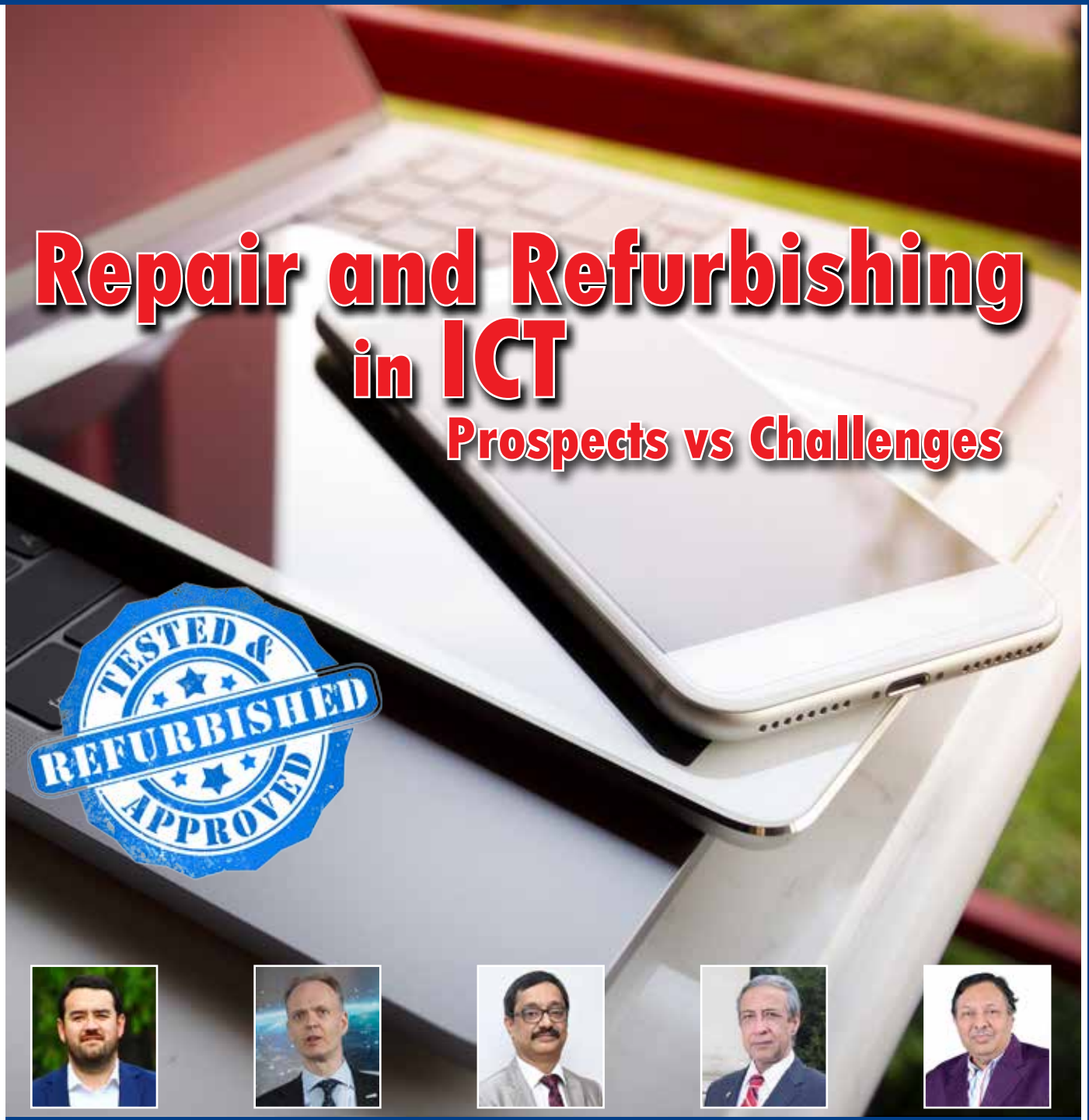
EL-SOFTECH

ICT UNBOUND

VOLUME 17 ISSUE 3 JUNE 2022

Repair and Refurbishing in ICT

Prospects vs Challenges



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Gurmeet Singh
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EDITORIAL

Repair and refurbishing market: Are we ready to tap it?

> "The focus on e-waste is going to make it easier for millions to repair and reuse their electronics instead of just throwing the device out. Importantly, this opens up a huge market for repair and refurbishing. Because of restrictions, stringent environmental laws and higher wage cost, repair works are going to be outsourced from the west."

Global market for repair and refurbishing has been estimated variously by different agencies. For instance, the Business Research Company, in its 2022 report released in January this year, said the global electronic and precision equipment repair and maintenance market size is expected to grow from $129.82 billion in 2021 to $142.14 billion in 2022. The market is expected to reach $195.55 billion in 2026, growing at a CAGR of 8.3%. The growth in 2022 is largely due to the near-normal post-pandemic scenario, which has considerably relaxed restrictive containment measures.

The expanding ICT repair and refurbishing market every year brings under its fold new verticals such as precision equipment, electromedical and control instruments, communication equipment like smart phones, home appliances like washing machines etc. The growth is driven by a number of factors. The main reason is the accumulation of e-waste, which is threatening to grow phenomenally as global electronics and related trades have shot to $4.5 trillion and sooner or later, it will overtake the oil trade. The burgeoning trade leads to higher e-waste.

Stemming out of this concern, newer movements are gaining ground to address the vicissitudes of e-waste and related problems. **The right to repair** is just not a sloganeering by the environmentalists alone. Heads of state are giving serious thoughts to it so much so that US president Joe Biden supported the right to repair at a recent cabinet meeting at the White House. This was part of an executive order he issued in July 2021 to reduce prices for consumers.

Global e-waste is set to grow to almost 75 million metric tonnes by 2030 annually, according to the UN Global E-Waste Monitor Report. Interestingly, Europe seems to be ahead of the US in identifying this menacing trend and tackling challenges through more stringent statutory measures, some of which have already been implemented and the rest are being discussed.

The focus on e-waste is going to make it easier for millions to repair and reuse their electronics gadgets instead of just throwing them out. Importantly, this opens up a huge market for repair and refurbishing. Because of restrictions, stringent environmental laws and higher wage cost, repair works are going to be outsourced from the west. There are a few countries which are well positioned to grab this opportunity, including China, Vietnam, the Philippines and Hong Kong. India's present repair and refurbishing market is estimated at $5 million, which does not reflect the potential. According to MAIT, the organization, which is championing the cause of the circular economy including repair and refurbishing, India has a potential to emerge as a US$20 billion annual market, creating five million jobs.

To tap the potential, to usher in a circular economy and to catch up with its competitors, India has to traverse a long distance, be it in terms of creating a conducive ecosystem for promoting repair, visiting regulatory barriers, re-export (shipment) of products, patent issues, guaranteeing quality of repaired products, etc. El-Softech, in the present issue, attempts to closely look at the subject to map the potential and evolve a pathway for India to become a major player in the segment.

India's SaaS Dynamics Unbundled

The global SaaS sector experienced unprecedented growth over the past year, as companies, universities and governments scrambled towards digital transformation in order to make their products and services available online and conduct business remotely during Covid-19.

Indian SaaS (Software as a Service) companies have leveraged these tailwinds to reach new heights in terms of both scale and scope in this period. There are nearly one thousand funded SaaS companies in India, ten of them are valued at over a $1 billion to achieve unicorn status. The startups now generate $2-3 billion in total revenues and employ nearly 40,000 people.

According to the latest findings, if Indian SaaS providers can execute to their full potential, they could potentially generate annual revenues of $50-$70 billion by 2030 and win 4-6% of the global SaaS market. This represents a value-creation opportunity up to $1 trillion.

Importantly, Indian SaaS companies are getting wider international recognition and offer a wide range of services across finance, education, healthcare, and wellness. El-Softech predicts that this is the most promising sector in the software segment. India's future growth prospects in the future segment hinge on SaaS. Innovation and research are the two pillars the SaaS landscape depends on for its growth.

Keka

Keka is a HR and payroll management software designed for modern organizations. It offers services like applicant tracking, leave and attendance management, time tracking, and more. This software addresses real-time HR issues and help in managing employees. The company has global clients, especially in the UK and US.

Zoho

Zoho Corporation Pvt. Ltd is headquartered in Chennai and provides services like CRM, inventory management, mobile application development, project time tracking, collaborative client portal, and more. Zoho invests in R&D and customer service.

IBSFintech

IBSFintech offers financial solutions for managing corporate trade finance and Forex treasury. Its seamless solutions help global corporates manage their finances. The company's offerings include derivatives, money, currency, and commodity modules, all of which can be integrated with third-party tools.

VTION

VTION is an innovation company that aims at measuring media audiences by analyzing consumer trends and behaviours. The real-time data provided by VTION provides valuable insights that help marketers and advertisers understand customer behaviour patterns.

El-Softech, in this edition, compiles from reliable sources a list of 15 Indian SaaS companies to be watched in the coming years, which can be game-changers.

India has seen exponential growth in SaaS investments in the last decade. As SaaS is becoming a buzzword in recent years and that trend is also discernible in India, there are inquiries from public and from a limited segment in the ICT sector about this. To the uninitiated, a SaaS is an application-focussed company and a service provider. It hosts applications and makes them available to customers over the internet. SaaS companies are responsible for maintaining databases and servers and making sure that users can access the applications from almost all devices.

A report from Bain & Company predicted that "Indian SaaS companies will reach $30 billion in revenue by the year 2025". Based on this, it can be said that Indian-origin SaaS companies could capture an 8% to 9% share of the international SaaS market. The report also highlighted that the spending in space went up to 170% in 2020.

Paperflite

Paperflite offers UX-focussed BI Software designed to boost social media content performance. The tool helps businesses identify the best content for all of their communication channels, share it with their audiences, and track how they connect with it. Companies can create content that increases conversions and dialogues by using the tool's metrics.

Freshworks

Freshworks specializes in providing SaaS customer engagement solutions to businesses of all sizes and provides organizations with ready-to-use software that is simple to set up and utilize. Freshworks' products include Freshchat, Freshservice, Freshsales, Freshdesk, and more.

Visual Website Optimiser

VWO offers solutions to identify and act upon growth opportunities. The company helps marketing, engineering, products, UX, and analytics teams of different companies. VWO is more than just a technological platform. It has a team of conversion-centric designers, content writers, and optimization strategists.

Facilio Inc

Facilio Inc is a popular SaaS startup, which uses IoT and machine learning to help businesses run more smoothly. This company's objective is to develop smart technology that provides facilities for all employees that engage in any firm. The company's products help simplify real-time work.

Software, including SaaS, now comprises $600 billion of the $3 trillion global enterprise IT and communications spending market. But with an 8% annual growth rate, its upward trajectory is almost twice the pace of the overall market. Should this remarkable growth continue, the SaaS market is expected to be worth about $1.3 trillion by 2030.

Today, 55-60% of global IT and operations workflows are delivered from India, which hosts 3 million developers, the world's largest pool. This deep talent pool and our right legacy of IT services bestows us with a strong foundation to target untapped potential in new segments. We see these markets are "India's right to win". Beyond our affinity to horizontal SaaS solutions, vertical SaaS and developer tools are two large sectors that lend themselves well to India's strengths.

Vertical-specific software needs deep domain expertise that our IT professionals have in spades. As the world moves from legacy on-premise software to SaaS, this opens up a large new vector for Indian companies to target. Today, SaaS accounts for 35% of the overall software pie but is poised to take a much larger slice over the next decade. Indian vertical SaaS startups such as Zenoti have already reached unicorn status and there are a number of other promising companies set to follow this lead.

CloudCherry

CloudCherry is a cloud-based CRM company that assists its clients' tracking and enhancing their customer engagement. It maps customer journeys, collects omni-channel input, and calculates Net Promoter Score to help organizations track and enhance customer engagement. The services offered by CloudCherry include customer journey map, text analytics, integrations, predictive analytics, dashboards, actionable insights, and more.

KlentySoft Inc

KlentySoft Inc is a sales engagement tool that allows the marketing team to send customized emails and follow-ups to leads. The company offers many solutions that help to automate all of the sales process' repetitive chores, such as sending follow-up emails and tracking engagement metrics. The sales team can concentrate on developing customer relationships and converting leads.

Talview

Talview is one of the fastest hiring and recruitment software for enterprise employers. This platform empowers organizations to enhance and speed up their hiring process and offers various services, including talent acquisition, online assessments, asynchronous and live video interviews, talent management, remote proctoring, behavioural insights, recruitment marketing, and more.

SaaS landscape

7 SaaS domains could be core drivers of a $500B market opportunity (by 2025)

Indian SaaS ecosystem is well positioned in multiple areas e.g., **Developer Tools & Vertical specific software**

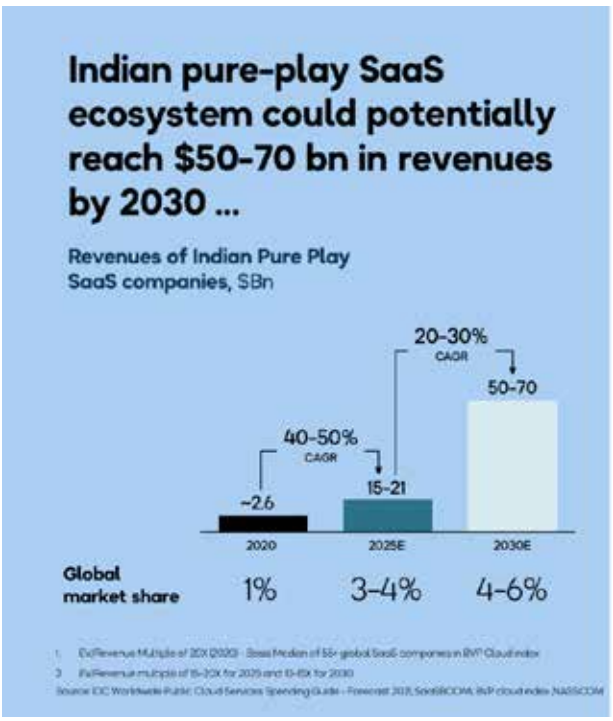
Reinvent **go-to-market for digital** (especially enterprise), and **excel in product** (product management, design, ops and engineering)

Growth rate of Indian SaaS ecosystem could **double** as they **pivot to driving high growth over medium/long term** instead of focusing on immediate profitability

5 key imperatives for Indian SaaS ecosystem

The other segment in which we have a beachhead advantage is developer tools and system infrastructure. Our large pool of developers not only gives us a ready domestic market, it also endows us with a deep understanding and an intimate first-hand experience of the problems to be solved. The pandemic has accelerated the shift to remote selling and the developer tools market lends itself very well to product-led growth motions that Indian SaaS companies can excel at as companies such as BrowserStack and Postman have already demonstrated.

While these opportunities beckon, all stakeholders including startups, VCs and ecosystem enablers, would need to work together to achieve excellence.



BYJU'S

BYJU'S is an e-learning programme, and this platform focusses on simplifying mathematics and science concepts. The company had introduced its Disney BYJU app in 2019. This new app imparts elementary learning through Disney's characters.

Playtonia

Playtonia is an e-sports platform technology company that helps online gamers connect and develop communities. The SaaS company arranges and promotes a variety of e-sports leagues for gamers. The company is presently working on incubation cells, gaming certificates, and setting up a variety of gaming cafes. The company is also working on establishing an exports virtual reality (VR) academy.

Hippo Video

Hippo Video is a CMS SaaS that serves as a distribution platform that creates and distributes personalized videos. The platform helps create customized videos for businesses in all stages. The USP of the company is personalized video content – leveraging video content for interactions that helps businesses increase their sales.

Agile CRM

Agile CRM is known for its sales and marketing solutions designed for SMBs. It provides a single platform for automated marketing, sales, and other services. Besides, it offers lead generation, contact management, and integrated telephony services. It also offers marketing automation, such as email marketing campaign management and social selling tools.

Technology Extravaganza

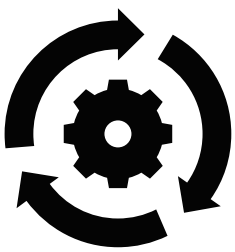
When will Artificial Intelligence (AI) transform the technology landscape?

There is no convergence of views. A few predict it would be shortly in the span of five to seven years and several other IT buffs feel it might take longer years than that. Major beneficiary in the dispensation will be ICT. In 2022, analysts predict, many experiments with AI will come to fruition. That includes significant business problems, which will have business-focussed solutions.

El-Softech explores the areas and domains that will be set for a transformation in the coming years impacted by AI, which is a compilation from many scientific sources and published materials.

1. Data Processing on a real-time basis

Organizations will strive to build flexible data pipelines to support their appropriate decision-taking process on a real-time basis. They have to sieve through thousands of sources containing structured and unstructured data. Traditional ETL (extract, transform, and load) will be complemented with more scalable data lakes, and in many cases data streams must be provided to be processed in real time.



2. Robotic scare or optimism?

Algorithms and machines will be primarily focussed on the tasks of information and data processing and retrieval, administrative tasks, and some aspects of traditional manual labour, according to the World Economic Forum's Future of Jobs report. The tasks where humans are expected to retain their comparative advantage include managing, advising, decision-making, reasoning, communicating, and interacting. By offloading mindless computer work to bots, organizations can reduce monotony in certain jobs and appeal to people's creative, intellectual nature. The extensive use of automation will help in lowering the cost of goods and services, thus reducing the cost of living to a certain extent.

3. AI enables effective supply chains

Intelligent supply chain applications should become the rule rather than exception in going forward. From supply and demand planning to digital manufacturing and logistics, supply chains in 2022 will be continuously transformed. IoTs or machine language will be used extensively to enhance productivity and precision. There will be a spurt in the production of apps and applications which will be run on AI and IoTs.

4.

Autonomous Transportation

The complete transition to an AI-guided transport system will soon be a reality. Companies like Google, Uber, and General Motors are striving hard to establish themselves at the top of this market. Algorithms designed to enable machines to learn from human inputs will be crucial in ensuring that these systems operate smoothly and efficiently. These vehicles can take the form of passenger cars, like the kind Uber runs now; or the one Google has been testing for years.

5. Education powered by AI

In future, AI-powered education systems will learn individuals' preferences, and by aggregating the data, these systems will be capable of accelerating education research and the development of new tools. The future of education will witness the utilization of intelligent tutors and other AI technologies to deliver personalized education. The use of AI will widen educational access, making learning lifelong, and retraining easier. Earlier predictions surrounding the technology suggested that in future it will be possible to process individual student data, so that someone needing extra attention can be imparted, recognized and helped.

6. Entertainment and Artificial Intelligence

The entertainment industry is expected to transform in a bit different manner. The use of AI will make the industry more interactive, personalized, and engaging in the future. Proliferation in the use of sensors and hardware will witness virtual reality, haptics and companion robots increasingly enter the home. Moreover, users would be able to interact with entertainment systems conversationally.

7. Healthcare re-imagined

AI promises the capability to automate medical diagnostics by mining patient records and the scientific literature. This technology will allow doctors to focus primarily on dimensions of care while utilizing their experience to guide the process. Personalized medicine will soon become a reality owing to the data obtained from patient records, wearables, mobile apps, and personal genome sequencing.

8. Home and Service Robots

Within the next couple of decades, there will be advent of AI machines with the ability to deliver packages or clean the offices. The robots will make use of the Cloud connection to share data for accelerated learning. Moreover, the use of low-cost 3D sensors will aid in speeding up the development of perpetual technology. Also, these machines will be able to better interact with humans, owing to progress in speech comprehension techniques.

9. Low-Resource Communities

AI will prove useful for assisting low-resource communities.

AI and predictive analytics techniques will facilitate government agencies in better allocation of limited resources by helping them forecast environmental hazards or building code violations. Responsible organizations can make use of AI-based planning to distribute excess food from restaurants to food banks and shelters.

10. Predictive Policing

Policing is yet another domain where the future of AI can have a major stake. Within a decade, cities will fully rely on AI technologies for detecting and predicting crime. Surveillance agencies will use the power of AI in automatically processing CCTV and drone footage, which in turn will help in easily and swiftly identifying anomalous behaviour. Studies suggest that in the United States, 20 of the nation's 50 largest police departments have utilized predictive policing software, to forecast the probable places where crime might occur, or to identify probable victims. However, fears surround around discrimination based on the idea of biased data.

11. Space Exploration with AI

NASA builds Robots for future Space Exploration projects.

Artificial Intelligence is not a new technology for NASA, as the international body for space has already utilized unmanned shuttles, rovers and probes to explore distant galaxies, which could have otherwise taken several years. These AI-powered vehicles can identify obstacles, like craters, and find safe paths of travel around them. For the future, AI can be instrumental in times of emergency, as the technology can help astronauts identify and prevent problems before they occur.

12. Weaponry in the world of AI

Significant research is being undertaken to develop weapons capable of targeting, and firing on their own. The use of AI for this purpose is a controversial topic, as the consensus dictates that humans have ultimate control over any kind of weaponry. Some technology leaders have gone to the extent of calling an outright ban on the production or use of autonomous weapons, lacking human control.

ICT on a Growth Prowl in Rajasthan

Interview with Dr Mukul Gupta

Founder, BM Infotrade Pvt. Ltd

Dr Mukul Gupta is the founder-director of B M Infotrade Pvt Ltd and has Ph.D. in Mathematics in the broader area of Basic Hypergeometric Series which is directly related to the work done by the renowned mathematician Ramanujan. Dr Mukul is a dynamic IT leader who has always believed in transparent communications and commitment. Under his able leadership, the company has successfully delivered many projects within its strict timelines. El-Softech had a brief virtual interaction with him and excerpts are given below.

El-Softech : *Can you give a brief of yourself and an overview of what your company is doing?*

Dr Mukul Gupta : I always have had a vision of creating or owning something of my own right from my childhood and have had visualized this dream almost every day. I was a daydreamer who used to churn up ideas now and then and used to work hard to turn them into reality.

As I grew up, this ideology of mine grew up with me, which made me focus more on my academic achievement. Turning my imagination into reality is what motivated me to pursue Ph.D. in mathematics. As we all know, Math is the base of everything around us. With mathematic alchemy power in my hand, after my academics, I packed my bags to achieve the dream that I have always seen.

I believe that the thought and attitude of an individual change as much as he or she travels and meets new people. My idea of creating something of my own has changed its shape as I travelled around. I learned that providing service to the needy at the right time is what the world needs in today's time and age.

Apart from that, the sense of gratitude and satisfaction that we receive after helping someone is what makes my life more cheerful at every moment. This experience of mine is today shaped in as B M Infotrade Pvt. Ltd.

Providing IT services to the clients in need and helping them achieve their dreams is what me and my family members at B M Infotrade Pvt. Ltd. is doing. As a dreamer, myself; with my knowledge, expertise, and experience, I always try my level best to turn my client's dream into a reality as I have turned mine into reality.

As they say "once a dreamer, always a dreamer". Here I am as a dreamer who is trying to show other young dreamers the way to change their dream into reality.

Our excellence in IT industry is for more than 25 years now and we thrive to be among the top IT companies worldwide. We have expertise on Cloud Technologies, Data AI, Software Developments, and Cyber Security. Our best-in-class managed services gives improved design, agility, migration, optimization, and customer satisfaction. We are proficient to provide seamless end-to-end services round-the-clock.

El : *You are into cutting-edge technology, be it AI, Robotics, Cloud, etc. We would like to know more about these verticals that you are working on?*

M G : In the International market, we are focusing on verticals that involve Cloud Technology, Data & AI, Cyber Security, and Application Development.

In Cloud Technology: Migration & Implementation, Workload migration from on-prem to cloud, Disaster recovery & back-up on cloud, Dockers & Kubernetes for legacy applications, Autoscaling, Office 365 implementation & mail migration, & Strategy as per target infrastructure.

In Data & AI: ETL - Extract, Transform, Load, Data Mart – Warehousing, Data Analytics, Data Visualization, Data Modeling – AI.

In Cyber Security: Security operation center – SOC, Mitigation from ransomware & virus attacks, Mitigation of cyber-attacks at dark mode, Greater visibility of complex & massive IT infrastructure, Cloud security frameworks, and Vulnerability and penetrating testing – VAPT.

In Application Development: Customized application development, Software design and architecture, Mobile application – Android application, IOS application, and Web development.

El : *Can you mention the names of companies outside India that you are working for?*

M G : There are many. We are working as an offshore center.

EI : *You are into an expansive scale of verticals like education, hospitality, hotel bookings, healthcare, and cybersecurity. Which of these is your forte?*

M G : Firstly, as an answer to your question, I would like to say that there are two different approaches for go-to-market, one for the Indian market and another for the international market. In the Indian market, we are selling hardware and software products. In the international market, our focus is on the services in the four major verticals – Cloud Technology, Data & AI, Cybersecurity and Application Development. The GTM of BMIPL for International market is through partners rather than approaching customers directly. We prefer to build partner networks and our company's strategy is to serve our customers in accordance with the partners located at different countries.

Hyper Converged Server Hardware

EI : *You mentioned about Middle East. Other than Middle East, are there other areas on which you are working on?*

M G : Yes. We already have partnership agreements with Togo, Azerbaijan, Mexico, Angola etc.

EI : *Some of the ones that you mentioned are not countries that speak English. Do you face difficulties in making business communications with them?*

M G : Majorly we have had no such difficulties. Translations of key words are made through our partners and meaning is derived out of them. As we are mostly working through the partner companies in those countries which understand English, communication is taken care of.

EI : *You have been active in various verticals such as cloud, Data and AI, and IT security. Could you explain your involvement in each of these segments briefly?*

M G : Our expert team designs the optimized solution as per the requirements of our customers. BM Infotrade provides you with consultation that help you decide and choose from various technologies and solutions.

EI : *Your products and solutions are spread over a number of segments like education, hotels and hospitality, manufacturing, and the like and you have a number of high-profile companies as your clients. Can you please give us a brief of your activities in these segments?*

M G : We provide our technology services to SMB, Corporate, Enterprises, and Blue Chip companies. We focus not only on building tech infrastructure but also on securing and maintaining it. Our company has been delivering the best results since 1996 to the existing clients, and we wish to do the same for all future ones. With a combined experience of over a century, B M Infotrade has become the go-to partner for its clients for solving problems using technology. We believe in transparent communication and transactions to ensure a long-term relationship with our customers. To provide the best quality solutions to our clients, we have certified team of engineers and our company is ISO 9001:2015 Certified.

EI : *You have as partners some of the biggie OEMs. To name a few: IBM, Google, Oracle. Automation Anywhere, Linux, etc. Could you explain your organization's relationship with them? How do you work together?*

M G - To provide our clients with the best solutions to their Technology problems, we carefully select our vendors. Various factors like their financial status, market credibility, quality, timeliness in delivery, and other aspects are taken into consideration.

EI : *What are your major clients outside India? What do you do for them?*

M G : Due to NDA, we cannot disclose the names of clients. And we have our focus to provide excellent services in four pillars such as Cloud Technology, Data & AI, Cyber Security, and Application Development.

EI : *In five years' time, how do you envision yourself?*

M G : We will try to ensure Long-term relationship with our esteem customers and want to serve technology to our customers through which they can increase their business revenues. To be a preferred go-to partner for all our customers by understanding their pain points and resolve through innovative technology.

EI : *It is mentioned somewhere in your company's profile that you have a 100 years background. Could you throw some light on that?*

M G : We have a combined technical experience of our team members for more than 100 years.

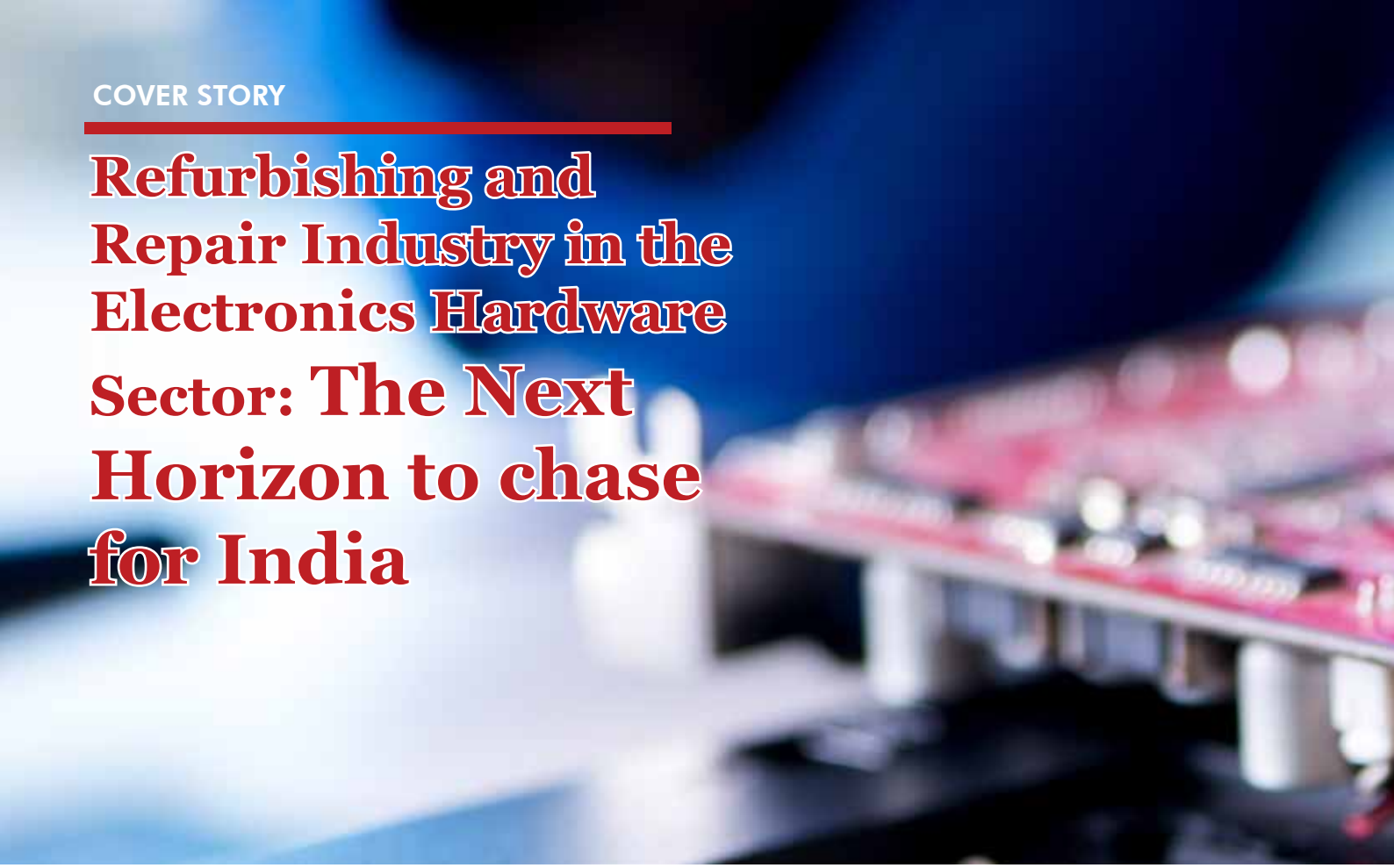
EI : *What do you think the government could do to promote the IT industry in Jaipur?*

M G : Physical Space is one of the areas where something could be done. Government could provide infrastructure at subsidized rates for setting up of IT company offices - offices that are big enough for 500-600 employees. A few big companies have built their own office building in Jaipur. If this is taken care of, automatically IT companies would show interest.

EI : *Is any government incentive being given to you?*

M G : Not applicable to us.

Refurbishing and Repair Industry in the Electronics Hardware Sector: The Next Horizon to chase for India



India's renewed thrust on local electronic manufacturing and its hunger for digitalization is shaping the contours of another sunrise industry - a sector which was hitherto untapped, a sector which has the potential that even the software sector did not have in its infancy in India. This sector is the electronics repair and refurbishing sector.

ICT sector is ever expanding. In its growth dynamics, businesses are created, scaled, and at the same time, some of the archaic devices are discarded and buried in the labyrinth of time. Of course, the question arises what are the businesses and devices that are created and discarded. There are many examples that can be pointed out. More visible example of business being created in the ICT sector, specifically in the electronics hardware sector, is repair, refurbishing and retrofitting.

How these verticals of businesses have come into being is another story. There are rationale and philosophy behind the emergence of these segments. The repair, refurbishing and retrofitting industry in the ICT sector is a direct impact of a few factors. The foremost is environmental, since accumulation of e-waste causes environmental degradation. Coupled with that is the price consideration from the consumer perspective. If smart phone user have to throw away their device every two years or even at a lesser timeframe, it causes deep holes in their pockets. The short span of usage of an electronic device has a double whammy or triple whammy effect. The device has to be thrown into the dustbin in a cycle of two years or so. One can imagine how it can add to the e-waste, which is threatening to reach menacing proportions. Equally important is what that causes to the consumers. If they go on acquiring new devices, whether it is smart phone, air conditioners, washing machines or medico equipment, one can imagine the impact it can have on the pocket. That is why there is a stress on the re-use of the electronic devices after repair and refurbishing. Countries that are in the forefront of digitization are evolving strategies and norms for reuse, such as the US and Europe, where mass awareness is created and legislations are brought to the forth ensuring refurbishing and repair, thereby increasing the lifespan of a device or equipment. Right to repair, as has been talked about in the west, is becoming a powerful slogan - as much as right to live, right to food and right to employment.

Where does advantage lie for India in the emerging architecture of right to repair and re-use? Developed world, which will be the hub for proliferation of products that have to be repaired, will not be able to do so because of the high cost. If there is a mandatory backing that the customer should have the right to repair, they have to send the devices for repair at a shop there. Not many will be able to do so because of the prohibitive cost. They would like to send the devices to destinations that are cheap and at the same time efficient in repairing and refurbishing. Not many such destinations are there except countries like China, the Philippines, Vietnam, Hong Kong and, of course, India.

MAIT (Manufacturers' Association of Information Technology) in its study has pointed out that if requisite initiatives are provided for promoting the electronics repair sector, the country is expected to witness a generation of five million

direct job opportunities in the next four years from now. Moreover, in the present scenario of the Covid-19 pandemic which has resulted in all-round chaos in the economy, forced businesses to lay off employees and left millions of Indians jobless. This sector is expected to be the next sunrise sector, a boon, which shall open up new job opportunities, thereby improving the rate of employment in the country.

The repair of in-service electronic equipment will most certainly enhance its life, thereby reducing the amount of e-waste which would have been generated had the electronic gadget been discarded as waste. A lot of repairs are already happening within India for locally available devices. India has a distinct advantage over China and Europe over cost of labour, while it also has world-class repair infrastructure owned by both Indian and foreign companies already located within India. All that it needs for the big orders to start flowing is an enabling Electronic Repair Service Organisation (ERSO) Policy.

What will be this market like? 'Mindboggling' is the short answer. In 2017, the repair market in the US itself for electronic devices was US$20 billion. Europe would also have that quantum of goods to be repaired. Because of the cost and environmental factors, these devices are going to be sent to cheaper and efficient destinations where cost of repair is low but guaranteed to be of quality. There lies India's chance to convert the opportunity into a multi-billion dollar industry.

But India needs policies that bridge the existing gap - policies that:

Create Repair Hubs where all custom and tax clearances are enabled through an efficient and time-sensitive process. This is especially important as the repair business has tight customer-friendly timelines that require equipment to travel from a landing port to a repair hub and back to the shipping port within 5-6 days after having been repaired.

Ease Custom Process - De-linking equipment serial numbers imported for repair with those being exported back post repair. The present system requires only the same equipment that has been imported for repair to be exported back and serial numbers are matched by the custom authorities. The repair industry however, finds it much more convenient to ship a piece that it had repaired earlier and which it stored as a 'standby'.

Create Logistic Repair Corridor/Channel – In order to keep the TAT as low as 5-6 days, it is essential that the government creates a logistic channel/corridor that eases landing port to repair shop movement. The present custom processes would need to be streamlined; technology would have to be exploited to another level.

Incentivise Repair of Foreign Equipment – Repair of foreign equipment needs to be incentivised to tip the repair economy scale in India's favour in the global repair arena. This incentivisation could be by way of reimbursement of excess tax revenues earned from this very sector by the government. This simple mechanism can potentially incentivise growth of ERSO at scale.

While manufacturing relies on proportionate imports, the repair industry is a highly labour-intensive industry and has excellent profit margins. As repair grows in India, so would the consequent demand for electronic components. With robust orders, Indian electronic repair companies would command greater leverage in sourcing of these components from abroad. It would also result in creation of a strategic component stock within the country, something that the country urgently needs in times of global supply chain disruption. Slowly but steadily, component manufacturing would also shift under the weight of heightened demand.

The enablement that is required by the country for making India an electronics repair hub is an effective ERSO policy - a policy that incentivises repair of foreign equipment and enables a wholesome regulatory-cum-logistic solution. A system where logistic and regulatory timelines are kept within a tight control and there is a mechanism to resolve Industry issues in a responsive manner.

Refurbishment and Repair: Are they esoteric concepts?

Refurbishment in the ICT sector is the distribution of electronic products that have been previously returned to a manufacturer or vendor for various reasons, not sold in the market or new launch of a product. Refurbished products are normally tested for functionality and defects before they are sold to the public. Repair and Maintenance is about restoring machinery, equipment, and other products to working order. The establishments that repair or refurbish, also typically provide general or routine maintenance (i.e., servicing) on such products to ensure they work efficiently.

"Refurbished" is different from "used". Refurbished products have been tested and verified to function properly, and are thus free of defects, while "used" products may or may not be defective. Refurbished products may be unused customer returns that are essentially "new" items, or they may be defective products that were returned under warranty, and resold by the manufacturer after repairing the defects and ensuring proper function.

Different companies and industries may have different types of "refurbished" products. Since the electronics industry doesn't have a firm, widely accepted definition of "refurbished", its exact meaning may vary from product to product, or from one company to the next. In various cases "refurbished" may be synonymous with "reconditioned", "refreshed", "repaired", "recertified", or "like new".

Now it is time we need to seriously think of recycling of our electronic products since we cannot afford to keep on accumulating unwanted parts of waste on our planet.

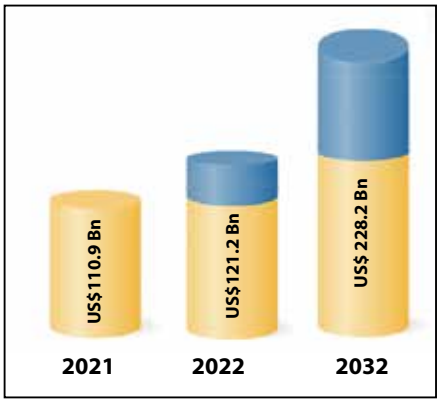
Advantages of Refurbishing

Refurbished can be Better than New

It is a fact that it is possible to achieve quality and longevity in refurbished products. Added to that is the advantage with acquiring a product that is up to 70% cheaper. While refurbished products are often only a generation or two behind the latest tech, they will offer comparable performance. Though the products can contain traces of use, it has minimal visible difference. And above all, reusing hardware leads to diminished production of new units and can save a huge amount of carbon, water and materials.

As repair grows in India, so would the consequent demand for electronic components. With robust orders, Indian electronic repair companies would command greater leverage in sourcing of these components from abroad. It would also result in creation of a strategic component stock within the country, something that the country urgently needs in times of global supply chain disruption. Slowly but steadily, component manufacturing would also shift under the weight of heightened demand.

Refurbishing - Market Size and Forecast (2021-2032)



Global Refurbished Electronics Market: Dynamics

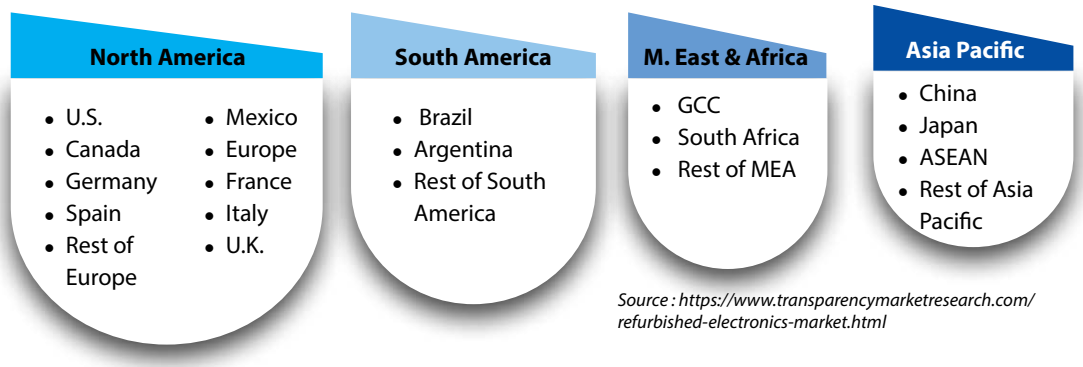
Key Drivers

The rise in e-waste discarding and increasing demand for affordable electronics such as computers, laptops, micro vans, and speakers are the major factors driving the growth of the refurbished electronics market. Additionally, the growing number of electronics companies globally, executing different marketing strategies such as discounts and warranty on refurbished products are enticing consumers to use these low-cost refurbished products without compromising on standard working quality. Furthermore, the government in developing countries such as India is striving to attract foreign companies in the IT and electronics sector. Thus, price benefits and warranty on refurbished electronic products are fuelling the growth of the refurbished electronics market.

Regionwise Analysis of Refurbishing Market

(Source : www.transparencymarketresearch.com)

Market, by Region



Source : https://www.transparencymarketresearch.com/refurbished-electronics-market.html

Asia Pacific to Account for Major Share of the Global Refurbished Electronics Market

In terms of region, the global refurbished electronics market is divided into North America, Europe, Asia Pacific, Middle East & Africa, and South America.

APAC is anticipated to witness the highest market share in the refurbished electronics scenario owing to the extensive production capacity and availability of refurbished devices to provide the equipment in secondary markets, which is further boosting the growth of the refurbished electronics market in the respective region.

North America is expected to witness the highest growth rate in terms of revenue in the refurbished electronics market due to rise in government regulations on reducing e-waste. This in turn will not only help in reducing e-waste, but will further help companies to pursue business opportunities from old and used products.

Competitive Landscape

Key Players Operating in the Global Refurbished Electronics Market

Providers of refurbished electronics are implementing development strategies to enhance their presence and consolidate their share in the market. Refurbished electronic providers have adopted major growth strategies such as partnerships & acquisitions, and forming regional and global distribution networks in order to increase their presence in the market.

Key players operating in the global refurbished electronics market include:
• Apple Inc.
• Acer Inc.
• Back Market Inc.
• Overcart
• Dell Inc.
• Hewlett-Packard
• Amazon Inc.
• ASUSTek Computer Inc.
• Samsung Electronics Corporation
• Lenovo Group Limited
• ReBoot

In May 2020, Back Market Inc., an online marketplace for refurbished devices, announced a funding round of US$120 Mn from investors, including Eurazeo Growth, Aglae Ventures, and Goldman Sachs, generating more opportunities to sell refurbished electronic devices.

Product Type
• Smartphones
• Wearable Devices
• Computing Devices
• Home Appliances
• Sound and Vision
• Gaming Consoles

Global Refurbished Electronics Market by End-user
• Corporate Offices
• Schools and Colleges
• Government Offices
• Individuals
• Others

In June 2021, Associated Banc-Corp, a U.S. regional bank holding company, entered into a partnership with nonprofit organization Digital Bridge and assembled about 100 refurbished laptops and computers, and provided them to the United Way of Greater Milwaukee & Waukesha County.

Cost-Effectiveness

In the midst of the pandemic, individuals limited their spending capacity to satisfy their urgent necessities as it were. A refurbished item, which is just about as good as a new gadget at a comparatively lower value, makes an optimal option for them. The refurbished market additionally offers great discounts, doorstep conveyance, no-cost EMI, guarantee, demo choices, item installation, and buyback options just like the market for new goods. Such choices impact buyers' decisions as brands offering refurbished electronics simplify the whole cycle, which likewise assists them with improved goodwill. Since new models are launched every other week, and the youth is attracted to every new launch, buying refurbished gadgets permits them to have better quality at reduced prices.

Digitization

The lack of access to a better stage to buy pre-owned electronic gadgets has given rise to several brands' interest in re-commerce. The online visibility of refurbished items gives buyers a clear view of the product and the state of the gadget. For refurbished mobiles in India, for example, there are so many websites and online stores where you can get an incredible incentive on each piece.

Unicorns in Repairing and Refurbishing can Emerge in India

Nitin Kunkolienker, President of MAIT is leveraging every opportunity for advocating the cause of refurbishing and its payoff to India. El-Softech had a detailed discussion with him in this regard and excerpts are captured here.

"The electronics repair industry has the potential of becoming an emerging sector for employment growth in India. With the right regulatory support from the Government of India, the domestic repair service sector in India can experience a tremendous boost".

Nitin Kunkolienker, President, MAIT

EL-Softech : *As you have rightly said, you are one of the persons who have espoused the cause of repair and refurbishing of ICT products. We have been noticing this as I have read a well-informed article of yours in the Economic Times. The market would reach US$20 billion. Right now it is US$5 Million.*

Nitin Kunkolienker : Actually it is much more, considering the activities in the unorganized segment. But it is better to make conservative statement. We Indians are repair centric, no one likes to scrap a product. This involves multiple levels of repairs. In this process, very informal, but huge level of repair potential exists in the country that has not been tapped. They are neither part of the organized service nor the repair systems of the corporates. They exist beyond these, in their own place. In 60 to 70 percent cases, a solution is found that does not exist in the formal structure. It shows that India has layers of skills, one being the formal skill that gets into the formal system, and the other that exists in the informal system. People realize that formal repairs are expensive and take their product to the non-formal one. A mobile that is giving trouble to the user is sometimes given away to somebody who gets it repaired from the secondary market. It is a system that is unique and exists in India, and one that we should be proud of. Whereas a mobile is discarded in a short time in other countries, in India it is reused and effectively used for five years over. This reduces e-waste. So, if this type of skill exists, we need to formalize them. India is a knowledge Society. Why we excel in IT is because our knowledge structure is way ahead of others. So, my larger mission is to take forward the knowledge part of the IT hardware industry beyond manufacturing and to repair- centric services. So, there are three facets. One is manufacturing-centric, the second is design- centric and the third - the largest, that can penetrate deeper into the country - is the repair- centric. Our mission is to work towards India becoming a global repair centre that brings global revenues. Globally, repairs do not happen. They just discard a product as scrap. That gives scope and opportunity for India. People with skills that existed in them since the last thirty years, could now be used which would also uplift them to a higher level. Excellent creative and intelligent ITI or diploma holders are available in massive strength in our country. A lot of entrepreneurial opportunities will emerge. I foresee at least four to five unicorns emerging in the future in India through this mission. So, it is a big game. How government sees this and removes the hurdles will decide the structure and future of this emerging industry.

EI : *You made it very clear that it is a billion dollar issue. Now what is it that holds it back since you or somebody else had been talking about this since 2015 or 2016? I read somewhere that the government was very positive but things did not change much.*

NK - I must tell you with utmost honesty that when I took over as the President of MAIT in 2017, I was talking about the repair industry and they got interested and promised support. That was a game-changer. In a roundtable conference, we, the industry people, and others discussed the matter and things started happening. But there wasn't much push. About eight months we started discussing the matter with stakeholders more vigorously and it gained support. In the government initially, there was no stakeholder who could take things forward. Then-Shri Ashwini Vaishnav took over as the new Union Minister of Telecom and IT. He took particular interest in the idea. He recognised the opportunity that was presented by MAIT and agreed to support the initiative. Earlier this month we had a detailed meeting with all the stakeholders on the issue. I foresee a very good going ahead. The Hon'ble Minister has assured to take other stakeholder departments on board and work to reduce bottlenecks that are present or are likely to arise. So we are delighted to see the turn of events and the speed that it gave to the idea.

The global electronics product market is worth close to US$3000 billion. With the average product life of 3 years, the total value at the moment comes to US$9000 billion. Close to 4% is the warranty cost which means that it is about US$350 billion. Spare parts cost comes to 50% of the warranty cost which means it is about US$175 billion. The repair cost is estimated at 40% of the spare part cost. Actually, it is more but we will be very conservative. I am sure if the government spreads the red carpet, it will be a revolution in the electronic hardware sector, opening many opportunities for skill development education.

Production can sometimes go into epidemic losses due to design flaws. This would affect the whole value chain. But a very smart repair-centric process can help you to diagnose the epidemic much earlier which in turn will improve the efficiency of the entire value chain. It can also give substantial inputs for the design. There is immense scope for working on your efficiency and competitiveness.

EI : *One point which I wanted to check with you - recently the US President Joe Biden coming out with a legislation furnishing modality repair. He issued an order on right to repair. As I understand, there was a lukewarm support to EU for doing that. The focus was more on other devices like washing machines, refrigerators, etc rather than smart phones.*

NK : I would like to tell you that in a converged world, there is a convergence of technology, business policies and also consumer psyche. And the right to repair, in my view, should be seen from that perspective. Earlier, because of the economics, companies were not repairing

MAIT delegation's meeting with Hon'ble Minister of IT, Shri Ashwini Vaishnav to discuss steps to fast forward PLI, EoDB & ERSO

your products. Now they are creating a law that holds the rights of the consumer to get repairs done. That is definitely an opportunity for us. But India should not be a dumping ground for somebody's waste. There should be a proper process. And of course sometimes, it will not be commercially viable to repair and the product may be stuck here. The government should tackle this so that environmental concerns are taken care of. A proper ecosystem needs to be created and the government should be involved in it. In repairs too, e-cycling will come in and informal India will become a formal and growth-centric India.

EI : *Well, across the board, there will be benefits, but do you think there will be resistance from the industry?*

NK : Business interests too should be considered. A balance is required. But there are refurbishers in India. About benefits, different areas will emerge. You will have to amend the import-export law. Customs law will have to be simplified. They are not very conducive today. There are solutions to everything including the environmental concerns. Earlier, there was reluctance in refurbishing medical machines, but now refurbishing is done and those machines are exported to Africa. When you are exporting, that is also an opportunity. If refurbishing or repair of these machines are done and sent to rural India, that too is good as these are very much required in those places. That will also bridge the gap between the technology available everywhere in India. In this and other matters, the government needs to take a call.

EI : *You have rightly pointed out that there are concerns. There may be procedural difficulties when products are being imported into the country and being exported to another country after repair or refurbishment. What is the solution?*

NK : Even today when you export products and they come back for repairs, there is a process. Similarly, when you import something and you need to send it for exports and also get it back, there is a notification that governs this. Also in India there is a statute. There are provisions and these are globally aligned. Fortunately, most of the IT hardware products are under zero duty. So, custom management doesn't come under GST element which you will get refund. In GST law also, there is a provision to get this money back. So, I don't foresee those issues. Now, we need to decide whether this concept we will make it across India or should it be restricted to SEZ or NSCs. So, that call will come in time. So, one of the recommendations could be begun with SEZs, then expand it. The issues can be sorted out, and then move to the next level. This could be a mission of three to five years. Globally, this is a new concept. So it will have to be well thought-out and planned. The concept will draw the attention of the entire globe towards us. Like IT-enabled Services was a global concept which germinated in India. It was there in the US, but could not sustain. When it came to India, it became a big success.

Excellent creative and intelligent ITI or diploma holders are available in massive strength in our country. A lot of entrepreneurial opportunities will emerge. I foresee at least four to five unicorns emerging in the future in India through this mission. So, it is a big game. How government sees this and removes the hurdles will decide the structure and future of this emerging industry.

EI : *That's a good point. I know that you mentioned about the competitions. There could be competition from China, Vietnam, Hong Kong, etc. These people are already doing it, I believe.*

NK : Not much. The type of intellectual skills that exists in India does not exist in those nations. China has issues. The new geopolitical global order will suit only India. Further, where are the markets of repair coming from? It will come from Europe, USA, Japan. None of them are savvy about China's entry or the Philippine's entry. The economy of skills will compel countries to come to India and not go to China. India has geographical and strategic advantages. Till date, we never capitalized our geographical positioning. It is time we started thinking on the global logistic perspective.

EI : *Somewhere you have mentioned that we have to create infrastructure for the repair and refurbishing industry. What do you have in mind when you are talking about infrastructure?*

NK - I talk about hard infrastructure and soft infrastructure. On the hard side, India is a very federal structure. We are a country of many missions. You look at the major volumes - five or six major states representing 80% of the electronic hardware. So India has to be seen from a holistic manner. When it comes to economic agenda, it should be clubbed with the defence agenda - strategic agenda, and so on. Today, China is very aggressive in every part of the world to promote their products. India isn't. Indian embassies need to become more business centric.

A strong economy will create a good base for India and that is what exactly happened in the last twenty years. So my point is that we need to match the infrastructure. China's worst port is equal to India's best port. JNPT is India's best port. The performance of JNPT does not even compete with the worst port of China. To have sound import and export, you need to have sound port-related economies. You can even compare the cargo handling facilities in the airports in China and India. We are nowhere. The major Indian airports are all passenger centric. Not much focus on cargo. Now, thankfully, there is some focus on creating good road networks. These roads need to be linked up, particularly with the many electronic hubs we have created recently. The port and airport connectivity needs to be very strong. The EMCs that have been created, needs to

be connected to the ports, especially to the Bombay port. So we need to rethink our connectivity infrastructure. Integrated policy approach too is needed. Secondly, why not start the repair services in the EMCs? Why can't we create a concept like virtual SEZs? India needs to have a strategic trans-shipment point. Our nearest trans-shipment point is Sri Lanka, South East Asian countries or others like Salala for the African market. So we need to have our own system of shipping lines carrying the staff and connecting to the world. Every trans-shipment costs US$200. That makes us uncompetitive in terms of freight value chain. We need to meet both cost and speed areas. The entire world today is on speed economy.

EI : *Coming to the question of standards, all repaired and refurbished products should have standards. In the organized sector there may not be many issues but in the unorganized sector there can be difficulties in maintaining standards. What is your take on that?*

NK : The setting up of standards in India has to be improved. Bureaucracy, the overlaps, etc are there. A product comes and goes back. It is not going to be put in use in our system. So there cannot be an application of standards. Standards are there when the product gets mixed up in our domestic markets. So my recommendations would be to give the standards out for the imports and exports. Also, in domestic repairs that will take place, the products have already been approved. So what we are doing is rectifying the defect in this process of Electronic Hardware Repair Services Outsourcing (ERSO). So where is the question of applying standards again and again to them? When you certify that the product is working fine, we are not going to change the model of the product or the circuit of the product. There is just going to be a repair and a swap of components. So, if it meets the benchmark that has been approved, the standards are clear. So this process of ERSO has no relevance to the standards.

EI : *And what about if there remain defects even after repairs? I am just talking about a certain possibility. In such an eventuality, how do we resolve the issue? The exporter would like to have a procedure through which he can indemnify or get back his money. There can be a candid procedure in place.*

NK : Business situations will always emerge and they will have to be tackled on a case-to-a case basis. At times, you repair a product based on the product standard that was available to you. However, the product standard may not work in a particular environment. Then the blame cannot be on the repair company. In places where there is more moisture, like for example, Goa or Kerala, the mobile could cause problems if kept inside for long periods because of the presence of more moisture there. During the procedure of manufacturing a mobile phone, these weather conditions were not considered. The failure rates of mobiles designed in Taiwan or China are high in India because the design itself happened in a different weather condition. So it would be ideal that when you design a product for the global market, you take into consideration all the different global weathers. If, in spite of that, the product causes trouble, then there really is a need to look into the causes, also considering the possibility of it being a business failure.

EI : *What is it about skilling? You need a lot of investment in skilling. It is like software development. You need to skill people and certify them for this type of work. What is your take on that?*

In the government, there was no stakeholder who could take things forward. Then Shri Ashwini Vaishnav took over as the new Union Minister of Telecom and IT. He took particular interest in the idea. He said if it is five million jobs and a US$20 billion opportunity, we will do everything possible.

NK : Now, with product convergence, the de-materialization of electronic products is happening. Twenty years ago there was a speaker, a phone, a camera, an audio system. Now all these things are converged into a single electronic product. A repairer has to handle all those functions. The skilling demand will be extremely high. I am in touch with the Electronics Skill Council of India. We discussed about the need for creating a very inclusive training course keeping in mind the informal talent that exists in the country. We were discussing that we need to create a platform or an app which connects every repair technician or engineer in the country through a very formal recognition model that captures every query and every solution that came. We can create a massive domain structure where all data of repair are available. Today, there is no such data and all those technicians and the solutions they come up with remain unknown. If we bring all that data into a digital network, we can create another industry out of that. This can be a byproduct of ERSO. The data can be given to the manufacturers and a new ecosystem could be built around it. This is a knowledge industry. We should not only see through one source of knowledge. How multiple sources of knowledge can be created is important. Today, with technology and mainly the emergence of 5G, many virtual dashboards could be created. Speed also is going to move up tremendously. When that happens, the entire concept will change.

Look at the world. Today, we have an almost 20 billion users that is likely to go to 100 trillion. Connected devices are going to be around 500 trillion within five years. It is going to happen. The impact of all that will be extremely good. Today, the world has four billion internet users. This will, very likely, move to eight billion. When that is reached, the way the world will think, how the world will change, is going to be phenomenal. You can look at what happened in the last ten years - Zoom and WhatsApp. In a small village, people will be discussing IT solutions. So a lot of opportunities, a lot of business models etc are going to emerge soon. Big international IT giants could use the services of the local technicians. The technicians can also create a startup and become a unicorn. So my idea from MAIT is to create some global phenomenon in India that is not just about repairs but a larger circular economy, inclusive economy that would take the common man of India to a bigger platform on the globe. This is the mission in my mind.

EI : *That is a wonderful vision and I am sure your five million jobs are an underestimate.*

NK : I want to go wrong on that. I would like to see twenty million jobs five years down the line.

EI : *Assume that from the US an Apple smart-phone is arriving in India for repair and Apple does not know about it. It is repaired and sent back. Will there be a compromise on patent or will there be other technicalities that may be involved?*

NK : If your product has a global warranty, you can get it repaired at the nearest repair centre. That is the regular service ecosystem. What we are talking at ERSO is about a global services hub. It will be a factory of repair and not a dealership of repair. Another thing is that today also there are counterfeit products that get repaired. There is global movement against that, but there are also parallel imports happening in India

EL : *A small question - Is there any room for retrofitting in this?*

NK - Yes, it is included within the US$20 billion market, and it is a huge opportunity.

Increase in Demand

The worldwide buyer market of refurbished electronic goods was almost $100 billion in 2020. Because of the Covid-19 lockdown which was seen in practically every one of the nations across the globe during 2020, numerous organizations battled and are attempting to explore their direction, which has prompted unemployment. Being more aware of their financial situations and limitations, individuals are more disposed to fix their need for gadgets by buying refurbished ones. This is driving the repair and refurbished market heavily. Likewise, Covid-19 has prompted disturbance in the supply network of raw materials, and this in turn has increased the overall cost of new electronic items.

Improved E-Waste Management Policies

Recycling is an insignificant method of overseeing e-waste since just 5 percent of such waste is reused eventually. Over 95 percent of e-waste in India finds its way back to scrap vendors who, with no regard for the environment, remove the main parts from such waste. The critical qualification among recycling and refurbishing is in the former - parts are isolated and reused while in the latter, only the parts in working condition are utilized to fabricate new devices. In this way, refurbishing is better for the environment because even the outstanding recycling processes produce some waste. Since many materials can't be recycled ceaselessly, a great deal of e-waste eventually turns out to be vain to recyclers. Refurbishing, subsequently, is feasible since working parts can be reused in new gadgets endlessly.

Electronic Waste by Countries

Electronic waste is a significant part of today's global, post-consumer waste stream. Efforts are being made to recycle and reduce this waste. The waste is often exported to developing countries for disassembly, recycling and disposal.

Leading Countries based on Generation of Electronic Waste Worldwide in 2019

(In 1,000 Metric Tonnes)

Data Source: Statista

Empower Disadvantaged Communities

IT equipment waste, referred to as e-waste or WEEE, is rapidly growing nowadays and becoming one of the fastest-growing waste streams worldwide. According to Statista, approximately 53.6 million metric tons of e-waste was produced in 2019. In just five years, this had increased by 44 million metric tons per year and only 17.4% of this was documented to be collected, and properly recycled. The negative impact of e-waste on the environment is well-known.

Electrical and electronic equipment is also closely interlinked to social and economic development which brings up another issue. Countries that lack IT equipment and digitally skilled professionals risk being left behind in the worldwide economic development.

The Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their disposal, usually known simply as the Basel Convention, is an

international treaty that was designed to reduce the movements of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to less-developed countries.

Of the 172 parties to the Convention, Afghanistan, Haiti, and the United States have signed the Convention but have not yet ratified it.

Government Regulation

Waste legislation

The United Nations Conference on Trade and Development (UNCTAD) tends to support the repair and recycling trade. Mining to produce the same metals, to meet demand for finished products in the west, also occurs in the same countries, and UNCTAD has recommended that restrictions against recycling exports be balanced against the environmental costs of recovering those materials from mining. Hard rock mining produces 45% of all toxins created by all industries in the United States.

Greenpeace contends that residue problems are so significant that the exports of all used electronics should be banned.

A look at the refurbishing and repair industry in various regions of the world

Asia

Many Asian countries have legislated, or will do so, for electronic waste recycling

South Korea, Japan and Taiwan ensure manufacturer responsibility by demanding that they recycle 75% of their annual production.

Electronic Waste in China

Chinese laws are primarily concerned with eliminating the import of e-waste. China has ratified the Basel Convention as well as the Basel Ban Amendment, officially banning the import of e-waste. In October 2008, The Chinese State Council also approved a draft regulation on the management of electronic waste.

Europe

Some European countries implemented laws prohibiting the disposal of electronic waste in landfills in the 1990s. This created an e-waste processing industry in Europe. In Switzerland, the first electronic waste recycling system was implemented in 1991, beginning with collection of old refrigerators. Over the years, all other electric and electronic devices were gradually included in the system. Legislation followed in 1998, and since January 2005 it has been possible to return all electronic waste to the sales points and other collection points free of charge.

USA

US President Joe Biden recently issued an executive order, which paves the way for new regulations for original equipment manufacturers (OEMs). The order directs the Federal Trade Commission (FTC) to draft regulations that limit OEMs' ability to restrict independent repairs of their products. This will make it easier to ensure electronics can be repaired or refurbished through third-party firms instead of having to go to the manufacturer for parts and services. The new restrictions could also lower the cost of repairs for some devices.

Canada

In February 2004, a fee similar to the one in California was added to the cost of purchasing new televisions, computers, and computer components in Alberta, the first of its kind in Canada. Payment of an electronics recycling fee was introduced in February 2007, followed by British Columbia in August 2007, Nova Scotia in February 2008, Ontario in April 2009, and Quebec in October 2012. In 2007, Manitoba issued the Proposed Electrical and Electronic Equipment Stewardship Regulation by which the sale of regulated products is forbidden unless covered by the stewardship programme.

The Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (EIHWHRMR) operates with a few basic premises, one of which being that electronic waste is either 'intact' or 'not intact'. The various annexes define hazardous waste in Canada, and also deem any waste that is considered or defined as hazardous under the legislation of the country receiving it, and is prohibited by that country from being imported or conveyed in transit. The Canadian regulation covered it subject to prior informed consent procedures.

Israel

Israel adopted a national e-waste law

that went into effect on March 1, 2014. The law demands that by 2021, electronic companies must recycle at least 50% of the weight of the electronics they sell. In addition, these companies are required to accept old electronics from consumers free of charge.

Latin America

EPR laws in Latin America are present but could use improvement in terms of the consistency regarding criteria for the development of new EPR programme that has impeded the broad development of EPR laws, such as post evaluation programmes, overall cost of waste management, reduction in the use of resources and decrease of the public sector burden. However, one aspect that differentiates their laws from those currently present in the U.S. is that they are quickly moving away from voluntary laws and working towards implementing more direct/demanding policies.

Chile

Given the rise of waste production during the past decade, solid waste management has recently become a central concern for Chile's government. In 2009, the Chilean National Environmental Commission

identified Chile as one of the countries with the highest rates of waste generation in Latin America. They have since been working to implement a law, with the help of the National Environment Commission that would add regulatory power over waste production. In August 2013, the Chilean congress approved a law that established a framework for waste management, EPR and the encouragement of recycling.

Colombia

In 2013, Colombia implemented an EPR law that ultimately focussed on enforcing guidelines for managing electronic waste. Additionally, the country has developed a number of "post-consumer programmes for used batteries, medicine, computers and printers, fluorescent light bulbs, used tyres and pesticide containers".

Brazil

Upon its implementation in 2006, the Mercosur Policy Agreement mandated Brazil, Argentina, Paraguay, and Uruguay to anchor EPR laws as environmental policies. Brazil enacted a National Policy to reduce solid waste which ultimately acted as an EPR and as a way to reduce both solid and hazardous waste.

Australia

In November 2008, the EPHC committed to the development of a national solution to the issue of managing television and computer waste. This action culminated in the release of a package of documents designed to enable public consultation on the various options for managing end-of-life televisions and computers in 2009. The paper canvasses various options for managing end-of-life units and analyses the costs and benefits of each. In November 2009, the National Waste Policy was agreed by governments across Australia and officially endorsed by the Council of Australian Governments in August 2010. The various policies of the government are to significantly increase recycling rates for electronics in Australia, from an estimated 17% in 2010 to 30% in 2012/13 and up to 80% by 2021/22.

India

India's refurbished electronics sector was an otherwise slow-progressing deal before the pandemic hit. The smartphone vertical, especially, had declined by 9 percent year-on-year in 2019 and it was expected to dip further until Covid-19 happened and the sector accelerated. It is safe to say, the pandemic, for many reasons, made the used electronic goods market flourish.

USA

Electronic & Computer Repair Services in the US - Outlook (2021-2026)

Statistics:

- attach money - Market Size: $19 bn
- business- Number of Businesses: 40,985
- supervisor account - Industry Employment: 127,374

The total U.S. industry market size for repair & maintenance cover all companies in the United States, both public and private, ranging in size from small businesses to market leaders. In addition to revenue, the industry market analysis shows information on employees, companies, and average firm size.

Refurbishing IT equipment has also had a remarkable positive impact on the planet. Giving a second life to the equipment has helped save over 3,000 tonnes of carbon that would have emitted into the atmosphere otherwise. As mentioned above, e-waste has dramatically increased as we are becoming more and more dependent on technology. In most cases, the equipment is in excellent condition. So, reusing ICT is the best way forward to collaborate with the finite resources of our planet.

Chile: A market in itself or a gateway to the US?

Luciano Alejandro Rivas Stepke
Regional Governor of "La Araucanía"

Luciano Alejandro Rivas Stepke (1982) is a Chilean politician and engineer. He has served as Governor of the "Araucanía Region" since July 14, 2021.

Chile is fast becoming a digital hub of Latin America having close access to the North American market such as the US and Canada. El-Softech's representative Vikrant Saxena visited Chile to understand the ICT dynamics of the Latin American country and held parleys with two important persons viz **Luciano Alejandro Rivas Stepke Regional Governor of "La Araucanía" and Dr. Emilio Guerra, Vice Chancellor, Autonoma University, Temuco, Chile.**

There is a concept emerging in the software segment specifically connected with outsourcing - near sourcing. Bereft of technicalities, the concept is borne out of expediency and convenience. Difference in time zones has been a major factor that has been pointed out as a hiccup while outsourcing work to destinations from the US to countries like India. To prove the old adage 'necessity is the mother of invention', the global software industry has come out with a solution and that is near sourcing. That would mean either relocating or creating additional facilities in destinations closer to their clients' domicile.

To cull out a few examples; there has been a proliferation of software developing and IT enabled service centres in Egypt, especially in Alexandria, mainly to service Arabic speaking Middle East Countries. Importantly, it is estimated that over 10,000 professionals are working in the city of Alexandria alone, who cater to the Middle East and the US market. Most of the works outsourced from the US and Middle East markets are serviced from centres. Importantly, some of the Indian companies have set up their bases in these countries to service their overseas clients.

Latin America is another destination which is fast growing up as near shore facilities because of their proximity to the US market. Chile is one such destination that is fast emerging as a nerve centre of near sourcing. Some entrepreneurs from India see Chile as a launch pad into the U.S. market. There is an added reason for that - Chile's startup revolution, which is gaining ground each passing day. Indian entrepreneurs are arriving on Chilean shores, attracted by its favorable business environment, technological expertise, and importantly government support.

Chile offers a stable, smaller market to pilot, test, and to grow in products and services, alongside a savvy and friendly business environment, and a competitive consumer landscape where many have disposable income.

There are many Indian startups which are operating from Chilean soil. To name a few: data services firm Evalueserve, Toolyt, an AI-powered personal assistant and a lot many have established themselves in Chile in the recent years, giving credence to the fact that the country is an ideal model market to test out products and ideas to bridge over into the more desirable U.S. market or to expand across Latin America. Start-Up Chile currently has 12 Indian-led companies looking to make inroads in sectors like software, biotech, and gaming. The program has had many Indian founders in the past, but has seen a significant uptick in recent years, according to Start-Up Chile and the other industry. The India-Chile pipeline has also been supported by a preferential trade agreement that has been in place between the two countries since 2006, and which was significantly expanded in 2016.

Several major Indian companies already have a presence in Chile, including Tata Consultancy Services, Infosys, and Polaris Group. Others who are now moving in are: ManageEngine, the business IT branch of Indian giant Zoho Corporation that has established a presence in Chile, and Indian agrochemical giant UPL acquiring Chilean company IngeAgro in September 2020. Many are using Chile as a market in itself rather than a launching pad to penetrate to the US market. In the recent days, pandemic might have disrupted the operations of some of the Indian companies - a good number of them left during the peak of the pandemic - they have been continuing with the business with the help of partners or employees and are getting daily feedback of what is happening there. The good news is that most of them are planning to go back sooner or later to keep the business tick as usual during the pre-pandemic times. They are very optimistic of a buoyant business because of two main reasons: one; the government support extended by Chile, and two; the continuous effort of the government to improve the business environment, and the third; incentives and other fringe benefits.

Dr Emilio Guerra, Vice Chancellor

Dr Emilio Guerra is a Forest Engineer (UdeCh), Professor, Master in Business Administration, Master in Neurosciences and Doctor in Natural Resources and Sustainability. He currently serves as Vice-Rector of the Autonomous University of Chile, in Temuco.

Startup Revolution Encompassing Chile...

Luciano Alejandro Rivas Stepke
Regional Governor of "La Araucanía"

El-Softech: *What are the areas of strength of the Chilean ICT sector?*

Luciano: The ICT Sector in 2018 represented 23.5% of the information sector, and a sizeable number of firms were in the areas of custom software, IT consulting, development of standard software and integration of solutions. The sector has grown by 5% in 2020. The country adopted the Digital Agenda 2020 as a policy framework.

The world ICT market reached USD 2,440.4 billion in 2020. Among the Latin American countries, Mexico and Brazil exhibit a higher turnover in ICT. Uruguay leads the ranking among the Latin American countries, closely followed by Mexico. In the second tier are Costa Rica and Brazil, and in the third tier is Colombia. Regarding the contribution of the ICT to GDP, Brazil leads with 6.8% followed by Mexico. Uruguay, is the third with 3.4%. One among the five IT professionals today in these countries earn 20% more than what is was before the start of the pandemic.

El : *Chile's startup revolution is drawing the interest of many from outside the country including India. What are the reseans for that?*

Lu: We give three levels of incentives for entrepreneurs from India and other parts of the world, who are looking at the Chilean ecosystem. Chile, has been a pioneer in attracting technology companies through the Start-Up Chile program, which promotes global technology ventures. ICT investors use the country as a platform to reach out the world market. Our startup survival rate is 53%. Chile has been the recipient of many international awards in top-level business and technological entrepreneurship forums. We have created some 15,000 productive jobs. Investments also have gone up from other countries including India. Importantly there is high incidence of women taking up startup leadership.

Also, there is an investment promotion agency called Invest Chile, which has a decentralized structure. This helped the arrival of new foreign investors. Today, the largest Ed-Tech in Chile, called Lirmi, operates from La Araucanía, catering to more than 2,000 schools in Latin America.

Although Chile still does not have unicorns, there are companies, such as Crystal Lagoons, Frontier Car and Cornershop that have had successful growth profile. For instance, Crystal Lagoons developed tourist complexes with artificial lagoons.

Chile has been a pioneer in attracting technology companies through the Start-Up Chile program, which is an acceleration program that promotes global technology ventures so that they use the country as a platform to scale the world. To date, Start-Up Chile is one of the largest and most diverse accelerators in the world, with a startup survival rate of 53%.

This has been patened in 190 countries including Arizona (United States).

Cornershop, after five years of operation and having raised US$31 million of venture capital, was taken over by Uber in a transaction valued at US$459 million. This way, we have a number of companies valued over US$ 100 million. In addition, the startups are supported by entities, such as JP Morgan, Alaya Capital, Endeavor, Bio Ritmo and Grupo Prisma, among others.

Presence of Indian companies in Chile

Regarding investment between Chile and India, we highlight two experiences, first of all that of Manage Engine, the business IT management division of Zoho Corporation. It has strengthened its portfolio with new products and introduced additional features in existing solutions. With a presence in the Latin American IT market for more than a decade, the company aims to help in the digital transformation that is sweeping across the region.

The Live Green is a foodtech company. With an algorithm, it replaces additives with vegetable-based products. Its owners come from India, they live in San Fernando, next to the plant. Attracted by the friendly ecosystem for startups, the founders decided to live in Chile. A Mexican giant has just invested in the company and they are going for more.

Everything has been fast for Priyanka Srinivas and Sasikanth Chemalamudi, the couple who founded The Live Green Company. A company that, based on an algorithm called Charaka, allows companies to clean the "label" of their products. This technology allows replacing chemical additives with vegetable-based products to existing goods, producing 100% degradable packaging, for hamburgers and ice cream.

El : *What is the size of the incubator ecosystem in Chile and the incentives being provided to companies setting up IT units in Chile?*

Lu : Currently, there are about 15 incubators operating in Chile that, through programs that last about a year, support entrepreneurs mainly with a scientific-technological base in the start-up, development and growth of their businesses.

The vast majority is university-educated. Seven incubators had firms in the initial stage, four in the 'growth' phase and two in 'scaling-up'. Business incubators have become the key pieces to promote disruptive ventures. This is endorsed in the report of the 'Performance Evaluation of Business Incubators and Accelerators 2020.

According to the Evaluation of platforms to support the entrepreneurship of business incubators and accelerators carried out by CORFO, the startups that have worked with accelerators have generated almost 2000 new jobs. It also highlighted Magical, Imagine, 3ie, UDD Ventures and IncubatecUFRO as the five with the best performing portfolios in sales, exports and capital raising.

The ventures supported by the incubators showed an increase in their sales of 23% in 2020 compared to the previous year, reaching US$33,004 million. Meanwhile, during the last four years, they reported accumulated sales of over US$474,868 million, which represent a return of approximately 13 times what the State invested in incubators in the same period between 2017 and 2020.

In the case of Araucanía, which is also called Incubatec of La Frontera University, the objective is to promote the business line of consultancies for startups and companies.

Business incubators are fundamental pillars of our entrepreneurial ecosystem. Through them, it is possible to deliver specialized services, supporting the development of business ideas or successful arrival in other markets, impacting their phases of growth, development, and scaling.

EI : *Chile is emerging as an outsourcing destination due to its proximity to west? Many Indian companies are focusing on Latin American countries including Chile for setting up outsourcing of their near sourcing strategy. What are the advantages of Indian companies looking at opening their offices in Chile?*

Lu : One of the central factors that I consider why Indian companies are outsourcing to Chile is access to diverse and professional talents that our country offers. 31% of IT job vacancies in Chile cannot be filled due to lack of professionals, while that figure in Latin America is 48%. This digital transformation, deepened by the pandemic scenario, made it possible to align the technology to the needs and preferences of current workers, since it offers the possibility of working remotely, and even doing it for other countries by exporting services.

Regarding the existing incentives, we find The Tech Visa is an initiative that seeks to facilitate the process of granting work visas, benefiting companies in the technological services sector, both national and foreign, and enterprises linked to Start Up Chile, for hiring professionals and technicians specialized in the area of technological services, which are not available in the country.

Other factors of interest for Indian companies in the sector to establish themselves in Chile can be early roll out of 5G network which will be completed in 2022.

EI : *India and Chile have technical cooperation to train Chilean students in IT and telecommunications. How should we take this project to the next level?*

Lu : Based on the formal approach made by the Ambassador of India, and the visits of Araucania Digital and the Autonomous University, as well as representatives of Indian IT companies to the regional ecosystem during the month of April, we consider that the next step is to generate a formal work that allows the creation of short-term actions such as periodic visits and training of human capital.

Our challenge as a regional government is to enable evolving incentives around tax, technical, human capital or infrastructure incentives to attract companies including from India to establish companies in Chile for either outsourcing or catering to our domestic market.

EI : *What more has to be done to promote Indian investment in the ICT sector in Chile?*

Lu : First, deepening the knowledge of actors in the Indian ICT ecosystem for the developing trust; for which an agenda for exchange of delegations between the two countries shoud be evolved. Such delegations should represent the public, business and academic sectors. Such delegations also should aim at evolving medium and long term business alliances.

Secondly, generating a set of incentives for companies to motivate them investing in Chile. It is necessary to articulate the competitiveness of the market, excelent government policies, growth oppotunities and availability of skilled people in the country. The stable business environment is another anabler which should be communicated to people. Chile also should promote the capabilities of local companies in other countries inorder to promote hand holding, join ventures and technical co-operation.

EI : *In the overall picture of the ICT sector in the Latin American countries, how big are the three elements of the ICT sector viz; software, hardware, telecom and telecommunications?*

Lu : Despite the negative impact of the Covid-19 pandemic on the Latin American

"India is a key partner for Chile both in the Asia Pacific region and bilaterally. Both countries share a 73 years long-lasting bilateral relationship which has been topped by the Preferential Trade Agreement signed in 2007, India's only bilateral trade agreement with a Latin American country. The agreement, which is currently under negotiation for its second expansion, includes preferences granted by both countries covering a universe of around 2300 tariff lines.

With a clear interest in strengthening the business relationship between the two countries, the year 2021 saw the creation of the Chile India Business Council. The council will enable closer ties to be developed between the Chilean and Indian private sectors and foster trade, investments and services. The ITC sector in particular is highly promising and we are confident in developing synergies between companies of both countries engaged in joint ventures and exploring new business opportunities."

H.E Mr Juan Angulo Monsalve
Ambassador of Chile to India

economy, according to the analyst firm in the information technology industry, IDC, the sector had a positive growth at the end of 2020, of 5.5% in constant dollar terms and continued to grow in 2021, with an annual average growth estimate of 7.7%. Unlike past recessions, technology investments have not slowed. In 2020, the industry continued to grow. For 2021, IT spending was increased, with an average growth of 7.7%, at constant dollar terms. The Latin American market showed a growth of 8.5% in the information technology market during 2021, which reflects the importance of the sector in the economic development of the countries of the region. IDC reported that by 2022 growth will be approximately 9.4% in the business market (excluding the consumer market).

Ricardo Villate, IDC Group Vice President for Latin America explained that this development has occurred because the IT industry continued to be an economic engine. He has even supported other vertical market sectors in IT changing and driving business processes.

By 2022, a continued increase in IT spending is expected, with an average growth of 9.4%. He highlighted that an example of this was that the e-commerce market. It increased penetration between 10 and 15 percentage points in all categories of commerce. This also translated into mobile payment methods reaching more than 50% of the population in Latin America. Another example is that the post-pandemic work model has been permanently remote in at least 40% of the companies.

In this same context, IDC projected that by 2023, forty percent of the 5,000 most important companies in Latin America will have a data governance architecture for enable DataOps; drive data engineering based on Machine Learning; reduce data risks and drive innovation. By 2024, IDC predicts that 1/3 of these companies will form data-sharing partnerships with external stakeholders through data clean rooms to increase interdependence and safeguard data privacy and valuable data assets.

EI : *What is the scope for future growth and value propositions of each sector? Why invest in technology in Chile?*

Lu: There are many positive features that Chile demonstrate for attracting investments. Some of these sectors are:

Renewable energy

The development of non-conventional renewable energies (NCRE) in the country has been a fundamental element to capture the interest of international technology companies to settle in Chile. Carbon neutrality is being sought and 90% of the operational costs of a data center is energy, and in Chile they have relatively easy access to NCRE.

Connectivity

The development of 5G technology and connectivity through continental and intercontinental fiber optics are factors that increase the attractiveness of Chile as an investment destination.

Digital talent

Human capital is also relevant. Santiago

Top Five Latin American tech hubs

Latin America is fast emerging as one of the world's most exciting tech hubs. While the COVID-19 recession had impacted tech investment in the region, the continent's entrepreneurial start-up communities are proving resilient in testing times

In recent years, Latin America has established itself as one of the world's most promising regions for start-up activity and burgeoning tech talent. Venture capital investment in Latin American tech has been growing steadily over the past five years, doubling annually since 2016 before reaching a record high of $4.6bn in 2019. The COVID-19 recession had, of course, impacted this flow of investment pouring into the region, but many of Latin America's thriving start-up communities – from Brazil through to Mexico, Chile, Argentina, to Colombia – have shown remarkable adaptability and resilience in the face of the numerous challenges of the past years.

1 – São Paulo

The vibrant city of São Paulo is often referred to as Brazil's innovation powerhouse, with its dynamic tech community attracting a steady flow of VC funding from all over the world. Indeed, over 60 percent of start-up investments in Brazil are concentrated in the city, and it's not hard to see why. The south-eastern megalopolis is home to a rich tech ecosystem, which supports an impressive number of local 'unicorns,' as well as boasting more fintech start-ups than any other Latin American city. It's hardly surprising, therefore, that tech giants such as Amazon, Uber and Spotify have chosen the city as their Latin American base. The well-established nature of São Paulo's technology sector has spared it from the worst of the COVID-19 recession, with many of its start-ups not

just surviving, but thriving in these economic hard times.

2 – Mexico City

Home to over 21 million people, the sprawling megacity of Mexico City is fast establishing a reputation as one of Latin America's most promising tech hubs. For many investors, Mexico is something of a gateway to the rest of Latin America – while Brazil might be more populous, its primary language is Portuguese, which can pose a challenge to businesses looking to establish a wide-reaching Latin American presence. Spanish-speaking Mexico, meanwhile, provides the ideal entry point to the region's growing economies, while its capital Mexico City also enjoys a strategic location, with the US tech hubs of Los Angeles and Austin a relatively short flight away. Streaming giant Netflix is one of many big-name companies that have established a regional headquarters in Mexico City, marking a vote of confidence in the city's thriving tech community.

3 – Santiago de Chile

There's a good reason why the Chilean capital has earned itself the nickname 'Chilecon Valley.' A rather remote city, surrounded by the Andean mountains, Santiago is perhaps an unlikely tech hub, but it has long been a hotspot for entrepreneurial activity. Back in 2010, the Chilean government launched the 'Start-up Chile' seed accelerator for small business, which provides equity-free investments for start-ups from around the globe. Since its launch, it has worked with over 1,500 start-ups from 80 different countries, in what has been hailed as a world-leading programme. What's more, the nation ranks as Latin America's top country for entrepreneurship, according to the 2020 edition of the Global Entrepreneurship Index, with a forward-thinking and adaptable tech community that will help to drive recovery in the aftermath of the Coronavirus crisis.

4 – Buenos Aires

Some of Latin America's most successful start-ups have been borne out of the Argentine capital of Buenos Aires – and it's not just by chance. The city is home to a vibrant and ever-expanding technological ecosystem, gaining a reputation as the region's best performing tech incubator. Ecommerce giant Mercado Libre – often called the Amazon of Latin America – is undoubtedly the city's greatest success story, but Buenos Aires is also establishing a name for itself as a regional blockchain hotspot, with the number of Argentinian blockchain and cryptocurrency companies rising by 10 percent in 2019 alone.

5 – Medellín

Colombia's second-largest city has seen its tech scene grow significantly in recent years. The city has been working hard to reinvent itself and shake off the reputation that has dogged it for so many years – with Time magazine dubbing it "the world's most dangerous city" back in 1988. Nowadays, Medellín can be associated with some much more positive adjectives: innovative, open and dynamic. In 2019, two of China's largest tech companies, Huawei and Tuya Smart, announced that they would be establishing bases in Medellín, specifically within the city's specially-developed Innovation District. The Ruta N complex, where both firms will be based, is a co-working space designed to foster innovation and collaboration between start-ups, with hopes to grow the entrepreneurial ecosystem within the city.

Source: https://www.worldfinance.com/markets/top-5-latin-american-tech-hubs

"As CEO & Founder of Grupo-TQS Chile, I consider it a very interesting experience that links us to the world of IT Indo/Chilean business. Together with the work team and from the point of view of business and business management, we feel very satisfied with the achievements and continue to move forward and create permanent links that benefit IT companies between both countries. We thank ESCINDIA/INDIASOFT for recognizing Grupo-TQS Chile, feeling honored to be invited as collaborators of this prestigious Organization."

Patricio Fierro
CEO & Founder Grupo-TQS Chile

is positioned as the third city with the most availability of digital talent in Latin America, only behind São Paulo and Mexico City. "Digital talent is a relevant asset. By 2020, we had almost 113,000 people employed in this area, and that leverages other tens of thousands of jobs and creates an ecosystem of human capital.

El : *How India-Latin America cooperation in the ICT sector can shape up? What are the core areas that need attention, quantum of cooperation (import and export), potential areas that hold promise of cooperation and the challenges ahead?*

Lu : At a territorial level, I believe that there are important areas of articulation linked first of all to the connection of talent between Indian companies and their abilities to generate human capital in Araucanía, which has proven to be a platform of skills for international companies such as start-ups. This synergy will make it possible to anticipate market needs, guide training itineraries and facilitate job adaptation. Secondly, there is the ability of Indian companies to insert themselves into our ecosystem based on the development of competitive and comparative advantages that allow them to facilitate investment and a strategic positioning in La Araucanía.

Dr Emilio Guerra
Chancellor

Chile and India can be Partners in Promoting Industry-Academia Handholding

Chile has invested for several decades in technology to modernize its public sector. Digital Government is a strategic element and is stipulated in the 2020 Digital Agenda. As of 2020, the country is in 34th place in the global e-Government Development ranking published by the United Nations. Local and municipal governments are also advancing their agenda toward digitization. Based on the new technological capabilities offered by the Internet of Things, Big Data & analytics, metropolitan cities and municipalities such as Santiago are transforming into smart cities.

According to the Faculty of Engineering at the Universidad Autonoma de Chile (UA), the areas of cooperation between Chile and India are:

- Increasing the production capacity of the information technology and communications industry in Chile through linkages with specialized resources in India.
- Orienting stakeholders in tapping bidirectional opportunities for the development of new business models that impact the Latin American market.
- Transferring technology, knowledge and good practices to reduce the existing gap in the ICT verticals vis-a-vis developed countries.
- Providing opportunities to represent Indian technology partners in Latin America
- Collaborating for the development of applied research.
- Promoting the economic development of regions through the execution of applied research projects that generate knowledge for productive sectors.

According to International Data Corporation (IDC), despite the ravages of the pandemic, the Latin American market showed a growth of 8.5% in the information technology market during 2021, which reflects the importance of the sector in the economic development of Latin America.

The ventures supported by the incubators showed an increase in their sales of 23% in 2020 compared to the previous year, reaching $33,004 million. Meanwhile, during the last four years, they reported accumulated sales of over $474,868 million, which represent a return of approximately 13 times what the State invested in incubators in the same period between 2017 and 2020.

For Chile, according to IDC, the growth of the industry was 6.3% in 2020 and for 2021, a growth of around 5.5%. It is under this reality that MITI, the IT Industry Association, explains that this growth is due in part to the great migration that companies had to make to digitalization in an accelerated manner.

The Chilean Government addresses the digital divide, through public policies focussed on telecommunications using a public-private model referring to digital development and investment channelling, under the subsidiary state model. In other words, the state subsidizes the private sector in areas where the demand is not sufficient to justify the investment and costs.

We can mention some telecommunications development projects published by the Undersecretary of Telecommunications in the month of March 2020.

Highlighs are the following:

- "Fibra Óptica Austral" Project, increasing connectivity infrastructure in extreme areas, through a subsidy granted for $64,148,400,000.
- "Connectivity for Education" Project, which contributes to access to information and communication technologies and various information and content services, for a subsidy of $5,759,482,000.
- "Telecommunications services for Wi-Fi zones" Project, to provide free Wi-Fi services in different districts of the country, particularly in the most vulnerable places, for a subsidized amount of $8,546,000,000.

Currently, the Chilean Government, through Invest Chile, has managed to leverage foreign resources to support national projects in the technology area for a total amount close to US$5,465 million.

The use of technologies such as Cloud, Big Data and the Internet of Things are still not widely used by companies. The intensification in the use of these tools in the next 5 years will be essential for Chile to join the 4.0 revolution.

The arrival of 5G in Chile accelerates the need for companies to rethink and create new faster and more interactive applications to attract their customers and improve business dynamics.

The arrival of foreign companies such as Microsoft, Oracle, Google and Amazon (Web Services) in Chile generated a magnet for activation in the local technology industry, turning the country into a platform for the delivery and export of global services from Latin America to Asia Pacific.

At the local level, a technology industry is emerging with great potential, the so-called digital economy, which could position our country as the technological hub of Latin America, an ecosystem of technology and innovation, of global services, of digital infrastructure, software development, data centers, strategic consulting, etc.

The number of international projects has grown from 52 in 2017 to 173, as of September 2021. In terms of value, these initiatives have involved going from US$1.6 billion in international investment to US$4.3 billion projected over four years, with a potential creation of 8,676 new jobs.

According to Invest Chile, there is foreign interest from companies such as Microsoft, Huawei, Grade, Google, Ascenty, Odata, Globant, Accenture, EdgeConneX, StarLink, Terminal.io, K+S and Becton Dickinson, among others, to establish themselves in Chile.

- Formation of specialized human capital with a seal of social responsibility prepared for a changing world.
- Link between interests of the business world with the profile of the professional that is needed for the market.
- Support and collaborate with the ICT industry through applied Research and Development projects.
- Intervention in the local environment to contribute to the digital transformation of companies.
- According to "Fundación Chile", although the development of skills is high compared to Latin America, in the country there is a 25% deficit of professionals per year in this area, due to the high demand it faces. This gap translates into a deficit of 5,000 people a year.
- The number of computer services companies has grown by 110%, while human capital has only grown by 61%, with an estimated demand for 2020 of 65,000 people.
- The government, together with foundations, universities and institutions, promote the implementation of projects that contribute to the formation of human capital and reduce this gap, such as digital talent that from 2019 to the present has trained more than 16,000 people.

We welcome ESC opening an office in Chile. This proposed office would be the central point of operations for the promotion of Indian technological services in Latin America.

The ESC India office will be located in the Autonomous University, which would allow collaborative work with careers related to Computer Science, Business and Science for applied research, importation of outsourcing services, technology transfer, application of international projects.

In the long term, this strategic alliance would allow it to be the bridge between India and Latin America to accelerate the progress of the ICT industry and reduce the potential gap in the region compared to developed countries.

Catapult looking at India for Investments in Diverse ICT Verticals

Dr Andy G Sellars FIET
Strategic Development Director, CSA Catapult

Andy developed the business case and strategy for the £50 mn Compound Semiconductor Applications Catapult, submitting it to HM Treasury in 2015. He led the Catapult startup from 2017, representing the Catapult during roundtable discussions with the Prime Minister, and joining the Secretary of State during the GREAT Festival of Innovation in Hong Kong. Andy is regularly called as an expert witness to provide evidence to Parliamentary committees, most recently for the National Security and Investment Bill and the Telecom Security Bill.

Andy joined the Catapult from Innovate UK, where he delivered £15 mn of strategic investments in electronics, smart materials and compound semiconductors. His early career was spent leading R&D teams with Rolls Royce, Spirent PLC and Abbott Diagnostics, and he was prime consultant on film and TV lighting for James Bond and Sky News.

Andy holds an Executive MBA from Glasgow University, a research doctorate from Strathclyde University and is a Fellow of the IET.

El-Softech had a virtual interface with Dr Andy G Sellars, Strategic Development Director, CSA Catapult. Being a strategic development professional, Dr Ande has hands-on knowledge of emerging trends in the ever-changing technological landscape. One of the pioneers in this domain, Dr Ande is currently working on the development areas for compound semiconductors in digital communications and healthcare applications.

El-Softech : *Can you give us an introduction to your organization?*

Dr Andy : The Compound Semiconductor Applications Catapult is a nonprofit research and technology organization. We are part of the Catapult Network. There are nine Catapults in the UK, representing a £1bn investment by the UK Government.

The idea of the Catapult is that it works between universities and private industry, working as an interface to take ideas from university research to private industry. The UK Government funds the university research 100%, but some ideas need further development for scale-up with Catapult

assistance for the commercial market. The Compound Semiconductor Applications (CSA) Catapult helps companies make advanced electronic products that include semiconductors of all types, but our focus is the application of compound semiconductors. Compound semiconductors have applications in electric vehicles, mobile phones, and telecom networks, etc.

EI : *You mentioned silicon semiconductors. Is there sufficient research going on in the area?*

Dr A : Yes, there is a lot of research in material science, chip design, and fabrication.

EI : *Many people are trying to use other rare earth elements for manufacturing chips. What is the advancement in this area?*

Dr A : Yes. Rare earth elements are being experimented with. I don't think rare earth elements are used in the large-scale manufacture of silicon chips, but they are used in small quantities to dope semiconductors, changing their optical properties, and they are sometimes used as a catalyst in the manufacture of compound semiconductors. But these applications do not require large quantities, this is my understanding. The main use of rare earth elements is in magnetics, and also in lasers. The main deposits of rare earth elements occur in North America, and Australia with large deposits in China. Rare earth elements are critical in certain applications like electric vehicles.

EI : *There is also talk in India that there is weaponisation of chips. Would you dwell on that?*

Dr A : Yes, as everyday products become smarter, semiconductors are becoming ubiquitous and are essential for economic growth and security. Various countries around the world are developing semiconductor strategies. Representatives from the CSA Catapult recently gave evidence to Parliament

CSA Catapult's Power Electronics laboratory

CATAPULT
Compound Semiconductor Applications

CSA Catapult was established to help the UK become a global leader in compound semiconductors through collaboration with both large companies, and startups to develop and commercialise new applications utilising this technology.

Compound semiconductor devices have the potential to transform the world of technology in the 2020s as radically as the silicon transistor did in the 1960s and 1970s. In the fields of power electronics and radio frequency systems, compound semiconductor devices can enable product manufacturers to achieve dramatic improvements in performance, size, weight, cost and power. In photonics, compound semiconductors provide unique emitter and detector functions to enhance sensor capability.

Compound semiconductor technology has such potential that it has triggered a cascade of innovative developments at UK companies and research institutes. But the market for compound semiconductors is so new that the infrastructure, systems and processes for realising a concept in the form of a working prototype or a complete system board have not been readily available to UK companies.

The Compound Semiconductor Applications Catapult's purpose is to deliver long-term benefit to the UK economy and accelerate UK economic growth in industries where applying compound semiconductors creates a competitive advantage and enables new products or end markets. Compound semiconductors bring many advantages in size, weight and performance when used in systems. Typically, they have a much wider bandgap compared to silicon which allows devices to operate at much higher voltages, frequencies and temperatures to power the essential technologies of the future.

Catapult envisages the UK becoming a global leader in developing and commercialising new applications for compound semiconductors. How do we aim to do this? Through the knowledge and expertise of our talented team based at our world-class Innovation Centre, based at the heart of the compound semiconductor cluster in Newport, South Wales.

on semiconductors. I am aware of similar initiatives in India, as I recently visited the Indian Electronics and Semiconductor Association. I think the critical thing is that semiconductors are central to most modern products and we need them in large proportions in our daily lives. They are needed in transport, communication, health, defence, etc. So we need to have access to them. But we need to be resilient if we are to have prosperity and security. There are mainly three types of semiconductors: silicon, compound, and organic. All are needed for various uses. The concern at the moment is that there is limited access and to make countries secure and prosperous, no country can be dependent on only one or two sources of acquiring them.

EI : *We would like to know your India plan. You are interested in entering the Indian market. How do you plan to do it?*

Dr A : We have two large areas of interest in India - Telecom Networks and Electric Vehicles and related Charging Infrastructure. These are two big markets and areas where we can work together. India is a good country to work with.

In May 2021, our two countries signed the India-UK 2030 roadmap, calling for a 'comprehensive strategic relationship'.

In April 2022, we signed a memorandum of understanding between the Indian Department of Telecoms and the UK Department for Digital, Culture, Media & Sport.

These agreements form the basis for India-UK cooperation in the near future, say, over the next few years. In addition, the UK Government has passed the Telecom Security Act and published a telecom diversification strategy, which aims to diversify the number of vendors in the market while ensuring we are not dependent on 'high risk' vendors. I believe this strategy calls for international partnerships, and there is an opportunity for UK and Indian companies to work together to develop and supply technologies for telecom networks in India and the UK. There is mutual interest in a deal for both UK and India, the partnership will have to benefit both countries for it to work. So there is a great opportunity here. The UK has a large number of small

innovative companies but not many on a large scale. Ideally, we need to work with large trusted partners. There are large companies in India that have large scales too. The CSA Catapult has recently run a Future Telecom Programme consulting around 180 companies – approximately 90 from India and 90 from the UK that could benefit from a partnership.

EI : *That was an elaborate response to our question on your interests in India. Thank You. A lot of importance is being given to digitization in India. You may be aware that recently the Indian government has come up with a private sector initiative - the Production-Linked Incentive Schemes (PLIs) for semiconductors. Different opinions are coming from the industry. One is whether the country should confine its interests to just the designing of semiconductors and the other is that we need to expand, and not restrict, in the light of the weaponisation of chips. We would like your response to that.*

Dr A : Sure. That's a great question. The UK is a world leader in semiconductor design, especially silicon chips. I recently learned that Indian designers account for around 20% of the silicon chip design in the world. Designing silicon chips is very important but if you don't have access to fabrication, there is a problem. The design is an electronic file. On its own, it is not useful. So you have to fabricate the design into silicon at some point. For security and resilience, there are two choices. Either you have a trusted partner who will guarantee that they will fabricate the semiconductor chips, or you have to have a sovereign capability in manufacturing semiconductors. If you are designing an Artificial Intelligence processor, for example, the design is extremely difficult. But unless you can fabricate the processor, you can't run the Artificial Intelligence software. You have to have access to fabrication. The thing about the fabrication of any semiconductors,

particularly silicon, is that it is highly capital intensive. So, for resilience and security, either you invest significant amounts in sovereign fabrication or you have a trusted partner for fabrication.

EI : *We have heard that you have expertise in imaging technology. This is something that India needs. We are into the large-scale digitization of land records. This is not easy because of tenancy acts and other things. How this imaging technology will come into use in resolving the issues?*

Dr A : In the UK, as I said, there are nine Catapults. The CSA Catapult works closely with the Satellite Applications Catapult, and they work with companies developing satellite imaging technologies. I'm sure they would be interested in working in India. I understand ISRO has excellent capabilities and is helping to grow the Indian satellite industry. The Satellite Applications Catapult has worked on projects mapping rainforests and deforestation. I would encourage Indian companies to contact them to explore partnership opportunities.

EI : *Google has mapped almost all of India, and GPS is common in the country. How will your company's product or solution be different?*

Dr A : Sensors being developed by companies working with the CSA Catapult could be used to gather real-time data in geographical areas in India, complementing maps generated by Google. The Catapult network has access to a lot of UK companies developing satellite technologies, which could potentially identify and digitalize land records.

EI : *In how many countries do you have your operations?*

Dr A : The Catapult Network has a presence in many countries across the world. The CSA Catapult is working on projects with European companies and started to develop relationships with Taiwan and India. We are currently looking at expansion strategies at the moment, which may involve an overseas office in the future. As well as telecoms and electric vehicles, other areas of interest include wind power and renewable energy generation. We could work together in a lot of different industries.

EI - One thing that struck me about your company is that you are giving importance to the commercialization of technologies. You want to promote the industry-academy relationship. This is not seen in India, though the government is doing a lot in bringing both parties together. Perhaps in this area, your company can do a lot in India.

Now the Indian government is thinking of a cross-border research organization. Part of the work will be done in one country, part in another country, and so on. The data will then be linked together. Since you are working with an organization that has been promoting innovation, you would perhaps be able to throw some light on the promotion of innovation in Indian universities for Indian research organizations.

Dr A - The role of the Catapults is to identify early-stage technologies and to grow the UK economy by helping companies to commercialise these technologies. The Catapult Network was established by UK Government around ten years ago, identifying what cutting-edge technologies were coming out of the universities and what could be done to commercialize those technologies. India could do the same thing.

EI - In which areas do you think India has the technological strength to come up in the next five years?

Dr A - I heard that the medical research technologies are quite advanced in India, but since it is not my area of expertise, I cannot comment further. Software and chip design are extremely strong. There definitely exist possibilities to grow in these areas, and also satellite technologies. I think in terms of where the markets are going, there is good scope for growth and commercialization in these areas.

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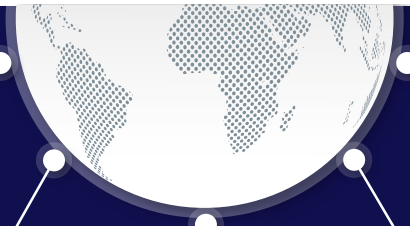

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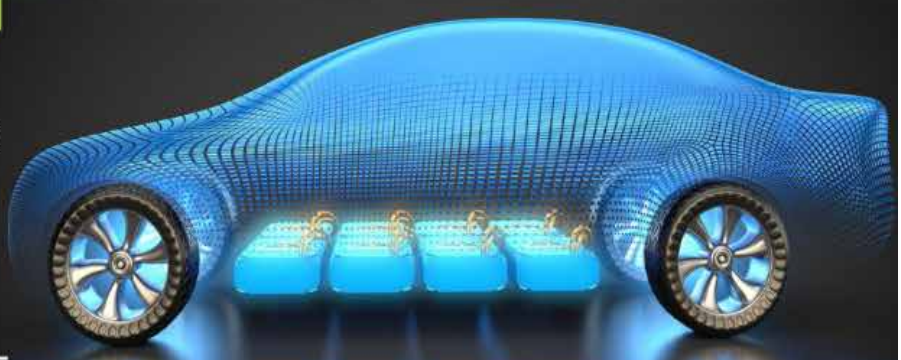

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