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EXPLORE



COVER STORY
FUTURE TRENDS

The A to Z of future tech trends

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Sunil Rajguru

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*Techceleration
still name of
the game*

The future is cloudy

There was a popular joke when the pandemic broke out. A time traveller asks: What year is it? On hearing 2020, he remarks: Ah Year 1 of the pandemic! By that logic 2022 is upon us and it's Year 3 of the pandemic. Who knows how long it will last? Whenever you think it is going, you hear of another spike happening in some country or another or a new strain creating panic.

One thing is clear: Most of the technological changes are becoming permanent. Mindsets have changed. People have embraced remote work, hybrid education, ecommerce, OTT and whatever no touch technologies they can get their hands on. Governments are okaying contact tracing, vaccine passports, driverless cars and whatever online tech that works for them.

Predicting the future is an arduous task and has become more so with a tech acceleration that shows no signs of stopping. All the top tech companies are embracing all the emerging technologies. That's leading to a multiplier effect. Amazon was an ecommerce company. Microsoft was known for its OS and office suites. Alphabet started off just as Google Search. These are now the Top 3 cloud service providers.

Big Auto (run by oil) ruled. But that is falling by the wayside. Tesla is by far the most valuable company in the world at a trillion dollars. In fact, EV player Rivian after the IPO became more valuable than both Ford and General Motors despite the fact that it has sold not even 1000 automobiles while the old giants had crossed 100 million. No-one quite knows what will happen to Big Oil in 10 years. Big Retail may be swallowed up by the online world.

Huge game changers lurk on the horizon, and nobody knows where they'll go. The metaverse: That will change our entire social network, the way we interact and the way we do business. It's not just about online money and digital currencies. Cryptocurrency: That has the potential to supplant the entire global financial order. The cloud is already the size of Planet Earth and larger. Quantum computing: The possibilities are endless. Nanotechnology: It hasn't even got going yet.

A super Artificial Intelligence that runs the world and maybe even merges with the human race? (The Singularity!) Robots which look and act like humans, just like the world of Isaac Asimov. Do we need the laws of robotics already? Will blockchain take power out of the hands of governments and put it in the hands of citizens or does it promise too much? Will drones of all sizes fill the sky? Will 3D printing take over the factories of the world?

The future is coming to us faster than before and yet we can't see it any more clearly.

Sunil Rajguru



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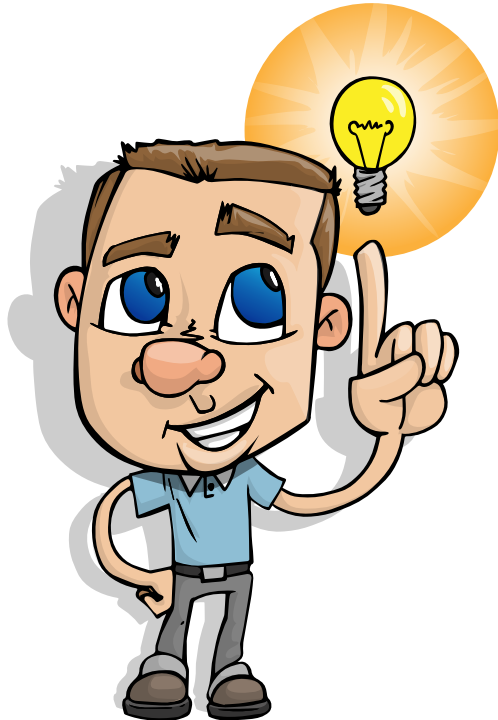
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What laptop is the best around 90K, I need a 4 GB dedicated graphics card, 1 TB storage and 8 GB RAM?

■ **Abhishek Agnihotri**



You have not mentioned whether a gaming machine or a business book. Within the budget you have mentioned, you can get Acer Nitro 5 AN515-57 Gaming Laptop. It is powered by Intel Core i7-11800H, dedicated NVIDIA GeForce RTX 3050 Ti with 4 GB GDDR6 memory, 16 GB RAM, and 256GB SSD+1TB HDD. The gaming machine has 15.6-inch FHD 144Hz IPS display and RGB Backlit Keyboard. The laptop is available at INR 90k on Amazon.

For a gaming machine your budget is fine, but if you are looking for a business book then within this budget you can hardly get any business book with a dedicated 4 GB GPU. Under your budget, the best business book that I can recommend is – Dell Inspiron 7400. The thin and light laptop is powered with IntelCore i5 11th Gen processor, 16 GB RAM, 512 GB SSD and dedicated 2 GB Graphics. the laptop costs INR 89k on Flipkart.

I am a student, should I buy a MacBook Air M1 now or should I look into another laptop for the best budget and performance?

■ **Sanand Thapar**



It all depends on your specific requirements.

#PCQuestTroubleShoot

Ashok Pandey

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I recommend that a student should always go with a Windows laptop, because of the wider number of programs available. Not only that, there are more configurations available on Windows, so you can choose the one that fits your needs. Another important factor is the price. In your budget, you'll find multiple Windows-based laptop options to choose from, whereas the choice will be limited to Macbooks.

If you are a CS or Architect student then I would suggest going with a workstation class laptop. They come with Professional-grade components like Nvidia Quadro Series of cards and Intel vPro certified processors. You can also configure your own laptop on the manufacturer website according to your needs.

I am looking for a laptop for gaming, coding, and animation, but my budget is only 30k INR, what is the best laptop?

■ **Vedika Rose**



That's a very low budget and at that price, I'm afraid you'll only find a basic device that can handle simple day to day productivity work. If you want to do both gaming and coding, then you need to increase your budget. A decent gaming and coding machine should have an Intel Core i5 or higher CPU, 8 GB or higher RAM, 500 or higher GB SSD and a dedicated 2 GB or higher GPU.

Keeping your budget in mind, I can suggest increasing your budget and can check out HP 15s-du2060TX. The laptop is equipped with Intel Core i3 10th Gen, 4 GB RAM, 1 TB HDD and 2 GB Graphics. This laptop can handle some of the games as well as can code.

My laptop isn't running games like Apex smoothly and freezes when I do multitask...

■ *Inayat*



The minimum specs required for games like Apex are an Intel Core i3 processor, 6 GB RAM and 1 GB or higher GPU. As you can play this game but not smoothly, I presume that your PC meets the minimum requirements. However, it doesn't have the capacity to handle other applications simultaneously. So, when you do multitasking, the compute requirements increase. For running such editing software, you should have at least 8 GB RAM and a dedicated GPU with 4 GB memory. Plus, you should have at least a Core i5 CPU. So, it would be better to upgrade your PC.

How powerful is Acer Nitro 5 with a Ryzen 5600H CPU, Nvidia GeForce RTX 3060 GPU?

■ *Shakib Saifi*



Acer Nitro 5 is a powerful laptop, just ensure to have Ryzen and RTX 3060 along with 16 GB RAM, 256 GB SSD. This combination would be capable of handling most games, including AAA titles.

I have an M1 Mac Mini, can I hook up the mini to any monitor or do I need any specific one?

■ *Talat Chauhan*



You can connect any good monitor to your Mac using the Thunderbolt 3 (USB-C) port. In fact, both the Thunderbolt port and HDMI 2.0 port support video output. Mac Mini with M1 chip supports an external display up to 6K using a Thunderbolt 3 (USB-C) port, and up to 4K using the HDMI 2.0 port.

You can buy any good monitor like Asus, Acer, HP, Lenovo, etc. that offers optimal viewing with a 3-sided micro-edge bezel for seamless multi-display tiling, and 4-way adjustable comfort. The screen with Quad HD 2560 x 1440 resolution would be a better choice.

Curved monitors are quite popular nowadays and offer a better viewing experience, you can also

check out the curved monitor with a resolution of WQHD (3440 x 1440 @ 60 Hz).

What games can run on my laptop having an Intel i5 8th Gen MX130 GPU with 8GB RAM?

■ *Sanjeev Singh*



You have an old device with an entry-level GPU that has only 640 shaders. It will allow you to play only entry-level games. The MX130 can be used with just HD (768p) resolution and Low/Medium graphics settings to play games including GTA V, Far Cry Primal, Rise of the Tomb Raider, etc.

What should I buy - an iPad or an Intel laptop?

■ *Ayan Mondal*



You can't really compare a tablet with a laptop. Both cater to different needs. While tablets are largely content consumption devices, laptops are meant for content creation. Sure you can do some amount of content creation on a tablet as well, but it doesn't quite compare to the capabilities of a laptop.

I would suggest getting a laptop, if you prefer to have a touch screen then can check out a laptop-like HP ENVY x360 Convert 13-bd0521TU powered by an Intel 11th Gen Intel Core i7 processor. It comes with 16 GB RAM, 512 GB SSD and Intel Iris Xe Graphics. Plus, it has a 13.3-inch multitouch screen and various connectivity options.

Should I take an i5 8th gen in 2021?

■ *Aditya*



The 8th Gen CPU isn't bad, but without understanding your usage, I can't really recommend going for an old gen processor. Most updated versions of software applications may not support the old CPU and you can face performance issues. However, if you are looking for a laptop for home use, just for doing some video calls, Internet surfing, Office, etc. then you can choose an older CPU to save on cost.

The A to Z of future tech trends

Sunil Rajguru

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If the smartphone was the single biggest game changer in the 2010s, it's going to be techceleration (technological acceleration) as a result of Covid from hereon. The pandemic era boosted certain technologies and laid others to the wayside. Looking at the A to Z of technologies going forward...

A for AI-ML-DL + Analytics: We have mastered Weak/Shallow AI. The Turing Test is probably irrelevant as certain bots have indeed started fooling humans and confusing them. In one experiment, bots beat boys in getting dates from girls via the screen interface.

In the 2013 movie *Her*, the protagonist is comfortable spending his life with his AI virtual assistant (voiced by Scarlett Johansson). Celebrities like Morgan Freeman, Samuel L Jackson and Amitabh Bachchan are lending their voices to the smart assistant in real life, much like Johansson in reel life. Virtual assistants are getting more control, becoming command centres of homes and offices. One day you too could find them like a reliable companion and confidante.

We are fine tuning General AI, dreaming of Super AI and theorizing the Singularity, where humans could merge with AI. Yuval Noah Harari's *Homo Deus: A Brief History of Tomorrow* explores a similar concept. Elon Musk's Neuralink is making this practical. Musk is also associated with OpenAI while Alphabet has DeepMind.

The whole bouquet along with AI transforming the world is: Machine Learning (ML) + Deep Learning (DL) + Natural Language

Processing (NLP). Thanks to billions of smartphones, tens of billions of IoT devices, trillions of sensors, digitization, digitalization/digital transformation and the acceleration of everything on the cloud, this humongous data explosion will be able to be crunched and analyzed chiefly through AI.

B for Blockchain: In a world where everyone is losing faith in the media and governments, blockchain is a technology that can bring in empowerment and transparency. In theory blockchain has shown to have great scope in things like digital IDs, digital voting and healthcare. It can transform distributed ledgers in banking and post-Covid, streamline supply chain logistics and management.

IoT networks, the gaming industry and weapons tracking are some of the other areas where the used cases are coming up. This is the least understood technology among the common populace and that's why you are seeing the rise of startups related to Blockchain-as-a-Service (Baas).

C for Crypto: While cryptocurrency is a subset of blockchain, it has branched out and become a standalone idea as people are losing faith in the entire financial system.



While Bitcoin gets the most media coverage, there are many other cryptocurrencies led by Ethereum which are gaining ground.

For those who think it is a passing fad, when 2009 was ushered in, the total value of cryptocurrency was Zero (since it hadn't been fully created yet). In 2021, the combined value touched \$3 trillion, getting into the league of India's annual GDP. Billionaires, techies, corporations, the common populace... Everyone is jumping on to the bandwagon.

More importantly, this is pushing many governments to go in for a digital currency. The Chinese government came out with the Digital Yuan e-CNY. Chinese ecommerce giant JD.com accepted that for its Singles' Day, which is described as the biggest shopping event in the world. India may have a digital currency of its own as may the UK and people are already calling it Britcoin.

D for Data Centers-Cloud: C for Covid. C for cloud acceleration. No crisis has pushed all businesses and homes towards the cloud like this one. For the first time people are talking of complete digitization and digital transformation and it may happen sooner than you think.

Trillions of GBs of data is zig zagging furiously all across the world through billions

of devices via millions of data centers each and every day. It's not just data but services and all manner of office work and home entertainment. Very soon we are going to live fully in the cloud world. The technology, tools and will is finally here for humankind.

E for ERP-CRM: Enterprise Resource Planning and Customer Relationship Management are going great even though you may not hear much about them. SAP. Oracle. Salesforce. They are all expanding and both these markets individually are in the region of tens of billions of dollars.

F for FinTech: Financial technology is an umbrella term for all the technologies emerging in the financial services sector also including cryptocurrencies and InsurTech (insurance technology). The role of the smartphone is increasing rapidly in the world of FinTech. Commission free trading Robinhood has been in the news for all the right and wrong reasons in the Covid era.

India's most famous FinTech company is Paytm. It shot to fame during the demonetization crisis and after that flourished during the pandemic era too. So did the government's UPI or Unified Payments Interface and the likes of BharatPe and PhonePe.





Fintech, crypto and ecommerce all go hand in hand and the entire monetary system is slowly moving online. This is for sheer convenience and the resilience of these systems in the face of natural disasters and pandemics. Amazon Prime-BigBasket along with Swiggy-Zomato have become indispensable and will only get more important as the years pass by.

G for (5)G: Every generation of telephony promises more but none more than 5G. The speeds, reliability and intensity will be unparalleled. They will power entire smart cities with all their components like smart homes, smart utilities and smart traffic networks. Smart factories or Industry 4.0 is heavily dependent on 5G.

H for HealthTech: The Indian healthcare system was in shambles but now some form of upgrade has taken place and we can actually aspire for Universal HealthTechCare. HealthTech is one field that can embrace AI-ML, robotics, IoTs, smartphone apps, VR etc.

I for IoT: Internet of Things devices and sensors are mushrooming like crazy and they are present in every industry and every field. They sit quietly and send valuable data 24X7 to the cloud for it to be analyzed in real time.

J for Jobs of the future: They were talking about it but the change has already come. They gave permission to robotaxis (driverless taxis) and autonomous delivery vehicles. AI is supplanting many jobs which humans can do and the role of the data scientist will get more intense as we move forward.

K for K-12 and beyond: Online education has changed the way we operate and will be great to reduce costs, cater to a wide range of students and

to those in remote areas. However children require socializing, sports, making friends, extra-curricular activities, team building and getting a taste of the real world in a controlled setting. It's about having fun.

That's why hybrid education is the way forward since it has so many benefits. The student will need the flexibility to work from either home or school or maybe like WFA (Work From Anywhere) you will have EFA (Education From Anywhere). VR glasses and the concept of a metaverse could take it to a totally new level.

L for Low code-No code: These let non-programmers create application software through the GUI (graphical user interface), hence democratizing coding thereby enhancing the pool of individuals that can do that. Of course it helps programmers too.

M for Metaverse: While a lot of people ridiculed Facebook for going Meta, Morgan Stanley called the metaverse the "next big investment theme", declaring: It can fundamentally change the medium through which we socialize with others. NVidia started talking about something it described as the "HTML of 3D" or Universal Scene Description or USD to power the metaverse.

Disney, which championed the multiverse in its Marvel Cinematic Universe franchise,

is also planning to come out with its own metaverse. UniversalTencent CEO Tony Ma weighed in: Anything that makes the virtual world more real and the real world more rich with virtual experiences can become part of the metaverse.

In other words the concept of Meta is going to be a big success and it will change society and business in ways that we cannot even imagine.

N for Nanotech: Nanotechnology was a slow moving field which showed great promise, but during the Covid era, it was initially used to make PPE kits. Nanomedicine involves targeted drug delivery and is being experimented in cancer-AIDS research and even something like tissue engineering. Nanoparticles are used in imaging and sensing. In general, nanodevices, nanoelectronics, carbon nanotubes are some futuristic applications.

O for OTT: Maybe it's time to call it something else. Initially it referred to devices that went "over the top" of cable TV boxes to give content. But now "Streaming" has supplanted cable TV and even the theatre

to emerge the undisputed emperor.

While Netflix, Amazon Prime and Disney + (they tied up with Hotstar in India) are the Top 3, it is quite encouraging that so many regional players are doing well. Going forward we will have a hybrid entertainment system where the virtual will clearly dominate.

P for Power: Power generation is getting more and more smart. The production, distribution and regulation of all kinds of energy is being handled by the computer. While this is increasing efficiency, the system is also more open to hacking and ransomware attacks.

Q for Quantum computing: This form of computing promises to break Moores' Law forever and nobody really knows how far it will go. First Google and then the Chinese achieved quantum supremacy. Now IBM has crossed the 100 qubit mark thanks to its new processor and is eyeing 1000 qubits.

R for Robotics: There has been a prejudice against robots but that seems to be vanishing thanks to the conditions that came





from the pandemic and the need for no touch solutions. They are being used in hospitals, retail and factories.

S for Security: Cybersecurity will become even bigger as we are entering into an era of 100% digitalization or digital transformation and digitization. If all the work is being done digitally via some device or the other, then there are unlimited entry points for hackers to target and cybersecurity has to become all-pervasive.

T for Three D Printing: 3D printing promised to take any material and print everything that was made by the human race. Now it's finally delivering on the goods. There's "plant-based meat" that is coming out of a 3D solution. A Dior concept store was printed in 5 days flat. From metal 3D printing, to those with pellets, it's all happening.

U for Unmanned Vehicles: Driverless vehicles for transportation, taxiing and deliveries. Everyone is doing research into them. They could replace all the drivers of the world who may have to seek new ways of employment. Then there are drones that can do almost anything from delivery to surveillance in any remote corner of the globe.

V for Virtual events: The events industry was hit hard by the pandemic. But soon virtual events took over. From simple ones like webinars to extravagant ones that lasted all day. Virtual concerts have also taken off as we are entering a hybrid world of events and entertainment.

W for WFA: First you worked from the office. Then there was the Work From Home (WFH) option, but now you need flexibility to Work From Anywhere even

as the global mobile workforce is in the region of 2 billion. We finally have the broadband, collaboration tools, acceptance and will to do so.

X for XR: In the beginning we had Virtual Reality (VR). Then Augmented Reality (AR) where the real world is enhanced by VR. Finally we had Mixed Reality (MR), the merger of the real and virtual worlds. To avoid confusion people are calling all this XR or extended reality.

Y for (Gen) Y: Millennials (Generation Y) have dominated the scene, but now Gen Z is taking over and the new technological changes will be done around them. They may become the inheritors of the metaverse.

Z for Zero-energy building: Climate change. Global warming. Low energy footprint. While one option is to replace fossil fuels with renewables, another option could be to come out with buildings that have an extremely low energy consumption and that's where technology is stepping in. ■

Wish List for Tech India 2030

Sunil Rajguru

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The West dominated till the 2000s. 2010s was the China decade. There is no reason why the 2020s cannot belong to India. If we get everything right, we could be a tech superpower by 2030. A tech wish list for that to happen...

Smart Agro Grid



The entire soil landscape of India has been mapped at both the macro and micro levels and so we have a great deal of data about the soil fertility, density and moisture. This helps the farmer to know the quality of all the soil all the time and he can plant which crops he wants and how many accordingly. Every tractor, pump and storage unit in India has an IoT device. This helps monitor them 24X7, check their efficiency and know whether they have broken down.

Irrigation systems rely on IoTs and sensors which open the pipes only when required, saving water and boosting plant growth. All cattle wear IoT collars to track health, location and total herd movement. Agricultural drones patrol the fields to look for anomalies and do routine tasks. Drones-as-a-Service (DaaS) caters to a wide variety of farmers and agro companies.

The government has digitized the entire agricultural system with all the information related to storms, weather, long-term climate, long-term crop trends, daily mandi

prices, vegetable-fruit networks, agro companies requirements... and integrated it into a convenient government portal which is available via all the apps, in every regional language, for the farmer in every remote corner of India via his smartphone. Or maybe he has an agro smartwatch to do the trick. The farmer can monitor both his farm and regional-national info from his wrist.

Universal HealthTech

For any patient, the first stage will be IoT wearables and home testing kits. The patient may choose to put automatic alerts to the hospital on in case of chronic cases. The second stage will be telemedicine which will rule out non-urgent cases. Only if both fail, will a visit to the hospital be required. Here too there will be an automatic reception and when the doctor finally sees or treats the patient, he will have all the details at his fingertips thanks to all the above data.

Government hospitals have finally been upgraded. Here too an IoT network across all beds and equipment ensures that the



administrators can keep track of all activities and so can a centralized command room. This will reduce corruption and inefficiency and also free up hospital staff to do more critical work. Everything is seamless thanks to a completely digitized EMR (Electronic Medical Record) process.

There are robotic receptionists and assistants in medical establishments. Robotic vehicles transport goods and medicine around hospitals. There is automatic UV sterilization. AR-VR-MR headsets are helping medical professionals train and patients recover from trauma. AI is helping the creation of drugs and vaccines, drug delivery and identifying problem areas. A national grid keeps track of the rise and fall of diseases at a macro level automatically triggering pandemic alerts.

Hybrid Education Network

Children need offline education to interact, socialize, play, team build, compete both on and off the field, do extra curricular activities etc. So that should not go away. But India is an overpopulated country, so one teacher can teach hundreds of students effectively. India is still a poor country in many areas despite all the development and so virtual education can be a solution. India is a large country with remote areas. Remote education will be the key. Also we need a syllabus that can be easily updated and be translated into multiple regional languages and here too the best solution is digital.

Virtual Governance Platform: All the records have been digitized and you no longer have to visit any government office. All the services and solutions are online. Projects can be viewed via XR headsets and citizens can even give their suggestions virtually.



Blockchain has been implemented in many government operations to ensure transparency.

Integrated Drone Corridor

The way we have an air corridor, the drone corridor is ready and is full of aerial vehicles of all sizes. The smaller ones are delivering essentials like medicines, the medium ones have replaced Swiggy/Zomato or whatever service is there at that time for regular deliveries. We also have the larger drone taxis or drone ambulances.

That's in the sky. Down below we have a Connected Vehicle Hyperway. By this time all vehicles will be autonomous, connected to 5G-6G-7G, and be part of a national smart traffic grid. This is an efficient system with much less accidents. ■



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What the future of smartphones will be like in 2030

Ashok Pandey
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Over the years, one device has become a perfect alternative to various devices – camera, calendar, notes, gaming console and more. Smartphone features that even a decade back seemed like straight out of a science fiction book, have now become a reality. But what will smartphones look like, say, 10 years from now?

The first smartphone was introduced in the year 2007, with a single camera and a couple of smart features. In just a few years, most of the consumers were holding a smartphone in their hand all day; and today we can't imagine living without it.

In just a couple of years, it replaced digital cameras, and with certain limits, it also became a pocket laptop, gaming device and more. It all started with a small touch screen and now we have smartphones with foldable displays. The incremental upgrades made it fascinating to know what's coming next.

▼ Future displays: Foldable, Flexible, and Holographic too?

In 2019, foldable displays entered the market. Manufacturers like Samsung and Motorola announced their devices with foldable screens. Later on, both companies announced their next versions with improved functionalities. At the moment, foldable phones were largely considered interesting gimmicks, but unfortunately, they were not

able to attract masses because they were expensive and also because the software wasn't advanced enough. In the future, hopefully, foldable phones become more affordable and vital for certain functions, so that people jump on board.

The foldable displays are expected to reach the next level. We have seen foldable phones, but in the near future, we can see multi-folding phones. Oppo has filed patents for a triple-fold phone. The triple folding slide phone is sized around a credit card when folded, measuring 54mm x 84mm and features three hinges that bend over in the same direction.

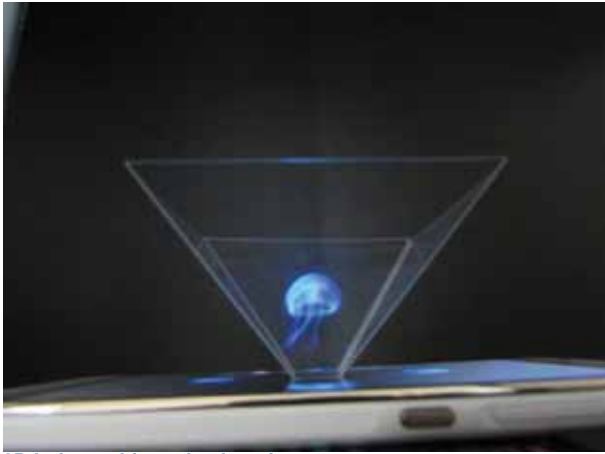
With the first slide the phone will reveal 40mm of the screen that's just enough to view the time, call history, notifications, or a music player interface. The next slide will open up 80mm of the screen as well as the camera. In its completely unfolded state, the phone's display will measure 7-inches.

TCL is also working on a tri-fold foldable concept phone. It principally is a 6.65-inch phone that unfolds into a full-size, 10-inch full-fledged 'tablet'. This transition takes 3x



Source: Yankodesign.com

Oppo's credit card-sized triple folding concept phone



3D holographic projection phone

unfolding. It employs the brand's DragonHinge hinge.

Concept phones are a great way of getting a glimpse at how phones of the future may look like. But can we expect Holographic displays?

We have seen the holographic screen in fantasy films but no real product surfaced till date. As far back as March 2014, rumours were flying around about the then-unreleased iPhone 6 containing holographic functions that allowed you to beam virtual displays to interact with. But forget about iPhone 6, now we have iPhone 13 and yet no holographic holographic functionality.

Holographic phones could become reality one day, especially if the HoloFlex prototype showcased by researchers from Queen's University in Canada is anything to go by. This screen is a combination of both holographic and flexible, enabling users to bend the handset to view the 3D display from different angles and interact with the images on the screen.

However, the HoloFlex is still in development and won't be available any time soon.

The phone manufacturers have talked a lot about creating robust mobile devices that can be folded.



Nokia showcased a concept phone back in 2008 – Nokia Morph. Designed by Tapani Tyhanen, who was director and head of Nokia's Research Center Laboratory in Cambridge, The Morph could be folded, bent and reshaped to suit the user's needs.

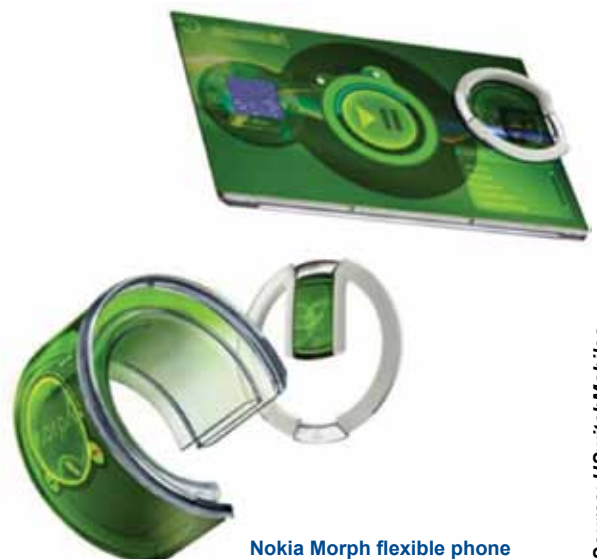
The concept phone could be wrapped around your wrist, transformed into a GPS-enabled belt clip for hiking and extreme sports, or used as a flat-screen for watching videos.

But before these concepts really take off, a couple of things need to be figured out,



HoloFlex Phone

starting with the pricing issue. We all know that folding phones are expensive and out of reach for many people. Secondly, durability is a major concern, foldable or flex devices require more flexible screens, along with hinges and moving parts. Having multiple hinges can raise difficulties to seal the phone



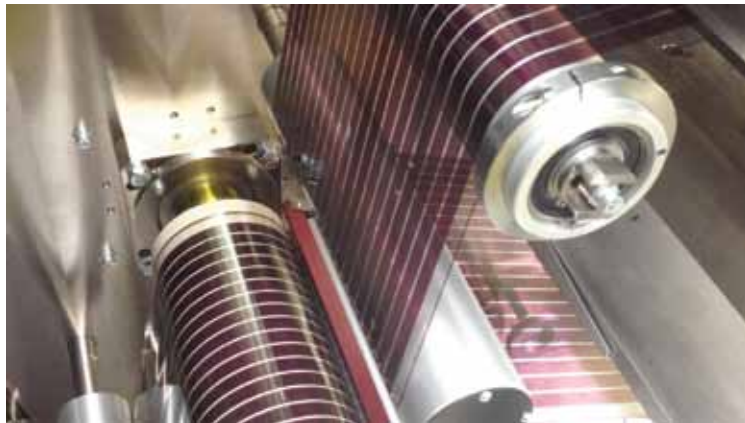
Nokia Morph flexible phone

against dust and water. Samsung has done a really good job with its fold devices, but many more solutions will be needed for screens that roll and flex.

▼ Clean energy shift: Solar-powered phones?

Yet a dream to come true, though companies are trying to make their device more environment-friendly. Kyocera showcased a solar-powered phone prototype at the Mobile World Congress trade show in 2016 but somehow that wasn't able to replace the need of a charger.

However, with the latest tech development in solar panels, this could become reality soon.



Printable Solar Panels

"Solar Ink", a team of Australian scientists from CSIRO (Commonwealth Scientific and Industrial Research Organisation) have been working in collaboration with the Universities of Monash and Melbourne to develop printable solar panels.

When we call it printable, you can understand how flexible it could be, enabling manufacturers to wrap at the back panel to charge the device when in sunlight. However, these printable solar panels are 10 times less efficient than most solar panels which are currently available on the market, yet can be a good alternative to a power source. Nevertheless, before this technology goes to market, the team is already working to enhance the efficiency of the technology.

▼ Front camera: Hide it! Multiple cameras at the back: Yes!

We all see a punch hole in the display



Source: Oppo

OPPO's Under-Screen Camera Technology

or notch for the front camera at present. Shortly, phones will have none of the above – manufacturers are trying to hide the camera under the display.

Oppo has already shown off this technology and other companies are likely working on it too. This will help to hide the camera beneath the screen, saving the screen space. Not only hidden, but the future phone can also hold a multi-camera setup at the front as well, for more accurate background blur.

The quad-camera setup is already here, but the future might hold an even higher number of sensors at the back. There are so many different kinds of lenses already that we will soon reach a point where adding more lenses will add nothing new. However, the megapixel count war is still on, the highest resolution in a smartphone today is 108 MP, but it looks like a number of phones in the

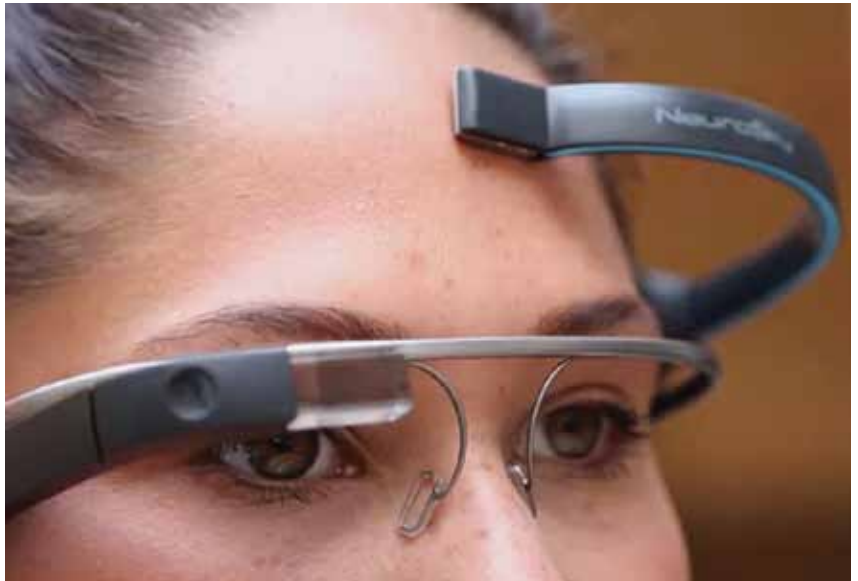


Source: ResearchSnipers

Light multi-camera design

future are gearing up to match or even exceed that.

According to science, a human eye can see 576 MP, but that doesn't mean you need a phone having the same 576 MP camera. It would be a surprise if manufacturers decided to even reach 576 MP. But be ready to get higher MP counts even with the entire multiple-camera setup too. Nowadays only the primary camera is holding the higher MP counts, but we can expect higher MP counts in the secondary cameras as well.



Source: BBC

Google Glass paired with an EEG headset

▼ No ports please!

You have seen phones without the 3.5mm headphone jack already. Hece, there would be no surprise if phones someday drop the charging ports altogether. Be prepared to see a phone without any port for connectivity or charging. As most of the users are now preferring wireless headphones and TWS, after a few years there will be no surprise if no one is using wired headphones at all.

For other connectivity requirements like data transfer, we use cable and plug to phone and computer. We've already seen a few prototype phones without any ports sharing all the data and file over Wi-Fi, mobile data, or

NFC options to a computer.

Similarly, we have seen wireless charging technology with smartphones. It's likely as wireless chargers get more popular and, more importantly, faster at charging the device, people will rely less on physical wires, making a port more and more redundant. So, in future, a phone without any port can become a reality and you can perform all the tasks without any wire.

▼ Can I control my phone with my mind?

Mobile phones have evolved a lot in the past decade, from the keypad to touch screen and now with services like Apple Siri, Google Assistant, and Samsung Bixby, we can just use our voice to interact with our devices.

In the future, we might just be able to control our phones with our minds. Maybe the evolution in mind control technology will someday allow users to perform every task with their voice or mind. Imagine how exciting it will be to open the app of your choice on your phone, play games, watch videos, and even edit images with your mind. ■



Source: Samsung

Wireless Charging



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EPYC™ MEANS BUSINESS

Amazon Web Services counts
on EPYC™ server processors.



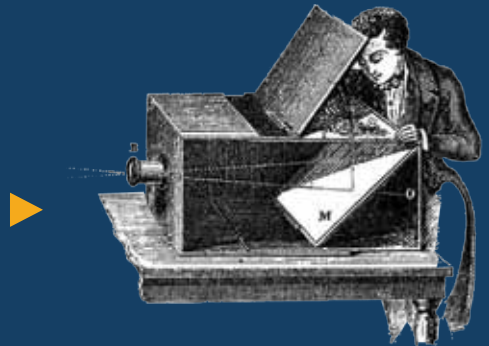
Evolution of the Camera

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Cameras' evolution started even before the introduction of photography. The first camera was Obscura (Camera Obscura: 500 BCE - 1600 CE), which was not capable of capturing the image but to project on a surface through a small hole and form an inverted image. An artist then traces the image on that surface.

The technology evolved through many generations—daguerreotypes, calotypes, dry plates, film – to the modern-day with digital cameras and camera phones.



DID YOU KNOW ?



During the 1848 workers' revolt in France, the Crimean War of 1853 - 1856, and the US Civil War of 1861-1865, written journalistic descriptions and hand-drawn or painted illustrations were replaced by photographic images.

1888



In 1888, the first camera was invented by George Eastman called Kodak camera. A simple box camera loaded with a 100-exposure roll.

1986



Reinvented in 1986 by Fuji called disposable cameras or single-use cameras. Fuji Utsurun-Desu or QuickSnap line used 35 mm film. While Eastman Kodak's 1987 Fling was based on 110 films.



Nikon introduced an operational prototype of the first SLR-type digital camera (Still Video Camera), manufactured by Panasonic – Nikon SVC.

1991



The first true digital camera was created in 1986 by Kodak and in 1991 the first professional digital camera system (DCS) was introduced by Kodak which was widely used by photojournalists.



For the first time, a manufacturer designed a DSLR body from scratch and introduced the Nikon D1 that completely changed the game by dropping the price by more than half.

1995

The first digital camera to have a dedicated movie mode - Ricoh RDC-1.



1998



▶ The first Polaroid camera called the Model 95, and its associated film went on sale in 1948 at a department store in Boston.

Fujifilm reinvented the instant camera - Instax Mini 10 and Instax Mini film in the year 1998. The Instax Square film and accompanying camera were released in 2017.



2000



▶ Fujifilm FinePix S1 Pro was the first interchangeable-lens DSLR to hit the market.



2004

Epson released the first-ever commercially available mirrorless camera R-D1.



2005



GoPro Hero 35mm camera could pivot “on the fly” and be functional to a depth in water of about 15 feet (5 m). It was described as a “reusable wrist camera” and included a roll of 24 exposure Kodak 400 film.



Canon launched their EOS 5D, the first full-frame, consumer-priced DSLR.

2007

The Red One was the first production camera, capable of capturing up to 120 frames per second at 2K resolution and 60 frames per second at 4K resolution.



2008



Polaroid announces it is discontinuing the production of all instant film products.

Panasonic took the mirror and prism assembly out of a DSLR and replaced them with an electronic viewfinder. Panasonic Lumix G1 became the world's first Compact System Camera.

2009

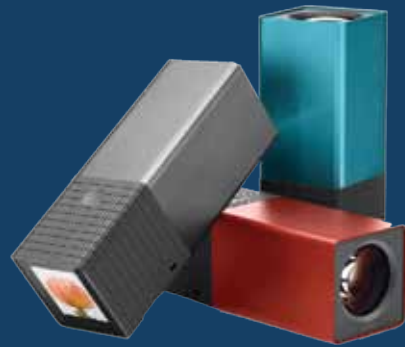
Kodak announces the discontinuance of Kodachrome film.

FujiFilm launches the world's first digital 3D camera with 3D printing capabilities.



2011

Lytro releases the first pocket-sized consumer light-field camera, capable of refocusing images after they are taken.



2013



The CALYPSO-PHOTO camera was the first underwater still camera crafted by Jean de Wouters and was released in Australia in 1963.

In 2013 Nikon launches world's first waterproof and shockproof interchangeable lens camera.

2018

Kodak resumes the production of Ektachrome film.

High-end DSLRs offer superb image quality and video recording at 4K resolution in a compact body.



2021



Hasselblad H6D-400C Multi-Shot is capable of producing 400MP images.

Evolution of the Camera Phone



Will Virtual Hiring platforms be able to tame the hiring bias?

Soma Tah

✉ somat@cybermedia.co.in



Algorithmic hiring processes, automated resume screening, and auto-generated assessments took the pain out of hiring, but can historical and institutional bias still sneak in? How do virtual hiring solutions providers tackle the hiring bias concerns?

COVID could have been the biggest destroyer of jobs in human history, the way it shut the world down. UN labour experts fear that more than 200 million people worldwide might lose their jobs next year due to the economic crisis caused by the pandemic. However, Tech is one of those few sectors that took off during the pandemic, and even the pandemic could not dampen the hiring spree in Tech. By adding 138,000 people alone in FY2021, the Indian IT-BPM industry continues to be one of the top hirers of skilled talent. The hiring prospects look robust for FY22 too, with the top 5 Indian IT companies planning to add over 96,000 employees, reveals NASSCOM data.

So how did the sector continue to hire talents even at a time when face-to-face meetings became a risky business? The way COVID forced organizations and people to switch to virtual working environments overnight, the shift to Virtual Recruitment was just a natural corollary. A survey conducted by recruitment assessment solutions provider, MeritTrac says that 86 per cent of the organizations moved their hiring and assessment online during the pandemic.

▼ Virtual Hiring and Online Assessments are here to stay

Now, after investing heavily on remote hiring solutions and also spending so much time perfecting the virtual hiring processes, they just might stick to the model in the future also, even when things get back to normal.

Vishwastam Shukla, CTO of the leading developer assessment and tech interview solutions provider HackerEarth corroborated the same. "Even if some companies might like to do the interview rounds in person, other steps in the hiring process like take-home assessments have seen a significant uptick. In Q2 of 2021, we saw a 200 per cent YoY increase in remote assessments conducted via HackerEarth Assessments, and a 74 per cent YoY increase in

remote interviews conducted on our platform FaceCode, our platform for virtual interviews."

Even though face to face interviews are picking up for roles that require working out of the office, the Indian Tech sector continues to rely heavily on virtual hiring. So much so that these virtual hiring and assessment tools which were earlier used by organizations to eliminate candidates before proceeding to in-person interview rounds, are now getting widely embraced by the organizations to select the candidates and not eliminate them.

"In the last 12-15 months, assessment companies have continuously augmented their capabilities to provide an online hiring experience that is as close as possible to an offline experience with the same level of integrity. Remote proctoring and assessment are also evolving continuously, as systems and platforms keep on getting better. This, in turn, is strengthening the end-user confidence in virtual methods, and we've been seeing increased adoption of blended and digital modes of assessment," said Sujatha Kumaraswamy, CEO, MeritTrac.

"In the past, employers were sceptical about the sanctity of the process as the probability of impersonation was high. Even large IT services organizations would ask candidates from a different city to travel all the way to their office for an interview. But today, with the evolution of AI tools and technologies, employers are finding it easier



to screen, assess and interview candidates remotely,” explained S. Pasupathi, COO, HirePro. The company offers an AI-powered platform to deliver fraud-proof assessments, video interviews, and the onboarding of candidates.

▼ Technology augmenting hiring and assessment experiences

Recruitment processes are complex and involve multiple rounds of sourcing, screening, interviewing, and selection which are undoubtedly a costly and time-consuming process. Recruiters and hiring managers working in silos often fail to discern what the job demands and thus lead to a bad hire. Hiring managers also don’t always leave timely feedback to recruiters, causing unnecessary delays in the process. Organizations, therefore, are keen to replace their manual hiring methods with efficient and error-free alternatives. Virtual recruitment and assessment platforms have made their jobs easy by helping them screen twice as many candidates in less than half the time.

“The benefits of all online assessments boil down to three key aspects- time, cost, insights-backed assessment reports. Purely from a delivery standpoint, the shift from in-person hiring to online platforms results in significant time as well as cost savings for every hiring drive. As systems and platforms get better, real-time live candidate status, as



VISHWASTAM SHUKLA, CTO,
HackerEarth



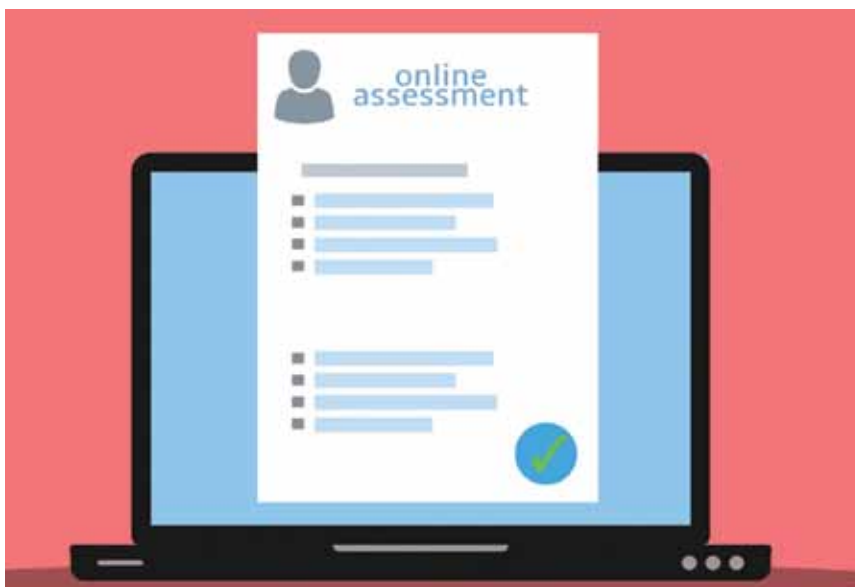
Today, someone who’s never been to a college can learn to code online and build better apps than someone with a four-year degree from the best institution in town. Hiring for skills, and not resumes, is the way forward and technology platforms help you do that by infusing objectivity into the process.

well as post-assessment reports, will provide significant insights along with the assessment scores and results. This optimization of the entire end-to-end value chain will also ensure shorter cycle times from applications to the result publishing stage,” said Sujatha Kumaraswamy, CEO, MeritTrac.

Technology can make hiring simpler, faster, and efficient. AI, automation, and analytics can help reduce time-to-hire drastically by doing away with laborious methods of selection. Virtual hiring solution providers use AI or RPA to automate resume screening, to auto-generate assessments according to the job descriptions/roles provided by the recruiters, for automated webcam-based proctoring. Employers can even leverage AI

to automate evaluation, and for evaluating candidates for specialized skills such as coding, project development, UI development, and emerging domains such as analytics and big data. HackerEarth, for example, uses intelligent algorithms to assess plagiarism and a candidate’s code quality. It also uses AI to auto-generate interview summaries by analyzing transcripts and other interviewer inputs during the interview.

In fact, instead of relying on the score alone, recruiters can use analytics to take a



deeper look into the candidate's ability, said S. Pasupathi of HirePro. "Analytics gives deep insights about candidate performance which includes the time spent on difficult and easy questions or the steps in solving a coding assessment. If they are writing code, then it tells the number of times they had to compile before they got it right," explained he.

"AI and analytics will have a big role to play in assessments wherein trust scores for every individual can be computed based on their body language and other factors while taking an assessment. This will not only ensure the integrity of assessments but also make it convenient for recruiting organizations," pointed out Kumaraswamy of MeritTrac.

▼ Technology helping eliminate Human Bias in hiring

The biggest draw of using technology in hiring is the objectivity that it provides, pointed out Vishwastam Shukla of HackerEarth. Virtual hiring platforms and advanced analytics tools also promise a more transparent selection process leaving little room for human bias. A very common hiring bias, for example, is the 'similarity bias'. We get along with people who tend to look and think as we do. Another one is 'confirmation bias'. We tend to notice and remember information that validates opinions we already have, and tend to forget or dismiss information that conflicts with ours.

There are tried and tested scientific methods that address such biases during remote hiring. Unlike manual processes, tech and data-driven hiring platforms try to ensure that such biases do not have any influence on your decisions anymore and you are able to choose only the best fit for your team, without any prejudices.

"Manual methods are bias-prone and leave little to no room for a skill-based approach to hiring. Earlier, recruiters used signals like academic pedigree or work experience to choose good candidates. Today, someone who's never been to a college can



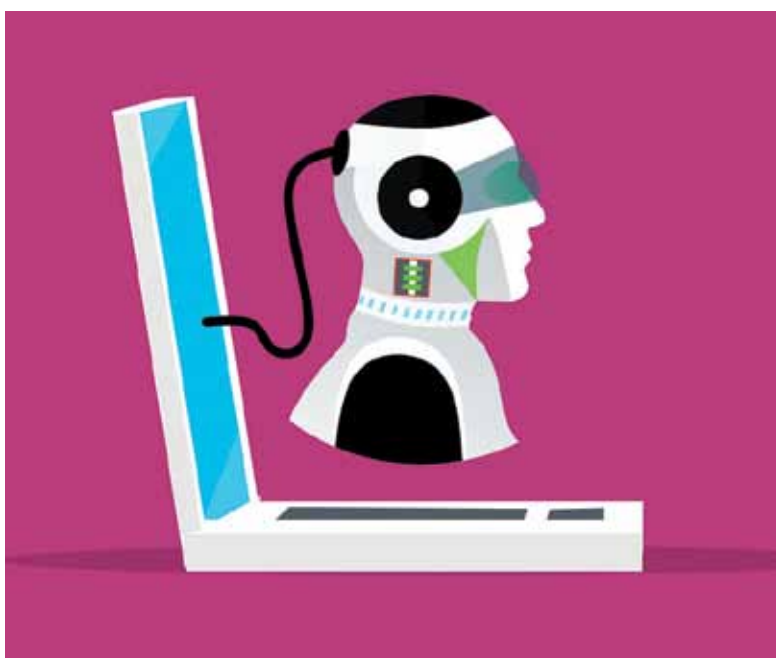
SUJATHA KUMARASWAMY
CEO, MeritTrac



AI and analytics will have a big role to play in assessments wherein trust scores for every individual can be computed based on their body language and other factors while taking an assessment. This will not only ensure the integrity of assessments but also make it convenient for recruiting organizations.

learn to code online and build better apps than someone with a four-year degree from the best institution in town. The way we hire needs to reflect these changing 'signals', and put expertise over experience. Hiring for skills, and not resumes, is the way forward and technology platforms help you do that by infusing objectivity into the process," said Shukla.

Also, when organizations utilize the blind hiring practices or interview services provided by the virtual hiring solution providers, the focus completely shifts to the skills of the candidates, rather than on their age, gender, race, academic record, experience, etc.



This also prevents them from pre-judging candidates and helps them start the interview on an even, clean note.

▼ Are hiring algorithms enough to tackle deep-seated Hiring Bias?

Many believe that hiring algorithms result in fair, accurate and objective evaluations, but there are concerns too in terms of its tendency to replicate institutional and historical biases and create new risks of their own altogether. Researchers have already found evidence that even after consistent efforts to make the hiring algorithms debiased they might still treat certain job candidates inconsistently. That can happen when they get trained on historical data. Also, despite the hiring algorithms helping recruiters to remove the layers of subjectivity from the hiring process, humans are still very much involved in the final hiring decisions. The people who are putting those hiring solutions to work can also add to the bias. Every solution provider is trying to deal with these issues in their way.

S. Pasupathi of HirePro said, "We have not



S. PASUPATHI
COO, HirePro

Analytics gives deep insights about candidate performance, which includes the time spent on difficult and easy questions or the steps in solving a coding assessment. If they are writing code, then it tells the number of times they had to compile before they got it right.

introduced elements such as facial analysis to evaluate candidates. Our focus is on evaluating the core skills of the candidate with precision, and hence, the data that the interviewer gets is straightforward."

Sujatha Kumaraswamy of MeritTrac believes that taking a conscious step towards incorporating a reliable assessment mechanism with the help of modern tools

and methodologies can take those concerns away. "To understand biases and restructure assessments, we review the various assessment practices and questions and eliminate ones that serve no purpose for the candidate-job fit. Weights can be assigned towards questions having the most relevance and so on. By incorporating both quantitative and qualitative skill assessments, we get highly objective reports and scores. While hiring virtually, we use data-backed hiring. This means we mask all irrelevant details and selection is based largely on the performance in the remote assessments," she explained. ■





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Platform Strategy 2.0 for D2C & B2B companies

Navdeep Gill

✉ pcquest@cybermedia.co.in



A data-driven platform team can enable your organization to scale faster and more efficiently than the traditional approach and product-driven mentality

Platform Transformation builds on technology platforms for distributed innovation, reshaping the business model and creating new efficiencies and value chains to improve data-centric customer experiences.

Platform Strategy can help create and capture new economic value avenues and scale the potential for learning across entire ecosystems.

Data is the holy grail. Now players are redefining the value proposition for customers and trying to lock in control points to expand horizontally and vertically across the grid by enriching their products and services with information, social content, or connected customer experience and feedback.

Developing a platform strategy includes asking questions such as:

- What partnerships will add value to platforms?
- How will target audiences interact with platforms?
- How value/offerings are monetized on platforms?
- How agile are the platforms?
- What expansion capabilities are needed with platforms?
- How well do platforms integrate with each other and related systems?
- What digital environments to operate in?

As Deloitte mentioned in the Platform Strategy document, your vision should answer three questions:

- What value is exchanged?
Outlines what the “currency” of your platform is, which could include some combination of information, data, or goods and services.
- Who is involved?
Outlines the participants in your platform, which will include some combination of producers (internal/external), consumers, and other stakeholders.
- How does it work?
Outlines the respective tools and functionalities that bring stakeholders in, facilitate sharing, and match participants, etc., in your platform.

▼ What is a Platform?



NAVDEEP GILL, Founder, XenonStack

The platform has become a very ambiguous term. Market capitalization to global reach, platforms have given digital natives what they have asked for. But what is a platform? Platform in general terms (as defined by Mckinsey) is:

- Software-based Digital Environments with open infrastructure
 - Matchmakers linking people, organizations, and resources.
 - Reducers of marginal costs
 - Foundations for combinatorial innovation
 - Harnessers of network effects
 - Orchestrators of ecosystems extending across sectors without borders.
- Platforms are grouped under three board categories:
- Customer proposition and experience platforms built on reusable code (internal and external)
 - Business solution platforms designed to be modular and run as a business (internal and external)
 - Core IT provisioning

▼ D2C and B2B Business have to build Digital Ecosystem 2.0

Platform strategy accelerates growth with data-driven customer experience, reworks the

value chain. The Platform Strategy combines business, technology, governance, procedures, and management together and has the ability to keep up with changing industry trends.

How should companies find their constraints and work towards removing them? A solid data-driven approach helps and establishes a strong case for change. So how does it work?

- Analyze data from various resources to create and evaluate frictionless hypotheses
- Formulate models for user engagement, customer satisfaction or any other business outcomes according to your industry
- Compare and assess the competitor positioning and capability
- Analyze market size, segmentation, product abilities, customer personas

Business to Business

A B2B industrial-products manufacturer whose growth slowed down and wanted to find out where they can capitalize the company's sizable base of loyal customers in their value chain. The data sensors used while manufacturing to evaluate performance, which supported an existing after-sales service business. Strategists suggested that more control points might be taken advantage of and found, in cooperation with marketing and sales, that many of its clients were relatively unaware of utilizing data analytics to drive business choices. The firm has chosen to offer its own data analysis services and has established an ecosystem of partners that can do so.

Direct to Consumer Business

And for the D2C market, things have changed, it is almost guaranteed that what has worked in the past will not work in the future. According to McKinsey, consumer sentiment research shows that two-thirds of consumers

▼ It can be very hard to build a platform. Just start with a solid platform strategy. And make sure your strategy answers two key questions: How will you attract customers? And how are you going to make technology the core of your ecosystem?

plan to continue to shop online after the pandemic. There must be a return to management principles as well as a step beyond the process. Being data-driven is a necessity. The utilization of data has played a vital role in many D2C firms' successes. Several D2C businesses have been able to grow with data-driven strategies, thus customizing and engaging customers efficiently.

The future of D2C businesses depends on the curation and filtering of massive amounts of data generated at the edge to fuel continuous Artificial Intelligence. This is an exascale-class data challenge. Curating relevant data at this scale is not possible for businesses without a strong platform strategy.

▼ Your Platform Strategy is important than the platform itself

Your platform approach is more important than the idea behind the platform itself. It can be very hard to build a platform, especially after many buzzworthy attempts and a few huge successes. There are countless ways to get it right! Just start with a solid platform strategy. And make sure your strategy answers two key questions: How will you attract customers? And how are you going to make technology the core of your ecosystem?

▼ Platform Strategy that Enforces Data Quality

Only 16 per cent of organizations think their data is of 'very good' quality. Once bad data goes on your platform, you can expect to get bad results out, limiting the effectiveness and deteriorating the customer experience.

▼ Building a Platform Team

The benefits of building a platform team can be many, but it needs to be done right. A data-driven platform team can enable your organization to scale faster and more efficiently than the traditional approach and

product-driven mentality. A platform team can consist of members below.

Platform strategist

- Long term platform Strategy
- Ecosystem roadmap
- Lead cross functional items

Platform product manager

- Driving discovery, planning, and implementation
- Identify, build and champion new platform functionalities
- Rapid platform experimentations
- Sync Between platform initiatives

Platform data manager

- Drive Strategy for processing, managing and serving data to the entire company and integrations with ecosystems partner

Ecosystem manager

- Build and Manage third party software developer ecosystem
- Seeking and Engaging with development partner

Platform privacy & governance manager

- Evaluate compliance solution options and drive data management and governance strategy
- Include sensitive data handling retention, user data protection and anonymization

▼ Don't envy them

Over the past five years, you must have found several news platforms covering various CEOs and companies. When leading international brands and their sales force make it big, it's easy to fall for the idea of a successful platform. However, the road to the right platform is not an easy one but surely a necessary one. As Pierre Azoulay from MIT says, "Platform strategy is, in some sense, one of the most ambitious ways of entering a market you could have, because it requires coordinating the behaviors of multiple parties that might not know each other, that might not even want to know each other," Azoulay says. "You're sort of this orchestra conductor, and as a result of being very ambitious, it also fails very often." ■

The author is Founder, XenonStack



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Panel Discussion: Future of Indian Tech Education: Re-skilling India



Prof. Rajesh Khanna
President, MIT University



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Panel Discussion: Technology Innovation in Higher Education



Panel Discussion: Edu-novate (Innovation in education) for education sector transformation



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Tips to protect organizations against the evolving cybersecurity risk landscape

Ashok Pandey
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The threat landscape is constantly evolving, every business should revamp the security architecture and re-align with the present business landscape

In the past, an organization's systems were typically secured by perimeter monitoring and the focus of the security teams was on the external elements. However, the remote-working environment has brought everyone and every application/device into the vulnerable category.

The security threats are evolving rapidly and it is much easier to compromise the framework from the inside now. Thus, it is very important to assess what kind of damage an internal threat can cause, and taking proactive measures to mitigate such risks is crucial.

We spoke to **Murtaza Bhatia, Sales Director- Cybersecurity, NTT India** to understand the new landscape, threats, challenges, etc.

Excerpts:

▼ Re-think security to align with the present business landscape

The post-pandemic business landscape has undergone a tremendous change. To keep the businesses running smoothly in the new normal, a massive re-architecture process has been undertaken. The revamp of the architecture has ushered in a number of benefits too. From the response to recovery, the entire wave of business alignment IT has now become fully hybrid.

Thus, it has become imperative to review the security and align it to the re-structured business processes and protect the underlying IT from security threats of the day. A rethink is needed regarding the shape of IT for any business and its security needs. We need to keep security investments in control yet give it the flexibility to manage the known and the unknown in the new scenario. Zero-trust logins and virtual desktops are some of the tools that are helping organizations function smoothly by allowing remote access restricted by user-profiles and roles.

▼ Anticipate cyber threats and stay a step ahead

One of the biggest risk areas has been the remote access to the company's data and applications which is now necessary for employees to work from home. Thus, an



MURTAZA BHATIA, Sales Director- Cybersecurity, NTT India

organization's systems are now vulnerable to cyber-attacks since they are no longer adequately protected by perimeter security. Employees log in remotely using different device types, and one might even try to access company servers using public and unsecured computers to carry out a task.

Therefore, one of the key strategic shifts is to switch from the current practice of responding to a threat when it is identified and adopt a predictive strategy that can help pre-empt the risks. Cyber-security teams need to keep an eye on the incidents of attacks taking place globally, and to analyze them thoroughly. This kind of analysis will help them predict the impact of such attacks on their own company's systems and make proactive changes to thwart the same. That's how an organization will remain ahead of the risks. The whole security control framework has to be transformed into a predictive framework with the right tools and technologies in place. The key is to know and react to situations that might unfold rather than reacting to an attack that has already taken place.

▼ **Safeguarding against data theft and data breaches**

The key is to ensure context-based access and complete visibility of the entire Hybrid IT platform of the business. Various silo controls have to be integrated with each other to enable real-time sharing of contextual information related to data and application access. Automation of the detection and response processes makes the operations and management of the security landscape faster and more capable.

Apart from the rethink of security tools and tech, there are some of the security best practices that all organizations should adhere to:

Preventing remote workforce related vulnerabilities: Across the board, organizations have reported a greater occurrence of cybersecurity risks since the switch to location independent working. Thus, it is essential to have secure logins in place. We recommend a cloud-based zero-trust framework or to opt for virtual desktops using which the employees can safely access the applications and data necessary for their work.

No third-party apps: Unsecured or unverified third-party apps and devices pose the maximum risk. Therefore, access to the systems should be allowed only through pre-approved devices and apps which have adequate security measures and solutions installed or integrated.

No deviation from company's security guidelines: All the employees should be regularly sensitized on threats and security policies/practices such as frequently changing passwords, keeping strong passwords and avoiding clicking on unverified links or emails. All it requires is for one employee somewhere to err and click on a phishing link and the entire organization's systems can be compromised. Usage of social media and public communication channels for corporate

communications should also be avoided.

Software updates: There is nothing more harmful than outdated software operating critical processes. Organizations should use remote cloud-based systems that automatically update to the latest software versions without any manual monitoring or effort. Such a system would automatically update even the remote devices used by work-from-home employees.

Data backups: The sensitive organizational data should never be stored in a single place. You can either choose cloud-based remote storage or take data backups that are stored at multiple locations which are not connected to each other. That way, you can easily recover the data lost or resume operations if one segment of the systems or data storage units gets attacked by ransomware.

▼ **Monitor now and in the future**

Today, the entire IT infrastructure has become perimeter less courtesy of the remote working practices. Thus, it has become absolutely essential to monitor the entire landscape to manage security effectively. You don't need to watch over the data and applications, but also the user profile, device type and network used to access the organization's systems.

Thus, we need to deploy proactive security tools which monitor and respond to threats and unusual activities on a real-time basis. Most of our client organizations are now demanding services that are integrated with features such as commercial threat intelligence, orchestration and automation, threat identification and alerts and also regular analysis of threat landscape and recommendations.

Such holistic and proactive 24/7 monitoring is going to be essential for all businesses operating in the digital ecosystem in the times to come. ■

▼ A rethink is needed regarding the shape of IT for any business and its security needs. We need to keep security investments in control yet give it the flexibility to manage the known and the unknown in the new scenario.

Can open-source solutions be a great leveller for Indian Healthcare?

Soma Tah

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Open platforms and protocols help innovators devise solutions that would otherwise require deep pockets. As India prepares to create electronic medical/health records (EMR/EHR) for each individual as part of the National Digital Health Mission (NDHM), fostering open source will encourage innovators to develop affordable HealthTech solutions

Did you know that the obstetric forceps, used during childbirth to avoid maternal and newborn morbidity, were initiated in the 16th century but were kept a family secret for over 100 years by a family of midwives (the Chamberlens)? There are different versions of why they went to great lengths to keep the forceps a secret. While one reason could be that using this sort of tool in childbirth was considered ‘meddlesome midwifery’ back then, it could also well be for knowing that they could earn a lot of money by being the people who could deliver a baby when no one else could.

Imagine making a lifesaving tool inaccessible to the vast community of health practitioners for more than 100 years just for profits! Now, if you look at the ‘vendor-lock in’ strategy of the proprietary software vendors today, it is no better than the ‘obstetric forceps’ scenario. Experts say that the collaborative nature of the open-source software (OSS) or Free and Open-source Software (FOSS) development can potentially bring technology innovations into the healthcare space much more quickly than independent development. It can also bring down the cost of technology adoption in healthcare to a considerable extent, fast-track diagnostics and improve patient care.

Indian Healthcare infrastructure consists of a large number of public and private hospitals. There are disparities in the cost of healthcare and the level of cutting-edge technology adoption in these hospitals. Now that India is preparing for the nationwide rollout of the National Digital Health Mission (NDHM), which will create electronic medical/health records (EMR/EHR) for each individual, open-source solutions can be a great leveller.

▼ Reasons OSS/FOSS-driven health systems are a better bet

“The most obvious benefit is financial i.e., no license fees, often no upgrade cost and a significantly reduced cost of ownership. With no vendor lock-ins, healthcare providers have the freedom to choose, decide and customize solutions to suit their contextual needs. All, without paying the ‘hefty’ fees to the ‘certified’ knowledge partners. OSS solutions will hold a trump card over proprietary solutions that claim inter-connectivity through tie-ups with partners. In our opinion, several fit-for-purpose OSS apps will ‘naturally’ take advantage of such inter-connectivity. And healthcare providers will not have to buy a ‘full stack’ because of possible compatibility issues,” said Angshuman Sarkar, Principal Consultant, Global Health Practice and Gurpreet Luthra, Tech Principal, Social Change Group, Thoughtworks India.

While the aforementioned financial benefits are a rational approach to healthcare providers’ procurement strategy – OSS-driven health informatics systems are also a better bet for safer, high-quality peer-reviewed systems. “Unlike closed source, proprietary black boxes, OSS leverages the cumulative knowledge of the wider global community to bring innovation, accessibility and knowledge to the healthcare providers and patients. Also, when it comes to security and robustness, it is easier to perform an evaluation of an OSS for maturity of design and coding – than for proprietary software. With the latter, healthcare providers have to rely on contracts, promises and third-party certifications. The term ‘vaporware’ comes to mind, where many poorly engineered products hide behind fancy decks and



GURPREET LUTHRA,
Tech Principal,
Social Change Group,
Thoughtworks India



Today, we have limited options to avail services/products - patients and providers have to use apps hosted on ‘big’ portals. Open market protocols will help innovators devise solutions that would otherwise require deep pockets.

Unlike closed source, proprietary black boxes, OSS leverages the cumulative knowledge of the wider global community to bring innovation, accessibility and knowledge to the healthcare providers and patients.



ANGSHUMAN SARKAR, Principal
Consultant, Global
Health Practice,
Thoughtworks India

good-looking UI/UX. With OSS, transparency builds trust,” they added.

Additionally, OSS helps healthcare providers provide optimal solutions for low-resource environments, where the need for high-quality software is significant because of the disadvantages and limitations that a care provider might face. Bahmni, a FOSS EMR/EHR and hospital system, was conceptualized by Thoughtworks with the mission of providing comprehensive and quality solutions to low resource environments. Starting from a single NGO-run hospital in a Chhattisgarh village (which it was named after), Bahmni today is used in some of the most resource-constrained and trying environments of South Sudan, Afghanistan and even in resourceful cities across more than 50 countries.

“But the biggest example of the OSS advantage is the COVID-19 India tracker that was set up by the OSS community in 2020 - a completely volunteer-driven effort that is so beneficial to the general public and the healthcare industry at the same time! Ease of integration, interoperability of software, backend support, name it and you have it! The Aarogya Setu app by the Government of India operates on the same concept. Covid was just a wake-up call, we need to be better prepared and build more resilience. These have proven the potential of open source,” said Gautam Rege, Co-founder & Director, Josh Software. The Indian healthcare industry needs cost-efficient, fast and reliable solutions- something the OSS developer community certainly can work on, feels he.

Also, proprietary solutions often lead to disparate systems causing major interoperability issues. OSS helps to avoid many data interoperability issues that make it difficult to exchange health information between EHR and other health IT systems. “AI/ML technologies are at the forefront of healthcare innovations today and the AI/ML communities are thriving on OSS and open datasets. Along with many other areas, these are the upcoming domains where healthcare providers could gain massive benefits from being a part of the communities,” said Vikalp Sahni of Eka Care. “However, these are also the ideas where OSS and AI models built on top of open datasets bring in more nuanced challenges such as varied public policies and ethical concerns across nations in terms of data usage and models built on top of it,” cautioned he.



GAUTAM REGE, Co-founder & Director, Josh Software



The biggest misconception about open source is that it is not secure. The fact of the matter is that more than half of these security breaches happen due to human error, insecure practices during the installation and application of software products.

▼ Key concerns around embracing OSS/FOSS in Healthcare

“While the nature of FOSS and the general challenges like licensing, lack of support, data privacy, security issues that come along with adopting FOSS in any industry, there are some aspects that are of more importance in healthcare,” said Ajit Narayanan, CTO, MFin. He explains them more in detail:

Accuracy: Healthcare solutions using FOSS need to be extremely accurate. General-purpose software may not fit that bill and therefore providers need to be more careful about what software they pick for what use cases. This is particularly true in ML models or publicly available datasets used for training.

Certification: The level of technology, reliability, support that a commercial vendor is able to provide, remains to be seen for OSS for very critical parts of the healthcare sector. This may hamper certification processes or slow them down.

Licensing: Be very clear of what the licensing terms are for OSS. If this is not examined well, it can potentially lead to downstream costs.

Security: Estimates that are close to 95 per cent of applications across industry sectors contain open source software and most of them are vulnerable. A security architecture/process is something providers need to have in place before the widespread adoption of OSS.

Josh Software's Gautam Rege has a different take on the matter. “The biggest misconception about open source is that it is not secure. The fact of the matter is that more than half of these security breaches happen due to human error, insecure practices during the installation and application of software products. If healthcare providers make it a thumb rule to understand the

technology in and out before making the move, half the problem goes away. If you're worried about fixing bugs or error improvement rates, open source vulnerabilities can also be caught extremely quickly, thanks to the efforts driven by the OSS community," said he.

But looking beyond challenges, OSS adoption helps a great deal with continuous enhancement, easy integration, interoperability, standardization and most importantly saves you valuable time to digitization, said Narayanan.

"Organizations should evaluate the FOSS's partner ecosystem that has already adopted the software – are they active on forums, do they provide regular documentation updates, do they make regular commits to the software. This approach will help decide the nature of support needed and the access to said support. Companies might still have to invest in building 'some' internal capability to handle initial queries internally and quickly. But this is not very different from proprietary products like Databases, ERP packages, etc., where organizations either bring in employees with requisite skill sets or partner with IT organizations that provide the needed skills," advised Thoughtworks' Sarkar and Luthra.

▼ Will NDHM and OSS/FOSS foster affordable innovations in Healthcare?

NDHM holds a huge promise to transform India's healthcare system. Adoption of OSS/FOSS opens up possibilities to build platforms and applications with best-in-class privacy policies and data sharing standards. "NDHM is being envisaged as an open digital ecosystem (ODE), a platform that breaks down data silos, enables information sharing with the patients' consent and enables service innovation to deliver better healthcare to every Indian. The success of ODE



AJIT NARAYANAN,
CTO, MFine

It is impossible to imagine a world without OSS or deliver the next level of innovation without OSS. MeitY is advocating extensive usage of OSS. OSS is likely to be a key component of GovTech 3.0 which plans to build an open, secure and inclusive digital ecosystem in India. NDHM is part of that puzzle.



VIKALP SAHNI, CEO
& Founder, Eka Care

NDHM is being envisaged as an open digital ecosystem (ODE), and the success of it depends to a large extent on its adoption by a large network of innovators, who build consumer-centric services on the platform. OSS enables governments to collaborate on a win-win basis with startups and tech talent.

depends to a large extent on its adoption by a large network of innovators, who build consumer-centric services on the platform. Open source enables governments to collaborate on a win-win basis with startups and tech talent while enabling sustained innovation," said Eka Care's Sahni.

"NDHM is establishing standards and protocols alongside an interoperable layer – that ecosystem players can leverage to provide patients, practitioners, payers and allied services with the desired user services. Today, we have limited options to avail services/products – patients and providers have to use apps hosted on 'big' portals. However, the proposed Unified Health Interface (UHI) will allow the expansion of market reach where anyone can develop an End User Application (EUA) and Health Service Provider Application (HSPA) using the standardized UHI protocol. Such open market protocols will help innovators devise solutions that would otherwise require deep pockets. NHA/MoH should actively support FOSS/OSS and its components that can be used as the starter blocks, EUAs and HSAs in the public health ecosystem. This will help ensure clinics, hospitals and users who cannot afford expensive software will still have a high-quality option available to them. We expect this to level the playing field. Where there are gaps and emerging needs, startups would be encouraged to innovate and develop affordable tech options," said Thoughtworks' Sarkar and Luthra.

"It is impossible to imagine a world without OSS or deliver the next level of innovation without OSS. MeitY is advocating extensive usage of OSS. OSS is likely to be a key component of GovTech 3.0 which plans to build an open, secure and inclusive digital ecosystem in India. NDHM is part of that puzzle," said MFine's Narayanan. ■

Educational institutions need enterprise-grade SaaS to shift from physical to digital

Hemant Sahal

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Competition, Complexity, Compliance, Customer Experience, and Costs- these 5 Cs explain why educational institutions need to adopt comprehensive specialized enterprise solutions, preferably SaaS

The Indian Higher Education sector is one of the largest in the world housing more than 39 million students across over 50,000 institutions. Since the onset of the pandemic, the education sector has seen a massive transformation in operations as well as teaching and learning processes. To make ends meet, institutions quickly jumped to ad hoc usage of technology, majorly online classes. Such temporary solutions sure helped institutions for a limited time frame but the effectiveness of such unplanned use of technology is highly questionable.

Since institutions have now learned from their experiences of over a year and with stabilized cash flows, they are now looking forward to systematic and long-term technology adoption. The make-shift solutions are expected to be replaced by more evolved SaaS platforms to lead the transition of physical campuses into a digital campus. Such SaaS platforms transform closed transaction-based IT into an open, engagement-based mobile ecosystem for administrators, faculty, and students, among other stakeholders. They support seamless collaboration between stakeholders, collapse information barriers, and provide deep insights to the institute's leadership for decision-making to improve both quality and outcomes.

These 5Cs explain why educational institutions will adopt comprehensive specialized enterprise solutions:

▼ **Competition**

The higher education landscape has seen a shift in the demand and supply dynamics in recent years. When the demand was high, institutions didn't care much about the overall quality since admissions would have happened easily. This was one of the key reasons behind the slow adoption of technology as it was a mere good-to-have vitamin. But now, the availability of quality choices for students is increasing the competition. Moreover, the New Education Policy is now paving the way for foreign institutions to set up campuses in India, further increasing the competition. Therefore, institutions can no longer afford to stay away from the progressive use of technology to differentiate themselves.



HEMANT SAHAL, CEO & Co-founder, CollPoll

Technology will also enable institutions to tap into a larger student base without the need to spend much on physical infrastructure. A perfect example is of a person living in the small town of Rajasthan but studying in an institution of choice in Maharashtra.

▼ **Complexity**

The Indian education system has leapfrogged into a new era with the introduction of the New Education Policy. However, the real test will be in implementing the recommendations such as Multiple Learning Pathways, Choice-based Credit System, Multi Entry-Exit Points, and Academic Bank of Credits, among others. Implementing each one of them requires orchestrating a series of complex activities which can't be achieved by the mere addition of resources. Institutions can use technology to plan and manage all such processes so that they can focus on what really matters - teaching and research activities.

▼ **Compliance**

The Government announced this year that institutions ranking in the top 100 NIRF or scoring 3.26 in NAAC are eligible to offer online degrees. This further increases the importance of accreditations and rankings

done by regulatory bodies as well as global private organisations, which tend to require consolidated databases regularly to assess the educational institutions on numerous parameters. The exhaustive documentation process is something that becomes a daunting task to manage in a given time frame. Departments have been managing compliances in silos, with a huge scope of human error in preparing reports and concerns of data leakage. Thus, to streamline the compliance process, UGC has asked institutions to simplify methods in administration and finance, build a centralized data repository and bring automated systems for accounting. As a result, a comprehensive SaaS platform becomes a one-stop solution to implement these reforms and manage compliance effectively.

▼ Customer Experience

According to a Bloomberg report, India's Gen Z population stands at 472 million, with over 32 per cent of Gen Z using mobile devices for transactions. The usage of devices, as well as enrolment in higher education institutions, is highest among this generation. Clearly, the smart generation needs smart technology for digital education. The digitally native generation needs access to everything from their screens, freedom to design their own curriculum, and simple ways to complete a task in a few clicks. It is more likely for students to complete processes, make payments, and provide feedback on time if they are given the option of mobile devices. Hence, access to a digital infrastructure is the key to manage a huge student population and accommodate the Gen Z characteristics.

▼ Costs

With the rising competition and complexity, marketing and administration spending are at an all-time high. Moreover, institutions are investing heavily in acquiring quality content, recruiting quality professors, and engaging industry experts to enhance learning outcomes and ensure student success. Except for a few institutions that can command high fees, most of the institutions are finding it difficult to meet the new expectations with existing budgets. Being a highly regulated space, there are not many institutions that can do it on the fees side.

▼ The Indian education system has leapfrogged into a new era with the introduction of the New Education Policy. However, the real test will be in implementing the recommendations such as Multiple Learning Pathways, Choice-based Credit System, Multi Entry-Exit Points, and Academic Bank of Credits, among others. Institutions can use technology to plan and manage all such processes so that they can focus on what really matters - teaching and research activities.

Technology has been already used in the industry for decades to reduce costs. It is high time for educational institutions to follow suit. Some of the simplest ways technology makes this possible are reducing administrative costs, improving the decision-making process especially on budget allocation and utilization, and effective use of existing physical infrastructure.

India is going through a "Digitization" phase - every business, small or large, needs to digitize itself, to offer a great customer experience to its users, and improve operations. Educational Institutions and colleges are no different. The better ones have realized they are serving the Gen Z customers who have grown up on the

mobile internet and want a seamless and easy experience. Administrators also want the ability to manage their back-office operations, the student population, and all administrative functions through state-of-the-art, modern software.

The author is CEO & Co-founder, CollPoll

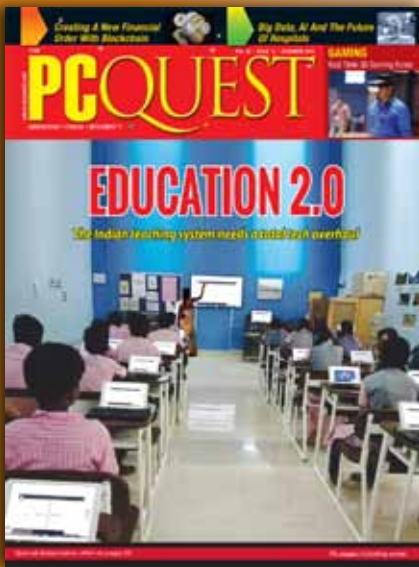
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Why crypto is a natural evolution of old money

Sunil Rajguru

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When it comes to any financial system it's about trust. People trusted the barter and value of gold. They trusted the notes and coins in their hands. They trusted online money. Now enough people are trusting cryptocurrency to make it a viable option

First there was “Might is right”. Anyone with strength could snatch anything from anyone weaker. We evolved and came out of that with the barter system. A goat could be equal to 2 bags of wheat. A day’s labour could be worth a handful of rice. Every piece of goods could be exchanged with some other piece of goods or labour or something else. Of course, there was a clear pecking order with precious stones and metals at the very top.

This morphed into the gold system. Gold now defined wealth and it was the ultimate exchange for barter. You could carry gold when you travelled and buy a great number of goods with it. Kingdoms started hoarding gold. They started minting gold coins. Silver, bronze and iron coins followed. The monetary system was born. Soon we shifted to paper currency.

But this paper currency was pegged to gold. You could only print as much money as there was gold with the government. Governments who did not follow this rule went bankrupt and crashed. Then it was pegged to a “fraction” of the gold reserves and that fraction kept getting smaller and smaller.

▼ When money became virtual

Finally, we had the “Nixon Shock”. In 1971, the then US President Richard Nixon “Unilaterally cancelled the direct international convertibility of the United States dollar to

gold”. The legacy of gold was thrown out of the window. The floating exchange ruled. In a way that’s finally when money became “virtual” and not “real”. The global financial system was ready for the online age. You didn’t need barter. You didn’t need gold. You didn’t need notes and coins.

Money could be virtually stored, shared, lent, recovered... But there was a caveat. Now the power was fully with the governments, banks and the financial moguls. They could manipulate at will. While there is such a thing as the free market, there is a great deal of pushing and pulling that these “powers to be” can do. You can see it in America today where for the government a trillion dollars is like a hundred-dollar bill for a poor middle-class citizen. The US is pumping out free money at a record rate. Will they crash like governments in the past? Nobody really knows.

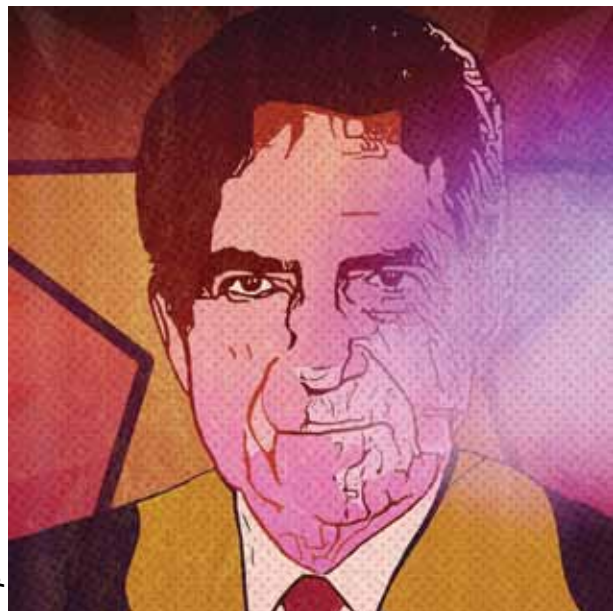
▼ The power of blockchain

In such an atmosphere, enter the blockchain, which promises transparency and empowerment, thanks to its unique use of cryptography and time stamps. The system is quite difficult to tamper or change the data that has been initially fed into it. The peer-to-peer network is almost fool proof in nature. More importantly, there is no need for a central authority that can take all the powers of the system.

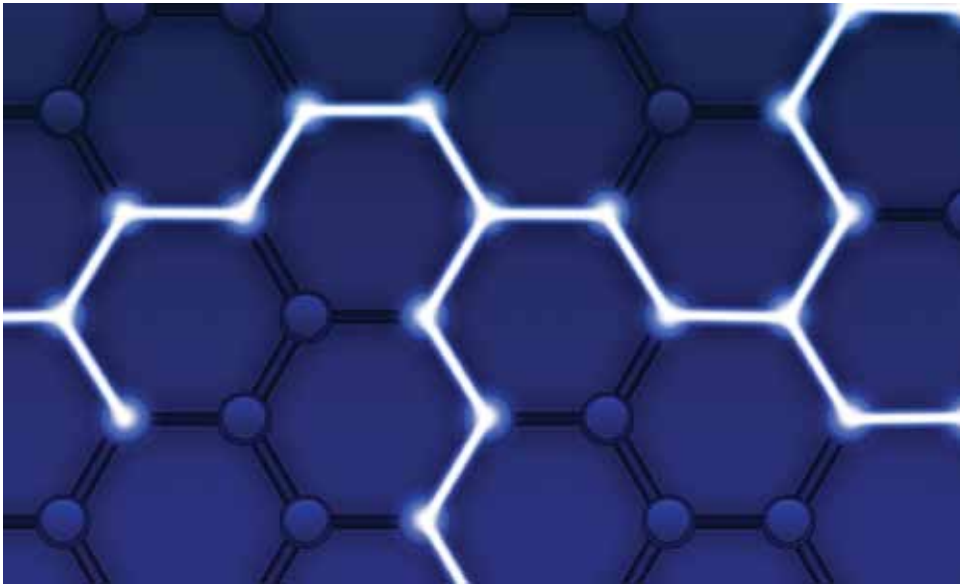
▼ Great innovation in cryptocurrencies

This system was brilliantly used by Satoshi Nakamoto (a pseudonym or group of persons) to create Bitcoin. The number of Bitcoins that can be mined are limited and hence it cannot behave like the US government, creating trillions of dollars out of thin air at will. Similarly, Ethereum was created by Vitalik Buterin in 2013. It has the added innovation from Bitcoin of creating smart contracts.

Litecoin is a fork of Bitcoin, NEO comes from China, Monero is popular on the Dark Web, Binance coin and BAT (Basic Attention Token) are both utility tokens etc. There is great innovation happening in the cryptocurrency domain while the media usually focuses on other issues. Ripple is a currency exchange that deals with both crypto



Pop Art of Richard Nixon



money. Now enough people are trusting cryptocurrency to make it a viable option.

The second is that it must be theoretically workable. People had excess goods or time (for work) that they wanted to exchange with something they didn't have. Gold was small and attractive and took everyone's fancy. People immediately took to coins and

fiat and currencies along with commodities. In fact, there are many cryptocurrency exchanges mushrooming up all across the world.

▼ Why it will work

When it comes to any financial system it's about trust. People trusted the barter and value of gold. They trusted the notes and coins in their hands. They trusted online

notes. Once enough devices and connectivity came into the picture, online money seemed like a good bet. Cryptocurrency has very sound principles as explained above and theoretically is a superior system. Blockchain and cryptocurrency have very sound technical, practical and philosophical arguments.

The system must be practically workable. Barter was great when the transactions were



small, and societies and kingdoms wanted exchanges in large numbers. Once it got really complicated, you needed some other standard. Gold is durable and it can be easily transported, stored and melted. Everyone in the world values it. It's easy to carry around notes and coins all your life. But that too fell behind. With the broadband and smartphone revolutions, people find online money more convenient. Though complex, at the user level cryptocurrency is quite easy to buy and sell. We are even seeing Blockchain-as-a-Service (BaaS) startups who will simplify things for you.

▼ Worth trillions now

The value of all cryptocurrencies on New Year's Day in 2009 was zero, for the simple reason that it wasn't invented yet. Bitcoin was strong even before Covid and the pandemic boosted some industries and destroyed others. First Bitcoin touched a market capitalization of \$1 trillion and then all cryptocurrencies were worth \$3 trillion. That's at par with the GDP of India and its 1.4 billion people. This is just in a short span from 2009-21.

More importantly it is not isolated but being traded. As long as any form of money is in continuous circulation, it will survive. The

same thing is happening with Bitcoin & Co. Investors are buying, selling and speculating. Global citizens are buying goods and services with cryptocurrencies, and it is being integrated with all the markets of the world. There is no going back now.

▼ What could bring it down

There is one thing that can pull it down and that is regulation and bans. But it is doubtful that all countries of the world will crack down on cryptocurrencies. Even if half of them do it will flourish in the other half. If by some outside chance all of them do, it will merely be pushed underground and become a favourite of black markets and the Dark Web. You can't just wipe out \$3 trillion overnight (the value can reduce drastically though) as the users are common citizens all over the world along with white money billionaires and black money operators.

Barter is limited. Gold is dead as a monetary standard. Notes and coins are going out of fashion. A new online financial order is being built and both blockchain and cryptocurrencies are going to play a huge role in that.

Bitcoin may or may not stay, but the cryptocurrency definitely will. ■



4 pillars of NXP's future of cars: Sense, think, connect and act



We caught up with **Sanjay Gupta, NXP India Head, Vice President and India Managing Director.**

He talked about the changes taking place in the semiconductor industry as a result of the pandemic, the rise of wearables, robotics, the automotive chip and their vision for the future of autonomous vehicles. Some excerpts from the video interview...

▼ Explaining NXP's four pillars of autonomous vehicles...

Our eyes and ears have been replaced with sensors like Radar (radio detection and ranging), camera and Lidar (laser imaging,

detection, and ranging). The electronics equivalent of human thinking is intelligent machines or Artificial Intelligence, Machine Learning, and advanced compute capabilities. These cars not only sense the high-speed data

that is streaming in, but they can also process and predict with it.

After “sense” and “think”, the third thing they can do is “connect”. This comes through high-end connectivity technologies. Inside a car we have Bluetooth. From outside we have Ultra-Wide Band. We have DSRC or Dedicated Short Range Communication, just like the Wi-Fi of a car. Car to car communication can happen in a seamless way. 5G integration trials are also there and can link with the cloud.

The fourth thing is “act” using the latest battery management system, using the latest electronic gadgets to act in a smart way and optimize fuel usage. These four pillars bank on a foundation of safety and security.

This same framework can apply to robotics too.

▼ The range of automotive chips...

Automotive chips are expected to work whether you are in the Sahara Desert or if you are in the extremely cold temperature ranges like Antarctica. They are extremely robust. That’s why the skills, the competencies and

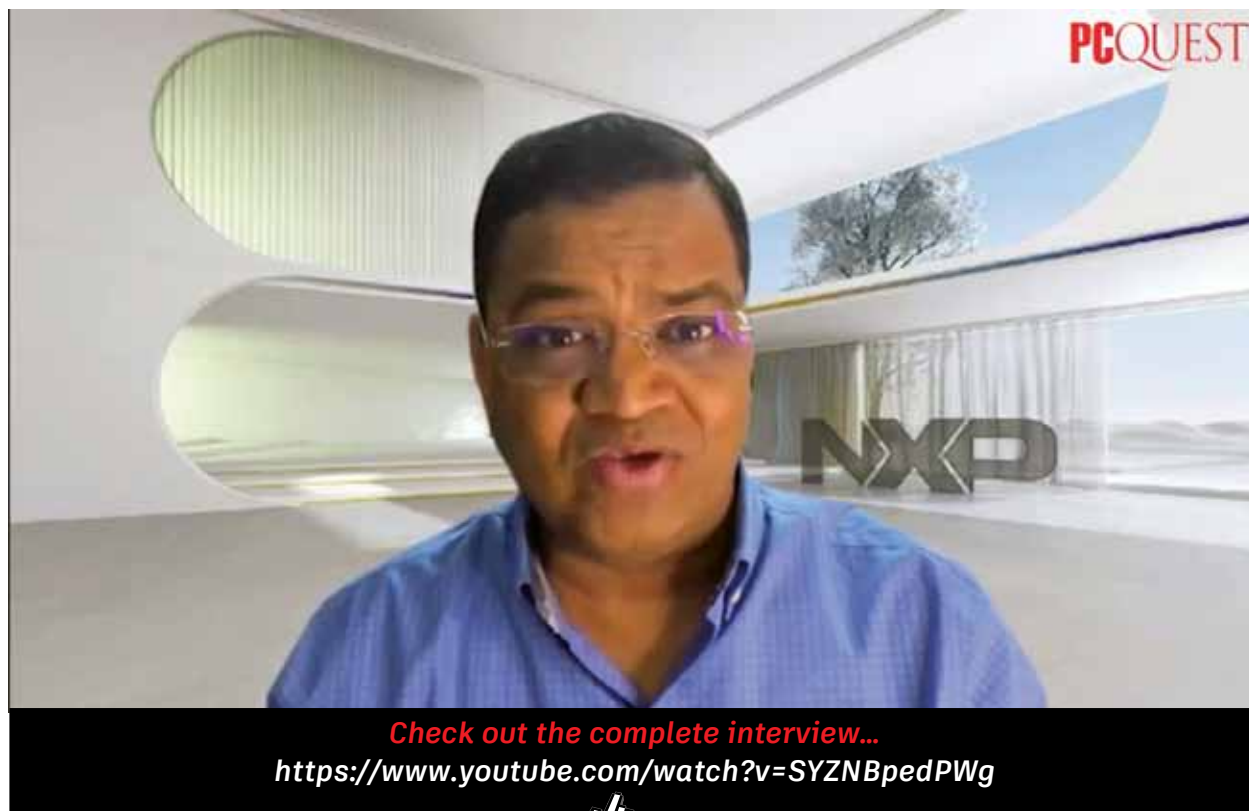
the experience that is required to build an automotive chip is very different from a mobile chip.

▼ Chip usage spike due to Covid...

Semiconductors have been integrated in every sphere of life, which we never realized a few years back. The pandemic has only expedited the usage of semiconductors. Digitilization in our economy and in our way of life was always happening at an organic pace, but the pandemic expedited that by at least 10x.

▼ Robotics to be a game changer

Robotics is going to be a game changer in the next decade. When you think of a robot, it’s a smart, electronic loaded gadget that can walk like a human. The 4 pillars of cars: Sense, think, connect & act; applies to robotics too along with safety and security. We say the smart autonomous car of tomorrow is actually a robot. Going beyond automotive we have Industry 4.0. This will optimize the supply chain and an entire warehouse can be driven by robots. ■



PCQUEST

NXP

Check out the complete interview...
<https://www.youtube.com/watch?v=SYZNBpedPWg>

Cloud is a computing model more than a location

We caught up with **Ajay Patel, SVP/ GM Modern Application Platform Business, VMware.**

He talked about the technological acceleration that took place post-Covid, the power of the multi-cloud, Kubernetes and Zero Trust



Here are some excerpts from the video interview...

▼ **Talking about the technological acceleration that happened during the Covid crisis...**

That acceleration which was unimaginable

before Covid, the business crisis forced everyone to react and they started to leverage the cloud. That urgency is not going to stop anytime, Every company is becoming a digital business. As they are doing that, they are using different clouds for the best workloads.

▼ On distributed computing at scale...

One of the big key trends we see is: Distributed computing at scale is here to stay. Containers have become the default by which you package up applications functionality and put them in production. Kubernetes has become the default by which you orchestrate these applications. You are trying to leverage the cloud of your choice.

▼ What is the cloud?

One thing is for sure. The trend is not being reversed, where we are going to move away from the cloud. But what is the cloud? The cloud is no longer the public cloud that we know about. The cloud is equal to the sovereign clouds that you may have in each of the regions. Cloud is at the Edge. Cloud is in the data center. It is really a computing model more than a location. The cloud is really a flexible fungible resource that is available on demand. Cloud is becoming more of an operating model.

▼ Operating with apps in the Zero Trust era...

One of the biggest challenges is if something goes wrong now, how do you debug your application? The second big problem is what is the security boundary of

your application. In the old days you would lock yourself behind a firewall. But now your application is running with services in the public cloud, using some SaaS, some of the code is running under your retail branch... You hear the idea of Zero Trust. The application becomes your boundary.

▼ On the top upcoming trends...

We're seeing application modernization picking up steam. Second is we're starting to see AI and AIOps being applied in all aspects of our life whether it's intelligence for business or intelligence for optimizing operations. I'm seeing security shifting left all the way, meaning DevOps is getting more and more control. And the last is: Everything is becoming a service.

▼ Helping the new DevOppper

How do you respond to a business that is changing and every industry is being disrupted? How are we going to make the typical DevOppper, just coming out of school, how to get him productive. We can't make him understand all these fancy technologies which are changing all the time. We have got to make it easy for him or her to build applications with ease. ■

Cloud is a computing model more than a location #VMware

PCQUEST

Check out the complete interview...
<https://www.youtube.com/watch?v=Lo-2Qkoyi84>



How India can become a HealthTech superpower by 2030

PCQUEST+HEALTHTECH talks

CyberMedia



C OVID left people with no choice, but to become more comfortable with digital care, making way for the adoption of personal care devices, virtual care platforms, and EMRs. Things are changing very fast in the healthcare industry too. Hospitals are aggressively turning digital. Doctors are becoming a lot more adaptable than earlier, which is a great sign for the future of the Indian healthcare system.

COVID-19 crisis has also brought few known and long-existing lacunae in Indian healthcare to the fore, i.e. accessibility, and affordability. But the advanced technologies made healthcare accessible to people at the click of a button, irrespective of where they are.

India became an IT superpower after the Y2K crisis and a global pharma powerhouse

by coming up with affordable HIV medicines during the African AIDS crisis. The two industries that have really stepped up amidst the COVID crisis are the tech industry and the healthcare industry and as a result, HealthTech took off too. But can India become a HealthTech superpower by 2030?

Which are the technologies, policies, and schemes that can make India a healthtech power by 2030? How can the healthcare industry, government and IT industry work in unison and go to the next level? **Eka Care COO & Co-founder Deepak Tuli, Cartula Health India COO Shweta Agnihotri, DoctCo Founder Nimith Agrawal, and Wellnest Founder Srushti Adani** discussed all these and more in the PCQuest HealthTech Talks moderated by Sunil Rajguru, Editor-Dataquest, PCQuest, & CIOL.

Click here to view his full conversation: [How India can become a HealthTech superpower by 2030](#)

Category: **SMARTPHONE**

TecnoSPARK 8 is equipped with a 16MP AI Enhanced Dual Rear High-resolution camera, 6.56" HD + Dot-notch Display, and a massive 5000 mAh battery. It is powered with Helio G25 Gaming Processor and 8MP front camera with dual flash to click flawless and sharp selfies. Its HyperEngine technology provides a seamless performance during gaming. The all-phone is priced at **INR 9,299.**



TECNO SPARK 8

Category: **WEARABLE**



**Just Corseca RAY
K'ANABIS**

Equipped with a magnetic charging USB cable, 400mAh lithium polymer battery with up to 20 days of standby time. FULL HD IPS LCD SCREEN 1.28-inch 240x240 pixels screen with the single built body with Hi-fi calling function. It comes with a Blood pressure, Blood saturation tracker, Heart rate monitor, Menstrual cycle monitor, Drink water reminder, Multiple Sports modes. It has advanced HR sensors for accurate and effective heart rate monitoring. The range starts from **INR 8,999.**

FULL HD Dual curved Screen IPS LCD screen with 1.69-inch and 240x280 Px. 200 mAh battery with 7 days of functioning time and 15 days of standby. In-app notifications and Call notifications. It has multiple Sports modes with Accelerometer, gyroscope and sleep monitor for accuracy. It has an all-time heart rate monitor and sleep tracker. The range starts from **INR 7,499.**



Just Corseca Stayfit Jive



Just Corseca SPORTIVO

It is designed to keep an eye on your fitness and health, the SPORTIVO can monitor your heart rate, count steps, track calories, monitor sleep, blood oxygen, and more. It comprises of 220 mAh battery with 8 days of functioning time and 15 days of standby. The watch is equipped with a 2.5D curved glass IPS LCD screen with 240x280 px, metallic frame and TPU band, 1.69-inch full touch display with elegant and fashionable design. The range starts from **INR 5,499**.

Category: **AUDIO**

SoundcoreLife Q series Headphones - Life Q30 and Life Q35 are equipped with Hybrid active noise cancellation, signature Soundcore sound, and customization for a listening experience with outstanding battery life.

Soundcore Life Q30, priced at Rs. 7,999 and Life Q35 priced at Rs. 9,999, crafted with an ergonomic design, are equipped with memory foam ear cups and headbands, and a lightweight frame making them a perfect candidate for the everyday hustle. The headphones also feature Hybrid ANC that picks 4 microphones and filters out irritating noises like traffic and airplane engines for a purer listening experience.

Featuring a 40-hour long playback time in ANC mode and 60 hours in normal mode, the dynamic headphones provide 4 hours of listening with just a 5-minute charge. The headphones sport Fast NFC Pairing and multi pairing options on the connectivity front.



SoundcoreLife Q-Series headphones

ZinQTriX 1 Wireless Earphones delivers unstoppable music/talking time for up to 5 hours and has fastcharging that can fully charge the earphones within 2 hours. It has 10 mm, dynamic drivers, for amazing sound output. It is totally splash Resistant and will help you to ace your game. It has built-in power management that ensures there's no scope for overcharging. ZinQTriX 1 Wireless Earphones with Bluetooth 5.0 technology is priced at **INR 449**.



ZinQTriX 1

U&i Shuffle 4 Smart Neckband features a combination of soft, yet tough ABS plastic and skin-friendly silicone. It is IPX5-certified that is resistant to sweat, water and dust. Packed with futuristic features, the U&i Prime Shuffle 4 has earbuds that incorporate neodymium magnets to help control your music. It keeps you connected on voice and video calls for a good 15 hours on a single charge and a 10-minute charge can give you a playtime of 6 hours. The Smart Neckband is available at a price-point of **INR 999**.



U&i Shuffle 4



ZOOOK Mini Blaster

This Bluetooth-enabled speaker is small in size, weighing just 550 grams, but high on specs. Powered with a 3-inch driver, ZOOOK Mini Blaster offers 10 Watt output with deep bass and an immersive sound experience. It offers a music playback time of at least three hours following a complete charge of three-four hours, thanks to its powerful 1200mAh battery. Any device can be connected within a range of 10 meters. The Mini Blaster is priced at **Rs 1,299**.

ZOOOK Music blaster offers an even better output at 14 Watt, as it's powered by a 4-inch music driver. Adding more power to the medium-sized speaker is its robust 1500 mAh battery, which allows a playback time of a minimum of four-five hours. It is equipped with the latest Bluetooth 5.0 technology, ensuring a seamless streaming experience within a range of 10 meters. The Music Blaster is priced at **Rs 1,599**.



ZOOOK Music Blaster

ZOOOK Twin Blaster is equipped with two 3-inch drivers offering a whopping output of 20 Watt. Weighing nearly 1.15 kg, ZOOOK Twin Blaster is powered with a 2400 mAh battery, allowing a four-five playback time on a complete charge. Just like the former, this speaker is equipped with the latest Bluetooth 5.0 technology. The Twin Blaster is available at **Rs 1,899**.



ZOOOK Twin Blaster



iGear Dynamo

iGear Dynamo is packed with two large 4-inch drivers and some funky LED Lights to create an awesome party environment. Dynamo is a small party speaker as compared to the large brothers out there, but is equally powerful to rock any party at the touch of a button. Featuring twin full-range drivers with 10 watts of pure power, it is equipped with the latest Bluetooth V5.0, the iGear Dynamo can instantaneously pair with the source the moment it turns on. The iGear Dynamo will be available at an MRP of **INR 1,850**.

Canon PIXMA E4570 inkjet multifunction printer offers a suite of productivity features, combined with high print yields and low-cost printing. It can print up to 400 prints of text documents with the use of the PG-47 black ink cartridge, while the CL-57S colour cartridge can print up to 180 prints. It supports Apple AirPrint, Mopria (for Android) mobile printing and Canon Print Service (Android plugin) for direct printing. It is also compatible with Google Assistant and Amazon Alexa for voice control. The printer is priced at **INR 9,910**.



Canon All-In-One PIXMA E4570 Printer

ViewSonic's latest Pantone validated ColorPro VP68a Series 24-inch full HD monitor offers 100% colour accuracy and provides consistent color performance. Pantone is a standard language for colour. The monitor is validated by Pantone passing the full range simulation test of 2,161 colors of the Pantone Formula Guide. Additionally, it assists those with color blindness by offering two unique modes: color blindness simulation and color blindness filter. It is a 24-inch screen monitor inclusive of the world's first TUV-tested color blindness mode. The monitor is priced at **INR 24,399**.



ViewSonic ColorPro – VP2468a



ViewSonic ELITE XG270Q Gaming Monitor

ViewSonic ELITEXG270Q gaming monitor has a refresh rate of 165Hz, 1ms (GtG) response time and verified as NVIDIA's G-SYNC Compatible to deliver a smooth and seamless gaming experience. It features a frameless design and built-in speakers, along with an integrated mouse anchor, headphone hook, ELITE RGB ambient lighting and ultra-thin brushed aluminum base for an amazing gaming experience. It will be available for an estimated street price of **INR 50,999**.

RAPOO's gaming mouse named VT30 is designed for optimum precision for serious gaming enthusiasts. The mouse features a high-resolution 6200 DPI optical scanner/tracking engine for the finest pointer movements on the screen. Using dedicated buttons, one can adjust the cursor's movement in real-time with up to 7 modes (up to 220 inches/second) to match your requirements, be it gaming or designing. The RAPOO VT30 features 8 high-precision tactile buttons too. Each button is tested and guaranteed for 30 million clicks. The mouse can be purchased at an affordable price of **INR 2,999**.



RAPOO VT30

Kingston FURY Renegade PCIe 4.0 SSD



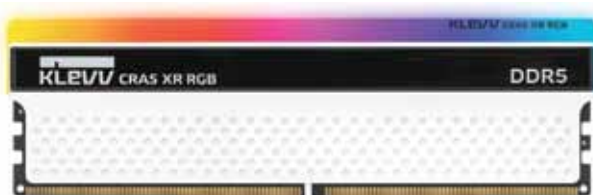
500GB – INR 12,800
1 TB – INR 22,000
2TB – INR 46,700
4TB – INR 123,400

Kingston FURY Renegade SSD is a next-generation PCIe 4.0 NVMe M.2 drive for gamers, enthusiasts, and high-power users. Kingston FURY Renegade SSD delivers cutting-edge performance in high capacities using the latest Gen 4x4 controller and 3D TLC NAND. It achieves speeds up to 7,300/7,000MB/s read/write and up to 1,000,000 IOPS to deliver amazing consistency for an exceptional gaming experience. Kingston FURY Renegade SSD is currently available in 500GB, 1TB, 2TB and 4TB capacities.

Kingston KC3000 PCIe 4.0 NVMe M.2 SSD delivers speeds up to 7,000/7,000MB/s read/write of blazing-fast performance and full capacities up to 4096GB for optimal storage. It is built with high-density 3D TLC NAND housed in the industry-standard M.2 2280 form factor to store even more and enable users to take advantage of PCIe 4.0 speeds. KC3000 is currently available in 512GB, 1024GB, 2048GB and 4096GB2 capacities.



Kingston KC3000 PCIe 4.0 NVMe SSD

Category: **RAM**

KLEVV DDR5 Standard and Gaming Memory

KLEVV's standard memory and signature DDR5 series of overclocking/gaming RGB memory support the latest Intel 12th Generation 'Alder Lake' Core Processors.

It will adopt SK Hynix chips and will first launch in a 16GB capacity with JEDEC standard frequencies of 4,800MHz CL40-40-40 at a power-efficient 1.1V. Larger capacity 32GB modules and standard memory for laptops (SO-DIMM) will follow soon.

Arriving 2022, KLEVV DDR5 overclocking/gaming memory series continues the outstanding and unique design of the current CRAS XR RGB. The memory series will feature extreme speeds of up to 6,400MHz. Exact specifications will be announced at the time of launch.

Kingston ValueRAM (KVR) DDR5 modules feature on-board Power Management Integrate Circuits (PMIC), which help regulate the power required by various components of the memory module and enable better power distribution, improve signal integrity, and reduce noises. The reliable and competitively priced Kingston ValueRAM DDR5 serves as the ideal choice for worry-free upgrades to DDR5 performance. Kingston DDR5 ValueRAM is available in 16GB single modules and kits of 2, at 4800MHz speeds, backed with a lifetime warranty and free technical support.



Kingston ValueRAM DDR5 Memory

Category: **GRAPHIC CARD**



Colorful iGame GeForce RTX

Colorful iGame GeForce RTX Customization Series graphics cards offer PC enthusiasts to customize their own graphics card. This unique graphics card allows users to fully customize the backplate. The graphics card comes with two backplates which uses a magnetic locking mechanism for easy disassembly and customization. It features dual axial fans with an air duct design that allows airflow to pass through the heatsink to improve heat dissipation and airflow inside the chassis.

Xilinx Alveo U55C data center accelerator card brings superior performance-per-watt to high-performance computing (HPC) and database workloads and easily scales through the Xilinx HPC clustering solution. Offering the highest compute density and HBM capacity in the Alveo accelerator portfolio. It delivers more parallelism of data pipelines, superior memory management, optimized data movement throughout the pipeline, and the highest performance-per-watt in the Alveo portfolio.



Xilinx Alveo U55C

Category: **CCTV**

EZVIZ TY1 Smart Wi-Fi Pan & Tilt Camera



EZVIZ TY1 2MP Smart CCTV is packed with a 360-degree field view, super-crisp 1080 video recording and smart tracking features. It includes features such as a motorized pan and tilt for 360° Visual Coverage which enables you to view the whole room with one camera, instead of needing multiple in different corners. The new product also enhances night vision with smart IR, which reduces areas of overexposure in video display for clearer monitoring of up to 10 meters at night. The camera will be available offline via EZVIZ official channel partners and distributors.

DELL

LATITUDE 5320 BUSINESS LAPTOP

LAPTOP

.....

Price: ₹ **77,500 onwards**

Dell has a wide range of laptops for consumers and professionals. Recently they announced a business machine to their Latitude series. The laptop is built on the Intel vPro platform powered by 11th Gen Intel CPU to deliver business-class performance without any glitch.

The latest laptop has a smaller footprint with a 13-inch screen with up to 4K displays resolution. The business machine is available with ComfortView Plus, low blue light solution. Let's explore more about this laptop

▼ Built and Design

The business machine has a solid body but is light in weight and compact in size. The lid is a little hard, it doesn't open single-handedly, which is a bit unfortunate. The display is awesome with very thin bezels on



Overall:

9/10

SCORE

PRICE: **8/10**PERFORMANCE: **9/10**FEATURES: **10/10**

KEY SPECS

Intel Core i5 CPU on vPro Platform; Intel Iris Xe Graphics; 13.3", Full HD (1920 x 1080), IPS; 256 GB SSD M.2 NVMe; 16 GB; Windows 10; 63Wh, 4-cell battery; Wi-Fi 6 802.11ax; Bluetooth 5.1; Audio jack 3.5mm; Fingerprint reader optional

PROS:

Overall Performance; Display; Comfortable keyboard; Multiple ports

CONS:

little hard hinge



the sides, on top, it holds the HD (or optionally FHD) camera with a privacy shutter. By the way, the laptop also offers an optional IR face recognition sensor.

The keyboard has decent key travel and clicky feedback, making your typing experience great. The review unit, I received, comes with a power button that also works as a fingerprint reader.

The touchpad is decent in size with good touch response but doesn't have dedicated buttons. The surface feels quite smooth to work on and the tracking experience is good as well. The bottom panel holds the speaker and the ventilation grill, with the hot air escaping the chassis from some vents on the back.

▼ Connectivity



The laptop comes with numerous connectivity ports, on the left side you can see two Thunderbolt 4 connectors, either of which can be used for charging; along with one USB Type-A 3.2 (Gen. 1) port and a MicroSD card reader. On the right, Dell added a security lock, an HDMI 2.0 connector, a USB Type-A 3.2 (Gen. 1) port, an audio jack, and a SIM card tray. It has the latest Intel Wi-Fi 6 and Bluetooth 5.1 for wireless connectivity.



▼ Performance

Packed with the 11th Gen Intel vPro platform, the laptop is equipped with an 11th Gen Intel Core i5 processor with 2.6 GHz clock speed along with 16 GB of RAM and a 256 GB SSD. The power-packed machine let me work on various apps simultaneously. Working on daily productivity apps like Ms-Office, Adobe Photoshop, Chrome, etc. it handled them quite efficiently. As most of the meetings are online nowadays, I used this for internal and external video meetings using apps like Zoom and Google Meet, etc. the laptop handled them breezily.

While browsing the internet and working on daily productivity apps, I didn't notice any performance lag. It was super smooth to switch between the apps and work on the PC even for longer hours while using the PC for more than a month.

It can even deal with heavy applications such as Adobe Suite. We used Adobe Premiere to edit videos and it was snappy in handling the editing tasks and rendering the video. To test its capability, we opened two chrome browsers with 10 tabs in each with applications like MS Word, Excel and Adobe Photoshop and Premiere. While operating the machine with all these applications running in the background, we didn't notice any performance lag. We were able to switch between applications.

The speakers were loud and clear. Mic did a fabulous job and the webcam on the incredibly slim top bezel was good enough for everyday calls.

▼ Battery life

Dell Latitude 5320 comes with a giant 4-Cell Battery, 63Wh battery that gives you juice to run for more than 8 hours with daily productivity. With some heavy usage, you can get over 5 hours of battery life. when you do multitask and run various heavy graphics-intensive apps, then it can last for around 3+ hours. ■

Bottomline: With remarkable specs, the portable laptop is an impressive performer. The light business machine is perfect to handle most of the business applications plus some heavy operations as well. It has a good battery life and overall great performance which is hard to beat.

MOLIFE SENSE 320 FITNESS SMARTWATCH

SMARTWATCH

Price: ₹ 3,499



Smartwatches were in trend, and COVID pushed this to become an essential part to be fit and healthy. Now there are numerous smartwatches, bands and hybrid options available to choose from. Molife recently introduced its Sense 320 fitness smartwatch that is loaded with various features, let's explore –

▼ Build and design

The Sense 320 fitness smartwatch has a 4.3cm IPS Capacitive Full Colour Touchscreen with a full zinc alloy metal body. The watch feels solid while wearing and it is designed with IP68 Water and Dust Resistance, meaning no need to worry even if you accidentally spill some water or sweat it out in the gym.

The watch comes with 16 sports modes and is compatible with Android 4.4+ and iOS 9.0+ versions. It offers seamless connectivity with Bluetooth v5.0. This also displays your phone's notifications and messages.

This Made in India Sense 320 smartwatch has dedicated sensors that give accurate readings of real-time heart rate, SpO2, and Blood pressure levels. It is powered by a 200 mAh battery that charges via Snap-on Magnetic Charging Connector and offers up to 7 days of battery backup and up to 25 days of standby time.

▼ Performance

Sense 320 has dedicated superior sensors which lead to accurate readings of real-time heart rate, SpO2 level, and Blood pressure. I used the device for more than 15 days.

Overall: **9/10**

SCORE

PRICE: **8/10**PERFORMANCE: **9/10**FEATURES: **9/10**

KEY SPECS

4.3cm IPS Capacitive Full Colour Touchscreen; IP68 Rating; 200 mAh battery; 16 Sports Mode; Bluetooth v5.0; Compatible with Android 4.4+ and iOS 9.0+ versions; Heart rate, SpO2 level, and Blood pressure

PROS:

16 tracking modes; Dedicated sensors for accurate tracking; Solid build; Battery life; IP68 rating

CONS:

Price could be a little lower

The watch delivers quite accurate results. It accurately measures steps, distance and calories burnt, useful to track your health and achieve your daily goals. Having 16 different modes you can track SpO2 (Oxygen) levels, monitor your sleep and various sports modes including basketball, tennis, swimming, football, etc. These may not be useful for many but for some of the people. Also, you can set up an alarm on it and control the music.

There are only a few skins available on the watch, though using the app you can download multiple dial skins plus customise the same. You can include an image and set that as we background as well.

▼ Battery life

The fitness smartwatch is backed by a 200 mAh battery which is amazing offers more than 8 days of backup with moderate usage. While utilising this at its peak, it was able to manage for 5 days. ■

Bottomline: The sleek and solid smartwatch has various useful features and dedicated sensors to track all the activities. Having amazing battery life, Molife Sense 320 is the right choice for people who want to monitor their daily health and fitness goals.



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of any vulnerabilities in your network.

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**INDIA'S
MOST DESIRED BRAND**
TRA's Desired Brand Report - India Study 2021

NOTHING STACKS UP TO EPYC™

3rd Gen AMD EPYC™ is the worlds
highest performing x86 server CPU.
Again.

AMD
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