

# EXECUTIVE SUMMARY 2023

IGIC ANNUAL MEETING, BENGALURU, 1-2 JUNE 2023



- Where is startup funding going?
- How deep is the slump?
- What impact on startups sustainability, what prospects for a rebound of funding?

These were the questions on the minds of participants at IGIC 2023. Discussions in three sessions bringing together key venture capital players and startup founders helped provide insightful analyses of what comes next and how founders and their funders can best navigate the new financial and economic landscape.





# THE ROAD TO PROFITABILITY AND RESILIENCE IN A NEW FUNDING ERA: A LEANER, EVEN MORE INNOVATIVE STARTUP ECOSYSTEM

Over the past few years geopolitical tensions, enduring inflation, significant macroeconomic uncertainties and risks, and bad surprises in the banking sector have severely impacted VC funding and slowed down investment activity with seed funding continuing to move ahead while series B and C and above funding has fallen drastically. A cautious rebound in VC funding is slowly beginning to happen, although the criteria have become much more demanding. Scrutiny on valuations is the order of the day and the focus is now on profitability and long-term resilience.

Ralph Voltmer, Partner, Head of India Practice, Covington & Burling, started the discussion with the issue of funding metrics in the current environment. Prashanth Prakash, Co-Founder and Partner, Accel Partners, India, noted that “in a free cash environment companies were evaluated on their top line, while in the current environment the multiple on the top line is a function of future profit pools in that sector.”

India is a tough environment to make profits. “In the B2C domain the most value-seeking customers expect great service and don’t want to pay for it,” Prakash said. “We have entrepreneurs who don’t see value in building frugally. Most of our entrepreneurs have not figured out how to make money.” After a bull run in 2021, market expectations on startups were high but many new listed companies got hit hard by the 2022 correction. But this would be sorted out over time. “The key factor is whether the founder is committed to the new reality and if there are profit pools in that sector or subsector.” Investing is driven by the stage and maturity of the ecosystem. “When it is time to return money and figure out liquidity, that’s when VCs also get smarter on how to guide entrepreneurs,” Prakash said. He pointed out that the Indian VC ecosystem is only 15 years old, and no one has yet been through even two cycles of learning.

Nilesh Kothari, Co-Founder and Managing Partner, Trifecta Capital Partners, took a long-term perspective looking at EBITDA as the focus is shifting from topline to bottom line. In 2016, there were similar discussions among VCs about how a funding winter was approaching, the need to extend runways—the time before a start-up runs out of cash—and how they needed to focus on profitability. The one thing that has changed for India specifically is that there are now 10 Indian tech companies listed on the stock market. They were beaten down and forced to focus on profitability, and the market has rewarded them. Many have now «buy» ratings on their stocks. “The founder knows that he needs capital 12, 18 or 24 months later, observed Nilesh. If he knows he is going to be rewarded for topline, he will focus on top line. If he knows he is going to be rewarded for his bottom line, he will focus on it.”

Salil Pitale, Joint Managing Director and Co-CEO at Axis Capital, reminded that public markets in India want profitability when companies list. The startup journey should be to demonstrate the validity of its business case and articulate its path to profitability. “In India, public market investors have historically been the ones who have funded startups. There is a willingness to play ball and give the business the benefit of doubt.” The other advantage in India is the thin margins and large market. “The scales that Indian businesses can achieve are humongous.” For him, there is no dearth of venture money in India both from institutional and non-institutional investors.

Valuation processes have improved in the last six to 12 months, observed Pankaj Gupta, Founder of EthAum Venture Partners in Singapore. “In 2021 there was a lot of FOMO (Fear of Missing Out). Startup founders were forcing investors to make decisions because they had five other term sheets in hand. VCs did not have time to do a lot of due diligence”. What has changed is that time between Series A and B has increased from 600-700 days to 800-900 days. Simultaneously, valuations and round sizes have decreased by 25% to 40%. All this has helped VCs do better due diligence.

“Today, instead of chasing unicorns we are chasing camels that can survive in deserts, in hot scorching heat”

PANKAJ GUPTA, FOUNDER OF ETHAUM VENTURE PARTNERS IN SINGAPORE

Sudhir Rao, India Managing Partner of Celesta Capital, focused on the risks taken by venture capital investors. “Risk does not mean whether you have profit or not,” he said. “We cannot forget that we are venture investors. But time allows us to recalibrate and ask ‘Do I need to be profitable this year?». He added that the exogenous risks on start-ups are higher than they have ever been. “What risk appetite do we have when there are geopolitical changes, when supply chains are going to be walled off, when wars take a new dimension? In that context, our risk appetite needs to be re- dimensioned.”



# WHAT A CHANGING VC LANDSCAPE COULD MEAN FOR STARTUP FUNDING?

While global VC funds are facing tougher conditions, smaller funds seem to be thriving, especially those invested in Southeast Asia and India. With hot money deployment having drastically dropped in India, entrepreneurs and investors' attitude has changed. While the earlier perspective was to raise funding every few months, the focus is now on building sustainable companies that are cash flow- efficient. “Dry powder” is being deployed at a slower pace than earlier. All sectors continue to be in play – be it consumer technology for the Indian domestic consumer, or enterprise technology from AI to IoT to Big Data, etc. Then there’s FinTech and to a lesser extent, digital health, and more recently sustainability/climate tech sectors.

Domestic VCs in India had, and still have, funds to deploy. “What has changed is that some of the large internet-oriented funds that come in and write 100 million dollar checks with little diligence have thankfully stopped,” observed Ben Mathias, Managing Partner, Vertex Ventures SEA & India.

In India, the constant factor across cycles is the large number of problems that require solutions. And there are still credible entrepreneurs with the confidence to dedicate their lives to solving these problems, observed Pranav Pai, Founding Partner, 3one4 capital. “It’s a new experience to have a rush of capital because in the last 20 years, Indian entrepreneurs have usually developed their activities in fairly frugal capital-starved environments.

Patricia Sosrodjojo, Partner at Seedstars which invests across Asia, Latin America, Africa, and MENA observed how, across the board, investment activities are down because of the unprecedented deployment in 2021-2022. However, Southeast Asia, Latin America, and India had inflated valuations in 2021- 2022. The downturn was a much-needed correction. The excess money was driving less discipline with companies not being run in a capital-efficient manner.

Francisque Lebrunie, Venture Partner at Super Capital in France, observed that new openings were emerging for involvement from VCs and LPs from Europe and Asia. The funding winter in the USA has created opportunities for European VCs, with more space and time for negotiations, more time for due diligence, with valuations becoming more reasonable. “We are very bullish on India. We have invested here now in 14 startups. Everybody knows that India is going to be great, but it's good to say it again.”

#### *What road ahead for Seed VCs?*

“Seed investing has been at an all-time high in the last decade,” observed Nandan Venkatachalam, Principal at Axilor Ventures. Pranav Pai added that in India entrepreneurship does not depend on the availability of capital. “The best companies in India have sometimes been built with zero equity, and zero debt. It's a tough 10 years in the start, but they set an example for what can be achieved in India today, if you build companies the right way.” For him, founders should not forget that they are here to build a business. Valuations will come and go, but the business has to be of a certain quality. The pool of opportunities is only getting larger and the fundamentals to approach those opportunities are now being addressed.» Entrepreneurs are realizing that they can actually build their businesses with a lot less capital, said Ben Mathias.

“If you're building a business – whether it's venture funded, or bootstrapped – at the end of the day, you're building it because you want to generate value, said Patricia Sosrodjojo.” Focus on building something with fundamentals, that can withstand the ups and downs of the cycles, she said. There's enough capital available in the market. But founders and investors don't want to take a markdown; so, companies don't want to raise capital at this point. New investors are reluctant to put in money at higher valuations. If the market picks up in the next 12 months, then they will want to deploy more capital at higher valuation.

Yacov Michlin, CEO of Biolight Life Sciences Ltd. and Co-Chair of Israel Advanced Technologies Industries (IATI) advised entrepreneurs: when you select an investor make sure that they have tolerance, are not pushing for an exit after two years, are willing to go with you all the way, and wait until you are a real company.

#### *“How long will this cycle last? And what next?”*

Patricia Sosrodjojo noted that the signs of change are here, though there are differences depending on the markets. A rule of thumb is that a cycle happens every four years, said Nandan Venkatachalam. So things should pick up by early 2024. Ben Mathia sees this moment as a ‘back to normal’ situation. Francisque Lebrunie observed that Europe had been forced to face the war in Ukraine, and the USA had a debt problem. “The situation will become more normal when these two problems will be solved.”

# PUBLIC MARKET INVESTORS AND THE FUNDING OF TECHNOLOGY INNOVATION

With the declining pace of venture investment, startups will have to tap public markets more over the next few years. To do so successfully, they need to understand the way public market players look at investments.

- How do public and private investors differ in their approaches to investment, especially as it applies to startups?
- What do public market investors look for when considering an investment in a startup?
- How do public markets value new-age companies?
- What does it mean for the way start-up founders need to map out their development strategy?



## PREPARING FOR THE PUBLIC MARKET

The nature of public markets is volatile, and a listing company will be subjected to greater scrutiny, publicly analyzed in the media and on the "Street". When a company has just been listed, the amount of noise and public scrutiny can feel jarring but one learns to accept this. Listing in public markets means greater accountability and public assessment of value. "You're required to dispense information in the public domain. Even a single shareholder has the right to ask, and it is mandatory for businesses to respond. But the reality is that unless you're publicly listed, the real value is also not known," warned Mrinal Singh, CEO and CIO at InCred Asset Management.

Minority shareholders have rights in publicly held companies but are not on the board; typically it is private equity actors who are on the board of the company, observed Manish Saxena, Fund Manager at PineBridge Investments. "They're there every quarter with entrepreneurs, which is not the case with public investors," he said. However, the value of public markets takes a different meaning when you consider the fact that investments are often held for long time frames.

## TAKEAWAYS

The focus has to be on key business propositions. "Businesses that will continue to deliver value will find the right trajectory in which they would reward shareholders or investors. Businesses write the business proposition in terms of what kind of unmet need they are addressing," InCred's Singh said.

Profitability or path to profitability? While investors may seek clear metrics on EBITDA, profits, and earnings for a traditional company, for startups, profitability may not be immediately as crucial as a clear path to profitability, with working unit economics driving growth and not marketing spend.

*Pay attention to a company's life stage, not just the nature of capital sought.* One needs to think of a company in terms of its overall life stage. Public markets are usually suited to late-stage capital. Early-stage investing has inherently lower success rates, but very high risk-to-reward ratios. Early-stage investors seek to capture an ecosystem or a sector by "carpet-bombing" investments. In later-stage investments, success rates have to be higher.

*Seek a clear rationale for listing in a public market.* Not all listings are solely to raise money; a company may list to increase its perceived legitimacy, attract talent, etc.

*Governance matters.* "Governance is a bit underappreciated," said Manish Saxena. Bankers can play a role in the composition of the board, ensure independent boards and advise on issues around governance, such as disproportionate allotment of options to founders that raise red flags in the public markets.

*Understand seasonality to manage expectations and ride the waves of volatility.* For example, an order-driven company might reasonably expect order processing in particular quarters, or there might be some seasons which are strong and others which are weak. "More realistic expectations will be set up if that guidance is given."

*Public markets are ready to invest in new-age companies if they demonstrate long-term viability.* However, founders and company boards must be prepared for greater scrutiny - not just of business models but also of governance standards.

*Another part of IGIC 2023 agenda was devoted to assessing the opportunities, challenges and competitive advantages in some key sectors where India has realistic prospects of joining the group of leading countries in the coming years.*





# STRIVING FOR LEADERSHIP IN THE BIO-PHARMA SECTOR

India's biopharma industry is going through one of its most vibrant phases ever. The Indian pharmaceutical market should reach 130 billion dollars by the end of 2030, while the global market is expected to cross the 1 trillion dollar mark in 2023.

- India's pharma sector supplies over 50% of the global demand for various vaccines
- Pharma is one of the top ten most attractive sectors for foreign investment in India

The pandemic brought out some of the best capabilities of the bio-pharma industry in the country, exemplified by the speed and agility in the development of vaccines. But the industry is facing various challenges, among them: low R&D investment, gaps in intellectual property law and rights, and a lack of global innovation collaboration. Viswanadham Duppatla, Vice President, Bio-Pharma Innovation and Head, Life Science Incubator, India, observed that the country has today close to 100 incubators supporting startups with basic infrastructure, and around 40,000 students graduate every year, which points to the large pool of skills available.

## INDIA'S BIO-PHARMA ECOSYSTEM: OPPORTUNITIES AND CHALLENGES

Almost all states have incubators (Maharashtra and Karnataka top the list) with excellent opportunities for startup founders. However, Brijesh Damodaran Nair, Founding Partner, Auxano, India, emphasized that "the right noises are being made, which is encouraging, but this is only a drop in the ocean." One of the biggest challenges in India's bio-pharma sector is de-risking capital risk. VCs and funders hesitate to invest in bio-pharma companies/startups because most VCs wish to see returns within five to seven years. So, convincing VCs to fund bio-pharma projects is complex. For Indian bio-pharma startups to do well, the sector needs trust, confidence, patience and funds from funders and VCs.

## PERSPECTIVES ON STARTUPS AND FUNDING

Leela Maitreyi, Director, Collaborations and Business Development at Bugworks Research, India, shared insights on broad-spectrum antibiotics: "Historically, the last set of broad-spectrum antibiotics were approved and came to the market in the 1980s." As a result, hospitals, physicians and patients have to make do with "old" drugs which are also available over the counter. This has led to antimicrobial resistance. But, according to her, the overarching problem to be addressed is that "India's antibiotic market is broken".

VCs are not interested in companies working in the field of novel innovations in antibiotics as broad-spectrum antibiotic drugs cannot be sold in volume. Investors shy away from low, slow and uncertain returns. Brijesh Damodaran Nair seconded this, “In pharma startups, the time from zero to 100 is long and so, VCs—early-stage risk takers—stay away as there’s a lack of patient capital.”

In that context, small bio-pharma research-led companies depend on philanthropic funds and grants alongside some equity funding. Could the cycle from discovery to clinical trials to go-to-market be accelerated? Technology could be instrumental in helping companies speed up and use data. Companies that get the big picture right via storytelling, numbers and data stand a higher chance of receiving funds.

### STRENGTHENING INDIA’S BIO-PHARMA ECOSYSTEM FOR THE GLOBAL LANDSCAPE

A lot is happening in bio-pharma and many opportunities await but coordination of efforts between startups, VCs, government, academia, and tech companies would usher a richer, more powerful bio-pharma industry. The panellists shared some actions that could influence the industry in the near future:

- **Harness the power of science:** There is a need to create differentiated and novel solutions, and stand out in the market through partnerships and collaborations between industry, academia, government, and funders. Incentives are also needed to tackle neglected areas.
- **Generate speed:** the Indian Bio-pharma has sown resilience. Now, the critical need is pace, agility and scale.
- **Adopt and adapt:** Adopt newer models and adapt to changes, for example, automation and digitisations.
- **Collaborate and partner:** Leverage industry and academia partnerships and collaborations—innovations and resilience cannot happen within silos.
- **Patient capital:** India’s biopharma startups require patient money from government grants, private investors and VCs.
- **Data and numbers:** Incubators and accelerators are good starting points for small research-based pharma startups - if there is clarity of ideas and convincing data points. With the National Health Stack coming into the picture, government and corporate leaders should prepare to support startups.
- **Stable regulatory framework** can help build trust and confidence within the local market, leading India to the global landscape. The pharma sector must push the government to start initiatives specifically designed for this industry.
- **Global regulations:** Governments and regulators across the globe should create an initial level of standard parameters and validation processes to make cross-border collaborations easier. Commonality across the regulatory bodies’ requirements can help immensely.

# STRIVING FOR LEADERSHIP IN THE FINTECH SECTOR

Fintech has now moved to the core of India's financial services sector. As of January 2023, almost 128 million retail payments were processed with a value of nearly 600 billion dollars according to RBI statistics. The industry is driven by favorable factors such as government policies, high internet penetration, including rural and semi-urban areas, and initiatives around user data security.

- Fintech has given impetus to expanding the reach of financial services in India
- Fintech supports customers' preference for real-time capabilities
- India Stack is boosting access to financial services in the country
- A customer-first approach is a crucial factor in fintech growth
- Regulatory barriers remain one of the biggest challenges to the growth of fintech
- Regulators could be *the* key facilitators of innovation in fintech

## INDIA vs JAPAN- A COMPARATIVE TAKE

Fintech performance in Japan varies widely from that in India. Kenta Yoshida, director MUFG, Japan, pointed out that, for example, in Japan, only 60% of the population has the My Number Card (equivalent to Aadhaar Card in India). As a result, during the pandemic, the Japanese government could not distribute subsidies to the 40% of people who did not have cards. Furthermore, unlike Aadhaar, the My Number Card is not connected to individuals' bank accounts. Japan does not have common QR codes for different modes of payment, while In India digitization is happening in all aspects, and transactions are much simpler and more secure than one might think.

“As Japanese investors, we feel quite bullish about Indian fintech companies.”

KENTA YOSHIDA, DIRECTOR, MUFG, JAPAN

He also pointed out that many Asian countries, such as the Philippines, Vietnam and Indonesia, present many opportunities for India's Fintech startups to tap into.



## A GROWING CONSUMER APPEAL FOR FINTECH IN INDIA

Throwing light on the consumer behavior and trends, Aishwarya Jaishankar Co-founder of Hyperface Technologies, highlighted a growing sense of confidence from consumers in India's fintech capabilities, "Indians are demanding new and better digital experiences." For example, UPI, Aadhaar, and the account aggregator framework are just a few examples of products and capabilities truly made in India. This is because fintech brings ease of use, security and safety and excellent digital experiences with innovations and developments.

But there is a lot more to do. For example, how will the fintech industry come up with products consumers don't have yet? The issue somewhere is the speed at which the regulator will be willing and able to move. This is even more important as Fintech is now moving beyond financial services. As Mitesh Jain, Co-founder and CTO of Symbo, Singapore, observed, "Fintech has entered real-time digitization all along the value chain—real-time lending, security, risk mitigation – fintech has become an enabler." Taking the risk mitigation element to the commercial insurance space, Shruthi Rao, Co-founder and CEO, Adapt ready, USA, spoke about how financial and physical risks can make or break a link in various systems. And that is where the mapping of various financial risks helps mitigate risks.

India is becoming a supply chain hub driven by significant foreign direct investments. But India is way behind in the commercial insurance space. One of the biggest challenges remains the regulatory barriers in preventing to tap into the market opportunities.

## HOW DOES INDIAN FINTECH NAVIGATE CHALLENGES AND DEVELOP WINNING ATTRIBUTES?

*Combine scale with value:* While India can build and scale, owing to its large population, one of the biggest challenges is to create quality for the global market. As Aishwarya Jayashankar said, "it is inevitable for players who want to be in the game for the long run to take a value-realization approach to build for the global market."

*Bring clarity on angel investments:* New startups depend on angel investors for initial capital. Therefore, they require a working and thriving angel ecosystem, which is still very limited. More angel investors will help add more fintech startups to the value chain.

*Clarity on First Loss Default Guarantee (FLDG):* India must have digital banking licensing and an environment that is not restrictive to the journey of fintech startups.

*Regulatory landscape:* Startups need to have clarity on the regulations applicable to operating businesses, to infrastructure, to customer experience. There are grey areas that hinder tech development in the industry.

*Fintechs must be part of the debate on policy-making:* Startup ecosystems can help influence policies related to security, data, infrastructure, etc., by working with the government. If the industry wants to expand globally, it may need to consider infrastructure and regulatory frameworks.

*Reduce the data gap:* There's a lack of data and hence a lack of clarity to be able to take risks in a calculated way. More innovative startups are needed to bridge the data gap.

*A cross-regulatory sanitized data centre for scaling and internationalization:* The industry must invest in sanitized data for the next decade. It's essential to have a cross-regulatory framework for data exchange



## STRIVING FOR LEADERSHIP IN THE SUSTAINABILITY / CLEAN TECH SECTOR

India's fast growing economy is generating a rapidly increasing energy demand. However, the country faces significant environmental issues, calling for policy reforms, and a paradigm shift in resources management. Nearly 70% to 80% of emissions come from electricity generation, manufacturing industries, and energy storage. Refineries, chemical, fertilizer industries which form the backbone of the economy need deep-tech solutions to stay relevant and competitive. Global initiatives such as The Paris Agreement, and SBTI (Science Based Target Initiatives) for the corporate world, require translating these frameworks into national policies and regulations. The Government has set a very ambitious target of 500 Gigawatt Renewable Energy (RE) generation capacity by 2030.

Climate tech will dominate decision-making at several levels and give rise to a whole new green industry in the country. India is becoming part of a global trend of acceleration of industrial decarbonization, opening new opportunities for startups in the space of alternative/clean energies, recycling, lower carbon footprint supply chains.

The panel provided comparisons between India's current progress towards a green and clean future, and China:

- India ranked 3rd in the world in the renewable energy sector in 2023, at 100-plus Gigawatts production, while China exceeded 1,000 Gigawatts capacity.
- 350,000 electric vehicles were sold in 2021 in India, compared 1.3 million in China.
- 420,000 electric buses were deployed in China in 2021, while only about 3000 were deployed in India the same year.
- By 2030, India's expected to reach 30% penetration in the EV private car category and 60 to 70% in the two-wheeler category.

In terms of mobility, India has specific challenges that will take time to address. However, in the last couple of years the sales of electric vehicles has picked up because of new market entrants, innovation, and various subsidies. Multiple stakeholders in India have made a significant push towards sustainability and clean-tech. The Government has launched large-scale national initiatives in wind and solar energy.

Business leaders are recognizing the value of sustainability in technologies, realizing that it is not just about mitigating environmental risk, but also enhancing long-term competitiveness and brand image/reputation. Large investments from Indian corporations into renewable energy and other clean-tech are opening opportunities for startups coming up with disruptive technologies to address a variety of issues.

Guruprakash Sastry, Associate Vice President, Climate Action Head at Infosys, India, mentioned how his company rolled out the largest corporate energy conservation program in the country. The company was able to reduce per capita energy consumption by 55% in 12 years, and per capita water consumption by 64%. They generate 60 megawatts of solar power as they transition to clean energy. The company has been carbon neutral for four years now across all emissions. Infosys facility became a “live lab” driven by data, innovation and collaborations with startups, IITs and Stanford. “That’s how you can encourage the startup system,” said Sastry. Challenges and questions still need to be addressed: While the company has provided EV chargers on campus to their employees, how does one increase the energy capacity to meet this growing demand? How to expand green infrastructure? Does one charge employees for such facilities?

Akshay V. Singhal, Founder and CEO, Log9 Materials which set up India's and SE Asia’s first indigenous cell manufacturing facility in India, pointed out that EVs which run on coal-generated electricity are actually harming the environment more in comparison with petrol or diesel vehicles. “Until the country has more Renewable Energy generation and management, it doesn't really solve the core purpose of going electric. So, right from generation, storage, to transmission to charging points, to downstream policy of disbursement of that power – policies have to be looked at, in a coordinated way”.

The recycling of EV-driven lithium-ion battery technologies is a high-profitability business opportunity. Technology has advanced to efficiently extract pure materials. “It enables us to open up urban mines, recycle batteries from all over the world, and get artificial sources of lithium for us.” Beyond recycling, extending the life of the battery is a key objective.

More domestic and international collaboration is required in the EV mobility space. There needs to be a lot of investment into R&D, and infrastructure, suggested Shreyas Shibulal, Founder and Director, Micelio and Micelio Electric Vehicles, India. Stakeholders in the clean tech space should seek to balance disruption and indigenization. Clean energy and mobility are linked; batteries are critical in both spaces. Over the next three years, huge growth is expected in the stationary battery space in India, with policies expected to change soon.

Local cell manufacturing in India will get a boost. It will solve various challenges when it comes to scale adoption and viability. “By 2030 the trend you will see is that half of the battery demand would potentially come from stationary storage and half from mobility,” said Akshay V. Singhal, Founder and CEO, Log9 Materials.

India has only scratched the surface in terms of answers to climate change. Solutions have to be geography-specific, and homegrown. “I don’t mind if the government doesn’t give any incentives; but they should not create roadblocks”, said Prasanta Sarkar, Co-Founder and CEO Newtrace, India. Startups often get mired in ambiguities of policies and processes. Indian bureaucracy lacks trust in startups, pointed out Singhal.

### **SOME CLEAN-TECH SOLUTIONS FROM ISRAEL & SWITZERLAND**

About 40% of the world’s fruits and vegetables are discarded because they go rotten, creating 8% to 10% of global greenhouse gas emissions. Todos Tech, an Israeli startup uses a small device backed by AI to selectively sense ethylene emissions, successfully predicting shelf life. The device helps identify ripening seven days earlier. The company will be expanding this technology to meat and fish. “In the next three to five years, everyone of us will move towards a more conscious consumption, which will drive industries towards a better future,” said Yossi Levi, CEO of Todos Tech.

David Glazer, CEO of 3R-T, Israel, spoke of his tyre-recycling startup that extracts ozone from the atmosphere to separate the rubber component from used tires allowing tyres to almost go back to new. Startups in clean-tech need significant investments, stressed David. And seeking funding from multiple sources is an uphill task.

Denis Tudor from Switzerland detailed how 25% of CO2 emissions in the world come from the transportation sector, with aviation being one of the biggest emission contributors. His startup offers a hyperloop solution for freight and passenger transport. For him, India is the world’s largest market for hyperloop, especially for passenger transportation. “This kind of transportation is not only sustainable in terms of energy efficiency and CO2 emissions but it is also immune to weather conditions.” He has received grants from the Swiss government, but the VC ecosystem worldwide is not yet prepared for sustainable solutions, he said.

# STRIVING FOR LEADERSHIP IN THE AEROSPACE SECTOR

India is moving towards becoming the world's third largest aviation market. In the past 15 years, Indian private companies have entered both the passenger and cargo segment in the engineering and manufacturing fields. The new government policy on Aerospace aims, among other things, at boosting the space sector to 50 billion dollars by 2024 and at institutionalizing the participation of private players. VCs have been increasingly involved in this sector.



Srinivasan Dwarkanath, Strategic Advisor in Aviation and Aerospace and Adjunct Faculty at the Indian Institute of Science, pointed out that success factors in this industry exist in India, for instance the skilled talent pool and the technology such as 3D printing which allows startups products to market quickly. Collaborations and partnerships with accelerators like IISc Bengaluru, IIT Chennai and T-Hub Hyderabad are on the rise. Government policy, especially in the drones sub sector has offered great benefits, bottlenecks have been removed, and regulatory frameworks have been simplified.

The drone subsector offers many exciting future opportunities for Indian startups. The drone industry witnessed a massive jump in the last three to four years driven by the Covid pandemic, and the Russia-Ukraine and Armenia-Azerbaijan wars, which showed the need for technology that does not rely on humans, observed Ankit Mehta, Founder and CEO, ideaForge Technology, India. Drones started out with defence or homeland security applications, but private players soon started working on other uses such as survey, mapping, industrial inspection, pesticide spraying in agriculture, mining etc.

**CASE STUDY:**

AEREO positioned itself as an end-to-end solution providing business outcome as well as hardware. “We started building deep analytics based on data we collected. The final product we give our customer is business insight.” Said Vipul Singh, Co-Founder and CEO, Aereo. The company mapped the state of Haryana in the last 18 months, covering 42,000 villages, and 40 million people.

**CASE STUDY:**

*ideaForge Technology: High scale operations: inducted drones for use in armed forces, farming activities, land records surveys. Its customers have done nearly 300,000 operations on their systems.*

Drones have created an opportunity to bring a lot of people into the mainstream, said Mehta. For instance, in India, the Government’s Svamitva scheme sets to survey 660,000 villages, creating property cards for villagers who did not have property ownership papers for homes they have lived in for generations. The government has also released National Highway construction payments to contractors only after drones have scanned progress. In the mining industry, drone use is mandatory for monthly volumetric assessments. Drones have also been used in disaster management, and in law enforcement.

Ishan Sahgal, CEO of Anavia - an unmanned helicopter manufacturing firm in Switzerland - spoke of how he identified some problems in the manned sector while working for a German company, and came up with his unmanned helicopter - a heavy-lift platform which can fly six hours on turbine engines; the craft can fly similar payloads and missions as a manned helicopter, burning 9 litres/ hour of jet fuel against 350 litres for manned craft.

One subsector with great potential is the one servicing airline engine component OEMs (Original Equipment Manufacturers), MROs (Maintenance Repair Overhaul) divisions in airline companies, according to Aruna Schwarz, Co-Founder & CEO, Stelae Technologies India/UK, as only 40 companies worldwide are players in the sector.

In terms of regulations, Kunal Shrivastava, Co-Founder, SUIND, Switzerland explained that “you have to provide different levels of safety assurance for differently-populated areas, depending on ground risks. A key challenge is that there isn’t a standardized policy around the world.” If a company operates in different countries, repeating the certification process is challenging. As a company in a path-breaking industry, how you future-proof yourself for regulations that don’t exist today is a key risk-mitigating challenge, he added.

India has taken a very progressive stance, compared to the rest of the world, when it comes to drone regulations. It went from ignoring, to denying, to accepting, to coming up with something not palatable, to now having a pro-adoption policy in the drone sector, Mehta pointed out. Nearly 85% of Indian airspace has now been opened for drone flying, provided you have a type-certified drone and a certified pilot. “ We have harmony between stakeholders, and India can set an example on how to evolve a holistic regulatory ecosystem,” said Singh. Shrivastava pointed out that it is more difficult to regulate drone software than hardware. There is no policy that comprehensively deals with drone AI. New regulations in international airworthiness will come to be implemented in June 2024.

How the situation may pan out for India with the Government being the largest consumer as well as the sole regulator for the drone industry? The whole approach to liberalisation is that the private sector takes over the government value today. A unified geospatial interface is slowly emerging – to collect, host, and sell data through an exchange being facilitated by the government. “In times to come, data and analytics will become the driving force. In five years the industry will have a completely different outlook.”

### WAYS TO BOOST THE AEROSPACE AND DRONE INDUSTRIES:

Singh suggested that there is a need to increase regulators capacity building, so they can address workloads related to certifying. Mehta felt that one area that needed the Government’s attention was to grant type-certification for drones in “beyond visual line of sight” operations, which have applications in ocean and forest surveys, medical supplies delivery. With the growing density of drone usage, he anticipated issues of tracking and airspace management. Aruna Schwarz suggested that India could emulate France in granting zero-interest innovation grants in the aerospace sector to stimulate first-level of product building, so that private players don’t have to rely on external private capital.

Cooperation between big corporates and startups is crucial. Startups benefit by partnering with big companies who will be able to give them market use cases and help them innovate and accelerate quicker, and support them financially.” One factor that could turn into a reality the aspiration to become a global industry leader would be a comprehensive National Aerospace Policy, bringing together the Ministries of Defence, Civil Aviation, S&T, heavy industries etc. Having a clear roadmap is necessary to achieve leadership, as is a coordinated plan with all stakeholders – government, public-private partnerships, and startups - coming together in the ecosystem.

# STRIVING FOR LEADERSHIP IN EVs SECTOR

The Economic Survey 2023 from India's Finance Ministry forecasts a 49% compound annual growth for domestic electric vehicle market between 2022 and 2030, with 10 million annual sales by 2030. While India is still playing catch up in comparison to China, the US and Europe, the expansion of the EV sector is now accelerating, with the significant increase of sales of EV batteries and the ramping up of EV and component manufacturing. A 3.2 billion dollar incentive program launched by the central government, which has ignited up to an overall 8.3 billion dollars of investment, should help sustain the accelerating expansion of the EV sector.

EV penetration in the two-wheeler segment increased from less than 2% in 2020 to about 7% now. EV cars make up about 1-2% of total cars sale. Among three-wheelers, EVs account for 30% to 40% of sales.

EV makers had to learn to create a technology stack for the Indian geography. Amitabh Saran, Co-founder & CEO, Altigreen Propulsion Labs, India, noted that automobile electrification started in 1999 in India with production-ready passenger vehicles sold by Tata Motors, but EVs have now to compete in price and performance with diesel and fossil fuel vehicles. Financing was key to putting more small vehicles out as well as good EV-centric manpower.

“In India, EV technology has to be built for the local ecosystem that includes extremely bad road surfaces, stop-and-go traffic, untrained drivers and bad driving habits, said Nakul Kukar, CEO, Cell Propulsion, India. We have to make for these needs. That's why the technology and the ecosystem for the technology will be built in our country.”

Vivek Srivatsa, Head of EV Sales and Marketing Strategy, Tata Motors, noted that charging is the biggest impediment to EVs with stations being largely restricted to cities and vehicle ranges within 250 to 300 km. “Consumers are stepping out more and going out of the city and the predictability of chargers is increasing,” he said. “The game changer will be when public sector companies or fuel companies get into charging.”



Vivek Srivatsa highlighted the cyclical nature of demand in EV four-wheelers. Customer profiles and customer expectations in the EV category are much wider than those in traditional fuel combustion engines. “The only thing keeping us together is the source of power,” he said. He pointed out that there is a lot of customer awareness in terms of battery costs going down and future technology enhancements coming up. People feel that they might get a better EV product if they wait a little longer causing a rubber band effect.

The macroeconomic rationale involved in shifting to electric lies in the arbitrage between hydrocarbons and renewables. Sanjay Krishnan, Co-founder & CEO, Lithium Urban Technologies, India, observed that consumer vehicles are more of an emotional buy than commercial vehicles - which makes cost and technological improvements much more relevant to buying decisions. In that context, current prices of petrol and diesel are a true opportunity for commercial EVs.

The inflection point that will take India’s EV market to the next level of growth “ will be when EVs account for 10% or more of new passenger vehicle sales,” said Manuj Khurana. “We are not yet at that inflection point even though we are at 7%. Commercial vehicles being EVs, and charging infrastructure should exist before that happens.”

## AHEAD OF THE CURVE:

*IGIC 2023 also endeavored to spotlight some emerging new sectors in which entrepreneurs are leveraging new technologies not only to create growth opportunities but also to address long ignored needs and improve daily lives.*





## AHEAD OF THE CURVE: FEMTECH AS A NEXT BIG THING

Femtech is a fast-emerging sector in India, and the country is the largest market in this space, after the USA and UK. The global FemTech market is expected to be worth 50 billion dollars by 2025. Indian startups in the sector are growing at an annual rate of 17%. The Covid pandemic triggered a huge growth in FemTech as accessing healthcare remotely became an urgent necessity.

FemTech broadly includes period-tracking apps, fertility solutions, pregnancy care, menopause health -- these cover several crucial stages of a woman's health. But a lot is still left wanting, especially in preventive healthcare, and therapeutics. “You can look at FemTech not only from the medical healthcare lens, but also as smart devices, or apps, or services that can better women’s life” said Noa Muzzafi, Founding Partner and Israel Director of Asia Bridge, Israel, who has worked across 10 Asian markets.

Socio-culturally in India, many women’s health issues have been taboo topics. They are also considered a “natural part of the lifecycle”, something that several generations have gone through, and therefore not seen as problems that need solutions. But now, women have better access to medical information. There is greater awareness among women about their own health; but not enough yet. From the perspective of his enterprise in the menopause space, Sanjith Shetty, Founder of Mirror, India, believes that getting women to say “we need help” is still a challenge; conversations are not easy to start. FemTech apps and forums provide a platform where women can anonymously talk about symptoms.

“People often forget that 80% of healthcare decisions are made by women not just for themselves but for the whole family. We need to ask women: ‘what do you want?’,” said Rohit M A, Co-founder & Managing Director Cloudnine Hospitals, and Managing partner at PeerCapital, India.

Indian FemTech has changed a lot over the last few years, with the ability to look at data differently, and to look properly at incidences. Digital health data is now accepted as clinical evidence, helping FemTech Startups to create more evidence-based products.

Traditionally most FemTech companies have female founders in a still male-dominated investor ecosystem. One point that most panelists agreed upon was that a greater awareness is needed among investors. FemTech investments have so far been focused on fertility and pregnancy. “FemTech female founders are not highly invested in» observed Sanjana Rao, Scientific

Communications lead & Co-Founder of Miyara, Switzerland, admitting that women FemTech founders get less funding; women may be more successful in raising funds from other women or from VCs that have diverse partners. “It is also up to us as women to invest in other women in diverse cultures and teams.”

When one looks at India the numbers are huge, but when one looks at the TAM - Total Addressable Market - numbers come down significantly. A business has to be curated to a customer set. “As investors, we look at verticalization as the way to go, and we need to go deep, especially in women’s health, observed Rohit. One has to build a defensible business, and not just a useable business. That’s what investors are looking at.”

Investments and talent go hand-in-hand. To be able to attract investments, every founder has to be the best storyteller and should have the ability to sell their vision to get the best talent on board. The ROI is important as well, as what the next generation of the product is going to look like. Noa Muzzafi observed how, as an investor, her company doesn’t invest in products, but in founders, as people, “because we know that products can scale and change. Technologies change really fast, but the core team is the most important factor”. “If they're amazing at storytelling and have a personal mission, those are assets. But at the same time, it has to be backed by data.”

From an India perspective, especially in healthcare, there have been very few outcomes that have been pure digital play. It's not just the amount of capital, it's about the kind of impact or outcomes. Quite often, a large part of the investments in the markets gets concentrated towards full-stack players. The ability to show a lifetime value and the need to show stickiness are key factors, Rohit pointed out.

Looking ahead, the panel agreed that FemTech is a revolution that is here to stay. IT needs to expand to address issues like early detection of critical illnesses such as cancer in women. The world looks forward to tech that gives transparency and awareness and the right answers when women seek out help, summed up Geraldine Lüdi, Founder of Josei in Switzerland. There is an opportunity for FemTech founders to collaborate and come together - to look beyond their own silos. Creating research and white papers together is the way forward.

The player that will win in FemTech is someone who solves three things -- efficacy, privacy and convenience, said Ekta Tibrewal, Founder of Savage, India. Convenience is something that’s underplayed a lot in this category, but in a country like India where women don’t prioritize their health, getting everything they need in one place is going to be important. Efficacy and privacy lead to retention and loyalty.



# AHEAD OF THE CURVE: OPERATIONALIZING THE METAVERSE TO DELIVER SUSTAINABLE BUSINESS OUTCOMES

A senior surgeon in an operating theatre in Mysore, wearing a Microsoft HoloLens, dialled a renowned oncologist in Bangalore on his iPad. Everything visible to the surgeon in Mysore was visible to the oncologist in Bengaluru, who then recommended a surgical incision guideline based on the view he had on his screen. That incision guide line appeared to the surgeon in the operating theatre in Mysore. Sandeep Alur, the Director of Microsoft Technology Centre, India who was inside the operating theatre, shared this example of how the metaverse was already being implemented in healthcare.

## THE METAVERSE AT WORK

The panellists brought a wide range of experiences focusing on industrial/enterprise metaverse as compared to consumer applications. Yuvraj Tomar, founder of Cloudworx, provided a look into the 3D twins - a metaverse application - used in industry. "Everybody in the company now wants siloed business data to be visible to everyone, right from the CXOs to the factory workers," said Tomar. "Digital twins and these kinds of 3D visualisations, serve as an intuitive medium for everyone in the company to understand what is actually going on with their consumers." «Digital twin» refers to a digital replica of a process or space - for example, an end-to-end replication of a supply chain oriented to locations and factories. "If you're talking about an assembly line for a factory, a digital twin is expected to capture all the nitty gritty of the steps, simulate them and help the business understand how this assembly line is going to function, said Tomar."

Cloudworx has served businesses including logistics companies, where the users were not only executives but also port operators and truck drivers, who wanted digital twin solutions for pathfinding capabilities. "They have to go to a particular container, they shouldn't depend on someone else or on a dashboard," said Tomar. Instead, they scan a QR code on their phone, see the whole thing in 3D, and plot their points.

Digital twins are a key example of metaverse applications already implemented to drive business growth and innovation. The technology and capacity exist, and businesses can use them to see returns now. However, it is best seen as a starting point, commented Alur.

An innovative business use case in a different domain is 1Bridge, a rural social tech company that features metaverse-based dealerships for electric vehicles. In October 2022 1Bridge launched the world's first metaverse showroom for rural consumers in a village about 120 kilometres from Bangalore, partnering with an EV manufacturer. Using Oculus headsets, ten village entrepreneurs helped other residents "visit the metaverse," said Madan Padaki, founder of 1Bridge. In the showroom, customers could explore the vehicle just as in a physical store: turning a key, hearing the sound of the engine, picking colours, etc.

## CHALLENGES

The panellists agreed that the metaverse is currently in a very nascent adoption stage for business and growth, and faces several challenges including design and regulatory issues.

In terms of design, there is still a tendency to think in terms of 2D, rather than 3D space; the form factor is also a challenge: devices (glasses, bands, etc) are still clunky or not easy to wear for more than 15-20 minutes at a time by a variety of users. The 'presence' aspect - being able to explore a space and take in all its aspects despite not being physically present - is another area where expectations are high; however, the closest we have today is the caricature-like avatar. "I would expect holoportation, a new type of 3D capture technology allowing high-quality 3D models of people to be reconstructed, compressed and transmitted anywhere in real time." said Alur.

The third and most important challenge is regulatory - including areas such as privacy, security, identity. Compared to generative AI, for example, which has seen explosive uptake and where CEOs are testifying before Congress about the need for regulation, the metaverse has seen relatively less public dialogue on the need for regulation. However, issues have already emerged, such as harassment or identity theft in the metaverse.

# AHEAD OF THE CURVE: TOWARDS A SECOND WAVE OF HEALTH TECH INNOVATION

The digitalisation of healthcare in India has primarily happened in the last four years as the COVID-19 pandemic accelerated the use of teleconsulting, telemedicine, and other digital medical advancements. Before that, people from rural India had to travel to urban areas for medical help.

## INDIA'S JOURNEY INTO HEALTH TECH

Just as in other sectors, India is skipping many of the intermediary steps and leap-frogging into patient-centric care. The country has struggled with a lack of infrastructure, of doctors, of emergency centres and hospitals. However, the foundation was built over the last decade for a high-quality healthcare, including at-home care—medicine delivery, tests, and online reports, among others. Indian startups have made low-cost, high-quality healthcare delivery possible. With the foundation set up they can now deliver therapy and care in a few areas:

- India has digital data available, allowing startups to build data-based services and focusing on diseases such as PCOS, thyroid, weight loss, and diabetes, among others.
- A percentage of the Indian population wants to improve their health situation and overall wellness---a need addressed by digital applications and solutions.
- Corporates are becoming healthcare payers via insurance. Companies such as IMG, an online pharmacy company, offer services to corporations' employees.

## THE GREAT POTENTIAL OF DEEP TECH IN HEALTHCARE

Deep tech is the use of AI and ML to diagnose or treat diseases. For example, ChatGPT can answer questions about diseases or diagnoses. However, one still need a human doctor to approve the diagnosis. The biggest challenge in healthcare in India is that older data does not exist; it is still impossible to build comprehensive disease models.

“Today, almost every healthcare participant—hospital, doctor, insurance company—is working with startups. There is an openness and willingness to try health tech options.”

Gaurav Agarwal, Co-Founder, Tata IMG



## CHALLENGES IN THE HEALTH TECH INDUSTRY

- Insufficient and not accurate enough digital data about diseases, prescriptions and diagnosis preventing healthcare companies to build comprehensive disease models.
- In India, the healthcare revenue pool is not very diverse. People spend money mostly on medicines and diagnostic tests. So, healthcare startups have to sell medicine.
- A lot of the tech imported into India is dated. Few hospitals in India can afford the latest, cutting-edge medical tech.
- The country needs a more robust physical infrastructure. As more health tech solutions emerge, regulators have to fill loopholes in the regulations.

## HEALTH TECH ECOSYSTEMS IN OTHER COUNTRIES

Yaacov Michlin shared an overview of Israel's health tech industry, emphasizing the need for real medical intervention for serious diseases, which can be supported by technology and innovation. How does Israel do it? By combining capabilities of hi-tech and life sciences. AI and digital capabilities can help the medical field by bringing in accuracy and speed. However, health tech cannot yet replace a human doctor.

- Israel started as a startup country and 90% of the tech companies in Israel are located within a radius of 100 kms.
- Israel has 1,800 life science companies and creates 100 new companies every year.
- The country fosters excellent convergence between people from tech and life sciences.
- 2021 was a record year for Israeli health tech startups acquired by in the USA.

Peter Nguyen added perspectives from the Vietnam health tech industry—one of Southeast and Asia Pacific's most attractive markets. There are 60,000 pharmacies in Vietnam for a one hundred million population. It is one of the highest per capita markets in the Asia Pacific region. But Vietnam's technology lags behind. Could that be an opportunity for India?

## LOOKING FORWARD

Indian healthcare and health tech companies are looking forward to the National Health Stack – a health identifier that will collect comprehensive healthcare data across India. The data would help build healthcare products and contribute to the ecosystem, such as health lockers and claims. The government is incentivising patients to share data to make the program successful. Gaurav Aggarwal pointed out some interesting cases that can be supported via the health stack, for example, incentivising healthy behavior.

Yaacov Michlin added an optimistic note, "India is home to big companies; many successful Indians head tech companies the world over; it has dynamic entrepreneurs who know how to build companies; research in India is cost-effective; there are advanced hospitals and a huge population. These factors provide an excellent advantage to the country—and so, health care should be one of the top growth sectors in India."



# AHEAD OF THE CURVE: DRIVING THE SUPPLY CHAINS DIGITIZATION

The global pandemic led to significant disruptions in global supply chains, raising concerns about their resilience. One of the responses has been to accelerate the adoption of digital technologies in supply chain management, such as automation, artificial intelligence, and data analytics. These have proven crucial in enabling real-time visibility, demand forecasting, and agile decision-making

## THE NEED FOR DIGITIZATION

Could modern transportation such as drones be used to provide on-demand transportation to increase supply-chain efficiency? A number of companies and startups such as ePlane, based out of IIT Madras focus on green, cost-effective “on-demand transport” to address this need. ePlane builds electric air transport systems – manned and unmanned - especially suited to time-sensitive cargo such as medical use-cases, or difficult terrain, large water bodies, etc., these drones have the potential to reduce shipping times, ease congestion in cities, and even provide greater quality of life to non-city residents. “In the future it might be that you don’t need to be within the city anymore for a 10-min delivery,” noted Chakravarty, co-founder of ePlane. “We are actually trying to fill significant chunks of the supply chain.” Swisspod, a Hyperloop system, shows the potential of hyperloop for freight transportation, not just transporting passengers.

The metal industry offers a good case study to understand supply chain challenges. It is a 12 trillion dollars industry, out of which iron and steel represents approximately 2 trillion dollars. India is currently the second largest producer of crude steel in the world. Despite the large size of the sector, the metal industry in India still operates in a very traditional way through phone calls. In this setup, power tends to be concentrated in the hands of the producer. Startups such as Metalbook are trying to digitize the system, acting as a full-stack digital supply-chain platform to make buyers and sellers responsive to market trends and create a power shift from producers to consumers.

Despite being a relatively mature supply chain the automotive one is another highly fragmented space. A car has somewhere between 20,000 and 25,000 parts. More complex class A parts might be managed by large suppliers. When it comes to class B and C parts, there is no less specificity and detail, despite being relatively less complex - parts such as gaskets and baskets, which may not be commoditised, leading to a fragmentation of the landscape. Startups such as CapGrid have been focusing on such low-complexity materials for automobile and EV manufacturers. Its sourcing platform has over 30,000 manufacturers, and AI-enabled complexity reduction methods for manufacturers.

The role of digitalisation in such highly fragmented and complex supply chains is rapidly becoming evident. Modularisation of products and processes reduces stress on suppliers and logistics, observed Dheeraj Tiwari, co-founder & CEO of CapGrid, highlighting the need for flexibility in processes. "For example, when a ship got stuck in the canal, global shipping was strangled because there was no flexibility around that." Digitalization allows for flexible supply chains. It also enables cost savings of over 20% for consumers, noted Pulkit Baldev, co-founder & CEO of Metalbox. "On average, in India, 60% of freight transport moves by road compared to 30% globally; only 30% of freight in India is transported via railways." Digitizing the entire supply chain can translate into a complexity reduction of 80% to 90%.

# AHEAD OF THE CURVE: JOINING – AND BEING A WINNER – IN THE GLOBAL CHIPS RACE

India is investing heavily in domestic semiconductor manufacturing, aiming to meet its own semiconductor demand which is expected to reach 80 billion dollars by 2026 - while securing access to one of the world's most valuable, geopolitically sensitive technologies. India's US\$ 9.3 billion Semiconductor Mission seeks to build a vibrant ecosystem through establishing fabs, design-linked incentives (DLIs), and other long-term strategic initiatives.

Countering the popular narrative of India lacking the necessary ecosystem for chips manufacturing, Anshuman Tripathi, member of India's National Security Advisory Board, noted that India does actually have an ecosystem to build on and strengthen. " We sent satellites into space, we have sent probes on Mars and the moon, he reminded the audience, using many of the necessary semiconductors built in-house in India."

India is already well-known for semiconductor design; however, there is a need for a full-fledged ecosystem which still does not exist, asserted Chinnu Senthilkumar, Managing Partner, Exfinity Ventures, India. " You cannot be only a semiconductor design process and move up in the value chain." While India has the technological expertise in both military and consumer electronics, the manufacturing ecosystem needs to be scaled to meet demand.

## CHALLENGES AND AREAS FOR GROWTH

Another gap is in software, where India has unleveraged strengths. Semiconductors have to be thought in tandem with software."Whenever we talk about a semiconductor story or product, we need to couple strongly with software," Senthilkumar said. Also needed are heavy investments into core science and skilling to enable the end-to-end development of this ecosystem. Another challenge is the lack of homegrown specifications, especially vital in key areas like military applications, said Gadadhar Reddy, CEO of NoPo Nanotechnologies. India needs to think big and go after what is necessary in the future, rather than trying to replicate what others are doing.

Manu Nair, Co-Founder of Synthara, Switzerland, echoed this point: "It's typically a bad strategy to try and jump into a battle where there are 200 players on almost every corner."



The skilling issue across the semiconductor value chain is crucial. Manufacturing for the semiconductor fab is moving in the right direction, but will still take some time. Equipment design and manufacturing are heavily specialised, and require doctoral-level experts. "We just don't have the skill set today in India," admitted Senthilkumar. While India does not have many fabs, the global Indian diaspora does have a sizable representation in semiconductor fabs globally, observed Tripathi, which can be seen as an encouraging sign.

Tripathi mentioned a striking example of the un-used potential in India with the present shortage of neon gas – crucial for semiconductors manufacturing - driven by the war in Ukraine. when supply was shut off, neon price soared to nine times pre-war levels. However, neon is a by-product of steel manufacturing, and India is the world's second-largest steel producing country. "we have had neon in our back gardens for decades," said Tripathi. But due to the lack of a supply chain or connection to markets, this neon was just released into the air. "India has the opportunity to be the neon capital of the world," he noted. In the same way, sulphuric acid is also essential for chips manufacturing and India is the world's number one producer of sulphuric acid.

AI computing requires new architecture, calling for innovation in the datacentre or software, and there is heavy demand, presenting opportunities for startups. This is also the case with the Automobiles and EVs sectors. There is a chance to produce good IP in a cost-effective manner in India. Another high potential domain is software for chips.

While there may be government money available, companies should prefer VCs that can offer a strong support ecosystem and network, said Tripathi, referring to the mentorship and connections available through experienced VCs. Senthilkumar added: "A smart small entrepreneur does not look only for money. He looks for all the benefits of an ecosystem."

*Showcasing the entrepreneurial spirit of startup founders may have a transformative impact on the sector in which they operate, and creating opportunities to foster new synergies and partnerships is an integral part of the mission of IGIC. This is what IGIC 2023 did again, bringing the spotlight on some game-changing innovations developed in India as well as in other countries represented in Bengaluru.*



*A cross section of innovative, dynamic startup founders from various countries presented their innovative product or service in two sessions. From mobility, climate action, and water to FinTech, deep tech and chips, the founders highlighted the potential of the technology they are developing to transform and impact their respective sectors.*

## **Manu Nair, co-founder and CEO, Synthara, Switzerland**

The global computing market is valued at 100 billion dollars. While chips are not getting any faster, AI workloads are doubling. Synthara is manufacturing chips 50 times more efficient at computing, 15% to 20% smaller in size than the ones on the market, democratising computing power. The product, ComputeRAM, will seamlessly integrate with existing software stacks, said Manu Nair, and will be launched in the second half of 2023. Six entities have ordered samples with a view to use in new IoT products, and consumer electronics. “Going forward, I would like our company to be the enabler for Indian companies to grow and make products that can compete with global giants like Apple” said Manu.

## **Ram Shoshan, CEO, BeAir, Israel**

A global drinking water crisis looms large. Attempts at atmospheric water generation have had mixed results because the technology costs a lot of energy. BeAir developed a low-energy structurally-optimised technology to cool and condense atmospheric water at a drop level process, using just 2% of energy. “We use a non-porous membrane to filter vapour mid-air and extract pure water from it, to which we can add some nutrients,” Ram Shoshan explained. The product is at Proof of Concept stage, having set up a prototype in one of Israel’s most arid regions; It has been able to extract 800 ml of water per hour. The BeAir system could be set up in high rises areas in the Middle East and India. Shoshan hopes to find a partner in the construction industry in India where the system can be co-built and embedded in neighbourhood communities.

## **Ezhil Subbian, CEO and Co-Founder, String Bio, India**

String Bio, a Bengaluru-based synthetic biology sustainability startup is helping transition to a low-carbon future by treating methane as a high-energy carbon source. It uses advances in bio-engineering, and a gas fermentation process (only three players in the world do this) to convert methane - by fermenting and brewing it - into alternative protein-based products with high commercial value in the human food supplement and animal feed industries, cosmetics and textile industries, explained Ezhil Subbian. The firm works with the oil and gas industry as well as the restaurant food waste industry, to extract methane from biogas. Protein for human nutrition is a 150 billion dollar market and the feed market is a trillion dollar one. “We are driving adoption of this technology and product, however, there are some challenges like a lack of clarity on carbon policy in India, and globally. In the next 3 to 5 years, we can deliver an offset of a billion carbon credits with our products,” she summed up.

### **Denis Tudor, Founder and CEO, SwissPod Technologies, Switzerland**

Nearly 25% of CO2 emissions in the world come from the transportation sector. SwissPod Technologies developed a hyperloop technology platform solution for freight and passenger transport. The company won the Elon Musk's SpaceX technology competition. The high-speed levitation-based travel solution at near-sonic speeds in vacuum tubes is a zero-carbon footprint technology. The hyperloop is immune to weather conditions. Tudor believes India is the largest market for hyperloop in the world, especially for passenger transportation. In the freight sector, the idea is to connect distribution and sortation hubs with ports and airports to decongest traffic. "I'm looking for collaborations with India, especially in the space of building large infrastructure locally," Tudor concluded.

### **Vishal Chopra, Co-founder and CEO, WeRize, India**

With a clear focus on Tier 2, 3 and 4 cities in India where 20% of the country's population is transacting 30% to 40% of the nation's GDP, this FinTech startup develops financial products such as loans and insurance with banks and lending institutions for populations outside the usual digital finance solutions. WeRize is a full-stack platform with an NBFC licence and a 25 million dollar revenue. The company used the LIC model of freelance finance agents to tap into an existing network of six million financially-literate agents on the ground across 5,000 cities, to reach one million customers. The company is looking to scale up. It is already profitable.

### **Miriam Reiner, CEO, VRNeurocogLab, Israel**

VRNeurocogLab leverages cutting edge technology that harnesses natural brain mechanisms for human-vehicle interactions. The assumption is that one can expedite memory, training and learning with self-induced specific brain waves. The company is integrating unique human brain intelligence with artificial intelligence through eye dynamics. So, for instance, truck fleets headquarters can gauge driver fatigue and suggest breaks, or control media inside the truck cabin by looking at the mental load of a driver. Market opportunities for the technology would be in the automotive, aviation and space and surgery sectors.

### **Gaurav Agarwal, Founder & CEO, Gamezop**

Gamezop adds gamification into non-gaming digital products. 3.4 billion people around the world play games online and Gamezop helps attract this demographic to non-gaming products. Gamezop solution allows a developer to include the Gamezop icon in his or her app. A click on the icon takes the user to a game portal where they can choose from a number of games to play for 30 minutes for free. The game does not have to be downloaded. While the service is provided free of cost to the developer, the revenue generated by ads while the user is playing the game is shared 50-50 by the developer and Gamezop. The value addition by Gamezop lies in its collection of about 300 carefully curated games, the proprietary methods to reduce the size of the game by 80% so that it can be played anywhere, and in the network of advertisers around the world. In four years more than 5,000 products—mostly non-gaming companies—have added Gamezop.

**Geetha Manjunath, Founder, CEO and CTO, Niramai Health Analytix**

Geetha showcased her company's use of AI to catch health risks early. The company is trying first to tackle breast cancer. Mammograms do not work well on women who have dense breast, which include all women under 45 and a large number over 45 years. They are also not universally affordable or accessible and are uncomfortable to undergo. Niramai claims a breakthrough in breast cancer detection using technology that converts temperature distribution in the body to a breast health report using smart AI solutions. According to Geetha, this technology works for all age groups, has no radiation risks, and is easier to use. It has not missed any cancer so far. The challenge to enter new markets globally is to go through a lot of regulatory compliances for the medical device.

**Pulkit Baldev, Co-founder & CEO, Metalbook**

Metalbook focuses on solving the problems for metal procurement. Procurement and logistics for the global metal industry, worth \$12 trillion, have been handled in very traditional ways. Pulkit's idea was to digitize the flow of materials and drive customers' behavioural change. Metalbook works with both primary and secondary metal producers. "We decided to be a one-stop solution providing customised solutions with a cloud factory which was a big hit".

**Raghuveer BK, Founder & CEO, Nivetti Systems**

Nivetti is a spinoff of Infosys and works to produce countries and companies critical digital infrastructure. The company builds secure operating systems and networking with a portfolio of routers, switches and customized networking solutions. They enhance digital security through a network traffic analytics and visualisation platform, infrastructure virtualisation and deception, and security research.

**Shruthi Rao, Co-founder & CEO, Adapt Ready**

Adapt Ready is a risk intelligence platform for insurance technology using big data analytics, machine learning, and AI. "The world is filled with unprecedented and interconnected risks—weather events, geopolitical instability causing energy and food insecurity." This has raised demand for insurance coverage, with corporate risk managers asking for more coverage but underwriters unable to provide it because of lack of clarity in data. "We tap into trillions of data points to analyse news, industry data to address the clarity gap," said Shruti. This helps both corporate risk managers and underwriters." Adapt Ready can be used in commercial insurance, banking, asset management and hedge funds or commodity trading.

**David Suter, CEO, Fast Sense, Israel**

Fast Sense produces gas sensors chips as a solution for energy sustainability over the next decade. The company has patents on printing semiconductors based chips and sensors instruments to detect emissions of low carbon blends of gas for the hydrogen economy. "The energy industry needs asset protection for pipelines and people working in the gas ecosystem," David Suter noted. "We need to quantify what's in your gas." For him, India is a perfect place to produce hydrogen, with plenty of landmass and hi-tech start-ups.

*Quite naturally, the IGIC constituency – startup founders, top VCs executives and corporate leaders, academic thought leaders – is focused on assessing where technology innovation is going and what are the implications. Some discussions at IGIC 2023 provided useful insights.*





## TECHNOLOGY AT AN INFLECTION POINT: MANAGING THE POTENTIAL, ADDRESSING THE RISKS

Sam Altman, the creator of ChatGPT, recently warned the US Senate about the possible risks involved in the use of some AI applications. “I think if this technology goes wrong, it can go quite wrong. And we want to be vocal about that,” he said, while urging its regulation. Historian and writer Yuval Noah Harari has famously argued that AI has hacked the operating system of human civilisation and that storytelling computers will change the course of human history.

Similarly, there are significant risks with respect to the use of facial recognition technologies, and governments are at pains to counter the ways blockchain technology is being utilised for money laundering and financing criminal activities. The more we realize the great potential of disruptive technologies, the greater the concern that it might be used in dangerous ways.

“We need AI, we need ChatGPT and more. It is a great boon but like atomic energy, it can be a great threat,” Mohandas Pai, Chairman Aarin Capital, India, said. He highlighted the skew of power that artificial intelligence has created, as this technology is mostly in the hands of powerful US high-tech giants. However, AI is a genie that has been let out of the box and could not be put back in. “Who is going to protect the individual against the huge beast controlled by a few?” Pai asked. “This is going to be controlled by the US, because they have the money. You have a few people who control the technology who in turn are controlled by the NSA and US government.” Pai called the power of technology to manipulate people’s thinking frightening.

Following up on Mohandas Pai remarks, Miriam Reiner, Professor at Israel Institute of Technology (Technion) and Founder & CEO of VRNeurocogLab, Israel, highlighted the need for AI use to be trustworthy and transparent. Hundreds of millions of dollars are being invested in robotic technology with AI as a major tool, and the challenge is about to construct AI in such a way that it respects human rights, and that it will be human-centred.

Reiner identified how AI can lead to pernicious outcomes. The first lies in the very way that algorithms are built. Deep learning of algorithms is only as good as the data that they are built with, and data sets can be deeply flawed. Amazon developed an AI-based system for hiring. The result was a major bias towards white males aged 25 to 38 and almost no females. Similarly, data-based analyses of recidivism in the US shows an unfair and dangerous skew. “There was a heavy bias that more people of colour will go back to crime than white people,” Reiner said. For Mohandas Pai, the only way to counter ill-use of this technological power, is to have a new global compact, a declaration of digital rights. “We need to have an open-source community to protect us,” Pai added. “We need to have a ‘balance of terror.’”

BV Naidu, the Chairman of the Karnataka Digital Economy Mission agreed with Pai that cutting edge technologies were double-edged swords that have the capacity to create great economic impacts but also cause great harm. “The technology does not have the capacity to regulate the threat of the technology,” Naidu argued. “We all need to come together to create a regulatory framework in the country, create laws on data privacy and data use.” One of the most important things was to define ethical guidelines on new technologies for young professionals and to have ethics education starting at school to “shape minds at the beginning of their careers that can have positive impact overall.”

The complexity of regulating AI stems from the need to do it at every level—individual, corporate, national and global. “At the national level, you cannot avoid the rogues,” Naidu said, and regulations can curb most malevolent tendencies at these lower levels”. However, while corporations can be regulated because they can be fined for violations, the tough question is how to deal with national governments. Pai voiced concern that for countries like the US and China, AI is a great power to harness. “How do you make sure that the deep state does not put it to malicious use?” he asked.

Claude Smadja pointed out the huge imbalance in digital power. He said countries like India, China and the EU needed to be very strict about how they would allow their data to be used and create pressures on countries to accept international solutions. He saw the rise of India and China as digital powers as a very positive development. “We need counterweights because this is the only safeguard against the abuse of power at international and corporate level,” he added. “But it will take time, we have to be realistic. The US and US hi-tech giants will fight tooth and nail against that.”

The need of the hour in the face of this challenge are data privacy laws, data sovereignty laws and data usage laws, Pai emphasised. Reiner added that one positive element is the fact that AI tools can be used to check and test AI systems to make them safer and more accountable.

# EXPONENTIAL INNOVATION: MANAGING THE “NEW NORMAL” FOR BUSINESS AND SOCIETY

“The prospect of a world inhabited by robust AI terrifies me; however I am also terrified by a world without robust AI. We need it, and we need to shape it in the right way,” said Paul Saffo, Technology Forecaster and Professor in the School of Engineering, Stanford University, USA. In saying so, Paul summed up all the mixed feelings, the apprehensions and excitement that surrounds the Artificial Intelligence narrative at present.



The world is witnessing exponential innovations in areas from genomics to energy and climate, dramatically illustrating how our time is defined by multiplying exponentials in myriad fields beyond the digital revolution. Moore’s Law lies at the heart of this shift. There are exponential surprises on the horizon in space (orbital, near space, and commercial space), quantum computing, bio-revolution, and nanotech.

Paul Saffo quoted Gorges Doroit, the father of Venture Capitalism, who said “Someone somewhere is making a product that will make your product obsolete”, which defines the nature of today’s competitiveness given the velocity of exponentials. For Paul, “we are in a race between positive and negative exponentials”. Reminding the audience to revisit the writings of Peter F. Drucker, he highlighted that the big challenge in current accounting practices is that they don’t take what is important into account. Beauty and happiness are not accounted for on a balance sheet. We have to change global accounting systems. “We are victims of what we measure.”

## GETTING READY FOR THE POTENTIAL OF NEW TECHNOLOGY

About AI, Saffo advised the audience to try ChatGPT and Midjourney. “You will never see where the opportunity lies till you actually use it yourself. Chat GPT barely touches the surface of Narrow AI; this is not AGI (Artificial General Intelligence)”. Conventional searches will still be used in the future, but conversations with non-humans are the next big thing.

Ganapathy Venugopal, (VG) Co-founder and CEO of Axilor Ventures, spoke from a tech investor perspective, of how the reaction to technology is always extreme – either awe or alarm. “We need to calibrate our responses,” he offered. Amitabh Chaudhry, Managing Director and CEO of Axis Bank Ltd asked Saffo “how do you react as a leader, to ensure you are ready for the potential of new technologies, and mitigate risks? “In India we are often waiting for the mountain to fall on us.” Saffo replied that his friends in Silicon Valley feel they are not caught up with India. “The days when India was behind are long gone.” The approach should be to be out of step. Look for explosions. “Ask yourself why you didn’t catch the AI explosion 12 months ago.” His own approach is to cultivate smart friends – “the right friends” – and listen to them carefully. In answer to another point made by Amitabh about keeping up with AI or going obsolete, Paul noted that «you have teenagers in this world to deal with that stagnant condition called middle age! The cheapest consultant you can have is a teenager obsessed with technology”.

Choi remarked that technology is evolving faster than our ability to adjust to its implications. He brought in the question of government reactions to technology, especially the regulation issue. In most disruptive technology domains, policy makers are struggling to come up with the frameworks that will help mitigate the risks involved, while not unduly hampering innovation.

Amitabh observed how regulatory frameworks “tend to be behind the curve. The pace of change and its interconnectivity is bothering regulators”. Not finding the talent to understand these changes, governments tend to come down hard on them and shut them down. They should instead engage more with innovators. However, VG considered that to expect governance to catch up with tech changes was wishful thinking, while pointing out that anticipation was not easy. For Paul Saffo the question is how entrepreneurs and innovators could have a more “intelligent” conversation with governments. For him, “if not for a visionary government, Silicon Valley would not have existed”.

The short-term challenge is to master risk anticipation in a way allowing for effective responses to these exponential challenges. The larger opportunity lies in identifying the leading edge of large-scale changes already passing unnoticed. Overlook the change, and you will be utterly unprepared for the next revolution; understand it and you will be in a position to craft transformative strategies.

# INDIA AS THE LAST FRONTIER MEGA CONSUMER MARKET: THE PIVOTAL ROLE OF TECHNOLOGY



In April 2023 India became the world's most populous country. In the past decade, except for the COVID-19 disruption, the country has registered 5% to 7.5% annual growth with an estimated 480 million consumers, growing by 20-25 million people per year. One promising feature of India's consumer picture is the average young age of the Indian consumer. However, a huge percentage of the consuming population lives in rural areas. A handicap partly compensated by wide internet and mobile phones penetration, and adoption of new technologies. India is today the last frontier consumer market.

## A CONVERGENCE OF PROMISING TRANSITIONS

Digital India is growing phenomenally getting fast towards almost a billion internet users with each user consuming 20 GB of data monthly, observed Pratik Pal, the CEO of Tata Digital. The low cost of data has made the whole revolution of payments seamless with the Unified Payment Interface (UPI). "We have to see the whole growth of India against this background," he said.

Pratik Pal listed a number of promising transitions in the Indian economy:

- The emergence of tier 2 and tier 3 cities. "Forty million households in tier 3 will become middle class," he said.
- The digital element of retail and the digital development of services set to explode over the next two years.
- The significant impact of the energy transition on how we consume products and live our lives.
- The impetus created by "Make in India" policy
- The talent transition towards new technologies like AI and the metaverse.

"As India goes through these five trends, this will shape consumers' shopping behaviour; it is important for businesses to adapt," he warned:

- Consumers are now very tech savvy and digitally committed. Industries must be prepared to meet their much higher expectations.
- Experiences above all: even with everything going digital, people value experiences above anything else.

- The next big push comes from customers' increasing awareness about health and wellness. The prevalence of wellness and health aspects and how you consume products and services are super important. "The businesses of tomorrow will look at how to build products for the health and wellness conscious. This will change the way products are conceived Pal observed."
- Consumers will also want smarter or tech-enabled products.

Looking at the next big wave of consumption coming from new consumer groups, statistics show that three out of five transactions will soon occur in tier 2 cities. Tier 2 customers essentially wants to behave like Tier 1 cities customers, but the physical infrastructure and supply chain are limiting factors. Businesses have to respond to the phenomenal consumer growth in tier 2 and tier 3 cities by being involved in building infrastructure. Another important factor is to ensure that credit is democratized and as accessible to rural as to urban consumers. Businesses need to capitalize on services beyond urban centers. Tier 2 and tier 3 cities have not yet food delivery and mobility, and businesses have to develop these services.

In a very near future one in every three transactions will be coming from GenZ customers. In about eight years, GenZ will be the biggest spenders in the digital ecosystem, outpacing millennials and GenX. This new generation does not have time to shop going through many filters on e-commerce platforms, Pal said. "They are Instagram people; they want images and personalization. Businesses will have to think about how to meet GenZ's demands."

These trends represent a number of opportunities for startups. There are possibilities for disruption in products and services that we have yet to even imagine. Pratik Pal mentioned an innovative app that allows digital pilgrimages to various holy sites which has an astounding 50 million users. "There are opportunities for startups to look at us as not one mass but many masses," he added. "There will be many Indias, many cohorts, many types, many classes." The biggest opportunity lies in sustainability and green commerce."

However, Indian businesses still need to invest much more on R&D in making global B2C products that have to meet very strict standards. "That kind of brand building requires a sustained intensive effort but companies are not making this effort because there is a large enough domestic market. We need to avoid turning India's significant demographic advantage into a point of weakness, Pal noted.



# SOURCING GLOBAL PRODUCTS AND SERVICES INNOVATION FROM INDIA: THE ROAD AHEAD

India has elevated technology and science innovation as a priority, with a national strategy that commits to strengthening national science, technology and innovation (STI) capabilities. The country is already a sourcing and talent hub for many multinationals. There has been significant digital and product innovation happening in the country, that are being leveraged. Different segments of the Indian technology industry have been doing well despite temporary slowdowns. Companies have actually gained market shares over most of their global peers because of business model changes and tech innovations. Indian startups are even being copied in regions like Latin America, Southeast Asia and the Middle East.

Rajashree R, the chief marketing officer of Tata Consultancy Services, shared how the company has institutionalized innovation and taken it to global clients. "We combine startups with our expertise and go to global customers," she said. "We have tremendous networks with academia and we were one of the first participants in IIT Madras's Centre for Innovation." She also spoke about democratization of recruitment as the company no longer recruits only top rankers from premium colleges but also through a national qualifier test. "The power of India is its population but unless we take everybody along we cannot do anything," she said.

One of the most exciting developments is occurring in Global Capability Centres. These offshore units of multinational corporations operate around the world and provide services to the parent organization. GCCs were initially seen as back offices but they are now doing cutting-edge work and are being set up as hubs of innovation. A large number of GCCS have come to India after the pandemic subsided. Companies worldwide have realized that they need to digitize and India is the only place where they can get affordable talent at scale. India accounts for about 45% of the world's GCCs.

Prashant Gokhale, the managing director of Bühler India, observed that when a multinational company—such as Buhler headquartered in Switzerland—enters a market like India, the cultural aspects are crucial: “When we started our journey in this country 30 years ago, it took us a while to understand cultural habits, the demographic and the diversity. Once you start getting a grip on it, you start leveraging your assets.” The company started R&D 20 years ago for Indian consumers but realized that innovations inevitably find broader use: “In India, we consume pulses high in protein in every meal. Today, the trend is about sustainable proteins from vegetables - primarily pulses. We have known those areas for centuries in this country, so we can leverage what we are doing here for global consumption.”

Within India, Karnataka has been ahead in technology and innovation and in setting up GCCs, said EV Ramana Reddy, the Additional Chief Secretary at the Karnataka government’s department of electronics, IT & BT, science and technology. After independence, all major public R&D centers were set up in Bengaluru. That created an environment for research and innovation that has extended to today’s research in AI and blockchain technologies. The state also has skilled manpower as a result of the priority given to higher education. Reddy stated that Karnataka has the most progressive sectoral policies for IT and BT, with strong connections between industry, academia and government.

How will India maintain its competitive advantage? Rajshree said that India will always have a talent advantage but needs to develop more organic research. “We need to see a generation of companies, large or small, that are based on very solid research.»

*How to create the most propitious environment for stimulating innovation? What kind of factors, practices, institutions and policies can create the best framework conditions for nurturing and boosting an innovation mindset? A number of sessions at IGIC 2023 tried to identify some best practices and examples, and provide actionable insights that startup founders, as well as corporate leaders, could make use of.*





# LEVERAGING INDUSTRY/ACADEMIA PARTNERSHIPS TO JOIN THE RANKS OF INNOVATION LEADER COUNTRIES

When India became independent, the country's main challenge was building industries in different sectors, particularly those considered essential for the economy. India looked to other countries to borrow, adopt, and/or replicate technologies. From 1947 to the early 1990s, India focused on building basic industrial capacities in the core sectors considered necessary. The focus was on absorbing, building scale, and productivity. The effort was mainly on the public sector and government-owned enterprises. The government also tried to invest in R&D but in government-owned, self-contained networks of research laboratories. However, there was no focus on involving academia in this effort.

Fast forward to the 1990s and onwards, the landscape started changing, the private sector turned dynamic, and academia started expanding (from 200 universities to 1,000 today).

- 40% of India's R&D happens in transportation and pharmaceuticals only 40% of the R&D spend comes from the private sector.
- India is missing from the top 10 industries that are R&D heavy, for example, semiconductors, electronics and hardware.
- The last decade has seen some bright spots in academia, for example, the IIT Madras Research Park.
- Many strategic government programs are trying to involve professors in creating core technologies. For example, 5G for telecom actively involve IIT, Bombay and Madras.
- Academic institutions have focused on creating talent for the industries and other applications and not on building R&D capabilities.

Compared to any evolving economy in the world where 70% of R&D spending comes from the private sector, in India, the private sector contributes only 40% towards R&D spending. Some pertinent questions were raised: Is industry in India interested to collaborate with academia, and does it know how to do it? Conversely, how much does academia want to collaborate with industry, for example, via apprenticeship?

While there are more universities today, “Is the industry ready to collaborate with academia beyond institutions such as IIT and IIM?” asked Sumit Kumar, Chief Business Officer, TeamLease Education Foundation, India. He shared his perspective on creating industry-academia collaboration through apprenticeship—collaborating and creating a talent supply chain. For example, he said, “If you look at areas such as ESG, which is horizontal across all sectors, there’s definitely a need for collaboration to address the skills required for the jobs.”

Switzerland, a small country with fewer than nine million people, is one of the most innovative countries in the world. More than two-thirds of the country’s R&D investments stems from private companies, and less than one-third from the government. Universities in Switzerland are facilitators for the implementation of ideas. The collaborative and consortium approach brings academia and industry together, where industry acts as the implementation partner for ideas. “Swiss universities aren’t focused merely on generating ideas. We’re more about facilitating the implementation of ideas. And how Switzerland can contribute to India is by way of better international collaboration,” said Michael Jan Kendzia from the School of Management and Law at the University of Zurich, Switzerland.

## BUILDING AN R&D STRATEGY

How do universities contribute to industries by creating the right kind of talent? Citing examples from Stanford and MIT, Miriam Reiner, Professor at Israel Institute of Technology (Technion) and Founder of NeuroCognition lab, stressed the importance of working in small groups of students to address a given problem. This method is proven to boost creativity, leading to higher achievements. Once the students identify a problem and build a solution, the outcome is tested for quality. This is one way universities could contribute to industry. Conversely, industry could contribute to academia by way of funding research.

“R & D and innovation is about identifying problems and building solutions. And it’s not just about building something, it’s about why you build something and what good it will do.”

Miriam Reiner, Professor at Israel Institute of Technology (Technion) and Founder of NeuroCognition lab

Reiner also shared the example of the EU Consortium. Each consortium consists of a few partners from academia (for research) and industry (takes the product close to the market). The result is a pattern of interaction between academia and industry that creates jobs, products, innovation, trains new scientists and engineers.

One of the most common metrics to measure innovation is patents. For example, in China, simply filing a patent can earn innovators money. The more patents they file, the more they make. And this strategy has its apparent benefits. As Ravi Arora, Vice President, Group Innovation, Tata Sons, observed: in India there is less interest in patents, and the Tata Group has introduced a method to measure patents, their quality and strength.

Where markets fail, the government can play a role in building better industry-academia relationships by encouraging investment in R&D. However, one of the main challenges is fostering partnerships at scale that make an impact in a country the size of India. Rishiksha Krishnan, Ram Charan Chair Professor in Innovation and Leadership at the Indian Institute of Management, Bangalore, shared the example of BIRAC—an organisation that supports biotechnology industry research, promoting partnerships between industry and academia. As a result, India has a large number of biotech startups.

The learning system in India has to evolve. Implementation is critical at the ground level. The learning system has to give up its bilateral approach—a student and academia or an employer and an apprentice. It needs to be more tripartite in nature—the coming together of academia, industry and the candidate/ student. These three stakeholders exist today but in three different bilateral relationships. The collaborations must go deeper in co-creating.

# DELIVERING THE “RIGHT” IP ECOSYSTEM FOR A WOULD-BE INNOVATION SUPERPOWER



In recent years, the Indian government has acknowledged the role of intellectual property protection in innovation. It has taken several measures to strengthen this ecosystem, such as creating a Centre of Excellence in Intellectual Property, a Cell for IPR Promotion and Management awareness programs, and creating a single-window interface - the Patent Analysis and Management System (PAMS). There has been significant progress in innovation and intellectual property with a surge in trademark and patent registrations. However, there is still significant ground to cover.

Ravi Bhola, an IP lawyer and a managing partner at K&S Partners, stressed that India's first national IPR policy made explicit the need for a legislative framework. Two years ago, a joint parliamentary committee on IP was created, with cross-spectrum political representation. The committee recommended a legislative framework; several industry bodies were in agreement, so such a framework could be in place in the next few years.

The next piece of the puzzle is creating the savvy for IP among young companies and startups who may not always know what it entails, or may not be well-equipped to embark on the IP protection journey. Bhola pointed out that the centre and several states have around 20 to 25 such schemes providing IP grants to young companies. For example, MeitY offers a flat grant of 50 lakh rupees for startups just for IP, and state governments have set up patent reimbursement initiatives. "The challenge is that a lot of startups are not aware of the existence of these schemes," said Bhola.

Providing the investor perspective, Nidhi Mathur Venture Partner at Axilor said that of the 50+ startups they have funded, more than a dozen have a very strong IP portfolio, and all of them hold this IP in India. From a purely financial point of view, the question of where one files for that IP does not have a one-size-fits-all answer. Taxation laws, and business reasons such as the location of one's client base, may be factors affecting the choice of location.

Not all IP is limited to patents, noted Winslow Taub, Partner, Covington & Burling, USA. With early-stage startups, or startups in industries where patent rights are less clear, the conversation around IP might need to be broadened.



Taub listed some such themes, especially from an investor or an acquirer's perspective:

- Maintaining confidentiality of key valuable information.
- Tight practices around employee and partner non-disclosure agreements.
- Regular review of commercial agreements in order to ensure there's no inadvertent release of IP rights through licences.

"There's a lot that you can do to preserve a good story around the value of your IP that has nothing to do with patent rights," said Taub. "The best trade secret action is one that you don't have to bring in the first place." Taub shared that his practice advises companies in China to be really particular about cybersecurity, IT infrastructure, and other assets to protect valuable IP, adding that this is just a good general practice worldwide.

### DISCLOSURE, PROTECTION, AND MONETIZATION OF IP

Startups seeking to protect their IP may also be faced with the dilemma of how much to disclose during the patent filing process, leading to the question of whether they should invoke trade secrets. "In patents, you have an obligation to disclose to get the monopoly. And trade secrets gives you the option to keep it as confidential information," Bhola said. Bhola often recommends a hybrid approach to his startup clients, between conventional IP and critical elements that sit in a trade secret bucket. "So protocols need to be established. It takes a lot of time and effort and resources to have a system in place to keep that trade secret secret,". Renju Harikumar, Director Global Innovation Protection at Accenture, India, acknowledged that this scenario changes when you think beyond a single company or supplier towards an ecosystem, where there is a need to balance protecting the "crown jewels of your company" with the need to share information.

The future challenges presented by developments like AI - especially generative AI - are raising questions that might shape the field of IP. The centrality of data to modern business operations - whether proprietary confidential information, or high-tech software innovation, or client lists - is very critical to an organisation. Questions around pharmaceutical IP challenges, around AI drug discovery are also still evolving.

The need to think big was another exhortation across the panel, as India's sectoral strengths move from services to a product-heavy orientation. Emerging areas included biotech and pharmaceutical; however, "we are still as a country satisfied with just working on low-hanging fruits, just working on the process side of technology, and not on the product development and innovation of drugs," noted Bhola. Axilor's Mathur concurred: "If you want to be a superpower, the point is not just quantity of patents and IP; it is also about quality...I really want to see people raise their ambition level."



# GOVERNMENT/CORPORATES/STARTUPS SYNERGIES FOR HARNESSING THE POWER OF AI

The AI market in India is projected to grow at a CAGR of 20.2% from 3.1 billion dollars in 2020 to 7.8 billion dollars by 2025. The development of AI technology is a national priority, and many supporting government policies have been adopted in the past few years.

## AI HYPE – WHERE IS INDIA IN THE RACE?

Pascal Kaufmann, Founder of Starmind and Founder and Group CEO of Mindfire, Switzerland, stirred a discussion about where humans stand in the AI race—will the Chinese or the Americans win the race? And then the question is, where are India and Switzerland positioned in this race - two countries drastically different in terms of size, population, geopolitical environment and at a different technological stage?

Switzerland has been one of the most innovative countries in the world, with a large number of Indians working with Swiss companies. In a globally connected world, many countries are interdependent, and it is essential to focus on each nation's strengths.

India and Switzerland have a considerable chance to win the race to AI if – despite all their differences - the two countries focus on interesting innovations. However, AI innovations cannot surpass human intelligence.

## THE IMPACT OF AI AND DATA ON INDUSTRY

Derick Jose, Co-Founder of Flutura Decision Sciences and Analytics, India/USA, shared an example from the energy industry, where corrosion is a major, complex, challenge, happening inside the pipes and under the ground. While a team working to create a code to solve the problem would require two to three weeks, an intern could make 80% of the code via GPT within a couple of days. In short, AI can affect the balance sheets of various industries—companies can launch more data products faster and bring down sales and marketing costs. So, what is the rate at which GPT will reshape companies across industries?

Sharing perspectives on the government's role, Derrick Jose mentioned the example of the Norwegian government which fosters data exchange for the country's energy sector. The Indian government, too, could provide access to trustworthy data for sectors such as healthcare and energy to benefit these industries.

“We strongly believe AI is not going to be a differentiator. AI is going to get commoditized. But what is going to be more important than AI is data.”

Derrick Jose, Co-Founder of Flutura Decision Sciences and Analytics, India/USA

India has 4,500 startups working in the field of AI. The panellists had an insightful discussion on big data and small data and how most startups prefer to work with small data. Panellists shared their views on AI impacting the healthcare and fintech industries and that AI application in energy has enormous potential. Therefore, government support is essential to AI startups.

### ACTIONABLE POINTS TO BUILD A COMPETITIVE EDGE

- *Democratise access to data:* Create vertical-specific data exchanges, especially for startups –have a trusted data source to help build more innovative applications.
- *Focus on advancing science instead of big data:* Collecting data takes years. It would take years for India to catch up with the advanced countries. Therefore, the focus should instead be on progressing science to harness the talent, skills, and ambition of the Indian people.
- *Create dedicated groups:* Bring together experts and talents from different industries and AI experts to foster innovation. It takes a whole ecosystem to raise AI.

# INNOVATION PARTNERSHIPS: CREATING AN INNOVATION DYNAMIC THROUGH ECOSYSTEMS COLLABORATION

Innovation collaborations offer numerous benefits such as reducing R&D expenses for all involved parties, fostering synergies among diverse technological proficiencies, and enhancing market reach for innovative products and services. The concept of connecting startups ecosystems or established corporations with startups engaged in pertinent domains is gaining popularity, particularly as financial resources are getting more constrained and the need to accelerate time to market becomes more pressing.

## LARGE-SCALE PROBLEMS REQUIRING DIVERSE COLLABORATIONS

Swissnex, the Swiss global network connecting Switzerland and the world in education, research and innovation, has three broad priority areas: health, sustainability, and digital transformation, and defined global challenges under each, mentioned Jonas Brunschwig, CEO Swissnex in India and Consul General of Switzerland. For example, under health, the focus area is antimicrobial resistance, a systemic challenge that involves coordination and collaboration across antibiotics development, policy, prescription, diagnostics, water treatment, agriculture, etc. Swissnex hopes to start building consensus across disciplines and industries to address this systemic and complex challenge, and then align funding instruments to this consensus.

Fraunhofer is one the world's largest applied research organisations. It functions as an ecosystem connecting German universities and technical institutions with industries. Fraunhofer works in a very multi-sectoral, multidisciplinary way: it has over 30,000 employees and over 3 billion euros in financial outlay. The Fraunhofer model offers some interesting lessons for other ecosystem builders and partners,» said Anandi Iyer, Director of the Fraunhofer Office India. «It's a very demand-driven, I would say, a cruel system in some ways,» added Anandi Iyer, because if you don't perform you perish.»

Fraunhofer has earned 50 million euros in the last nine years, from Indian industry and government. «So, there's a business case for Applied Research, and for contract research,» said Iyer. The journey from research to market is crucial. «It's not good enough to be technologically advanced, it is necessary to have a technical, business proposition,» said Anandi. Impact is measured in several ways and at different scales. The imperative to work in ecosystems, with multiple kinds of stakeholders and sharing of knowledge bases, is embedded into the institutional structure.



Another key metric used is the satisfaction scores of startups, said Shivi Jain, Senior Programme Manager at German Entrepreneurship, an organization specialized in building collaboration structures between governments, corporates, investors, startups, and universities in the global innovation ecosystems. Each startup may have different goals when entering a market or exploring an ecosystem, so as an enabler of collaborations, German Entrepreneurship tracks startup survival durations as well as satisfaction scores. The organization started with scaling German startups to US markets, then expanded to China, Japan, South Korea, and India. It helps corporations find the right startups to enable intra-organisation innovation to solve particular problems, set up R&D hubs, and allied activities.

The GAIN, a «practitioners’ accelerator,» supports startups with understanding India as a market, and scaling within this market. «When we open up our bilateral relationship with another country, we look for partners like us,» said Raja Mukherjee, Co-founder & CEO of The GAIN. The organization’s mission is to connect affiliated startups to global markets through its well-established partner network across several countries.

The panellists highlighted that innovation partnerships offer an opportunity to bridge the gap and level the playing field between established businesses and new players. Established businesses can benefit from the agility, fresh perspectives, and disruptive ideas brought by startups, while startups can access resources, mentorship, and market reach through collaborations with established players.

“India is not perceived as an innovation hotspot as much as we know it is, and so it’s more a narrative challenge,” reflected Jonas Brunschwig. “How do you inform stakeholders in Switzerland that what’s going on in India is actually something they need to pay attention to?”

One issue to be addressed is the trust deficit across the value chain when it comes to intellectual property ownership and the need for alignment of shared vision, noted Tammy Ben-Haim, Consul General of Israel for South India. Panellists emphasised the importance of establishing clear agreements and frameworks upfront, defining the ownership and usage rights of IP generated through collaborative efforts. In the same way, they also concurred on the need for clarifying objectives across the board; of building on what exists through market research and dialogue; of looking at research as an investment, not as a cost, as the right approach to create the best partnerships. Alignment of goals and a clear understanding of mutual benefits are also vital in creating a conducive environment for collaboration. Moreover, active engagement, frequent interaction, and knowledge sharing among partners is crucial to maintain momentum and drive innovation.