakshmaiah Educatio		
Galgotias University		

Top 10 Zone Wise Institutes

East

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		
Gandhi Institute for Technological Advancement, (G		
Amity School of Engineering & Technology, Amity U		
Kalinga Institute of Industrial Technology		
Techno Academy of Technology		

Top 10 Government Institutes

Government

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	
International Institute of Information Technology, Naya Raipur		
National Institute of Technology, Silchar		
National Institute of Technology Hamirpur		
Thiagarajar College of Engineer		

Top 10 Private Institutes

Private

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 Lakshmaiah Education Foundation	Vaddeswaram	
Galgotias University	Noida	
Maharaja Agrasen Institute of Technology		

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

16th T-SCHOOL SURVEY & RANKING | DIGITAL INDEX | EMPLOYABILITY INDEX

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