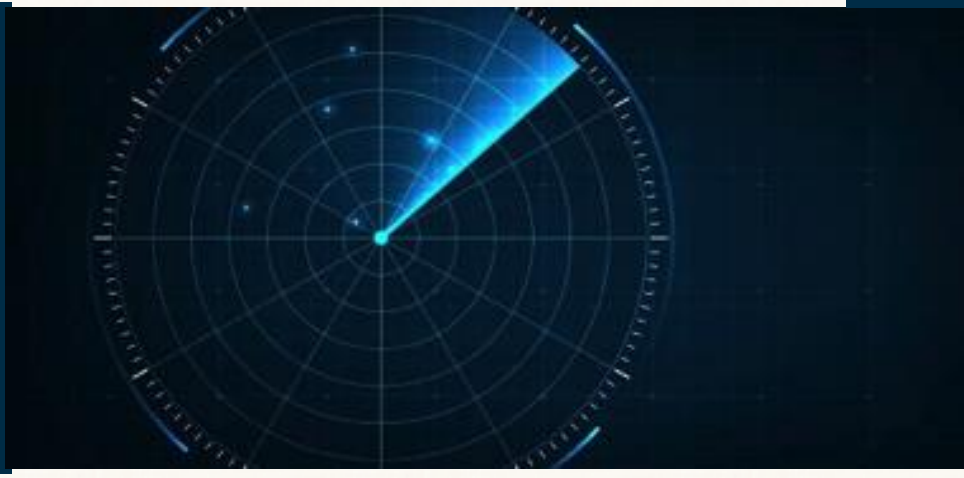
PRIMUS PARTNERS

MONTHLY POLICY NOTE

July 2022

Navigating INDIA



"I have no special talents. I am only passionately curious"
– Albert Einstein

INSIDE THIS EDITION

This edition of the Monthly Policy Note brings new flavors. From how SHGs are critical to India's rural economy to how something like an IPEF is much more than just an acronym.

Innovations in transport and smart manufacturing in the aerospace and defence sector – functionally related themes that have one underlying commonality – research, development, design and innovation.

While reflecting on how COVID has turned healthcare delivery on its head we also discuss on how technology plays a very important role when it comes to climate change including the increasing focus on carbon credits / offsets.

In the expert section, we have Mr Anil Chaudhary (*Group CEO - Metals and Mining, Essar Group and Former Chairman, SAIL*) *share his inputs on the steel market in India - a very relevant theme for the industrial segment in India.*

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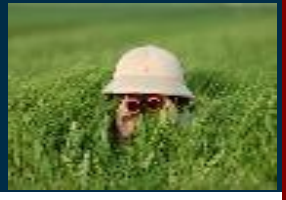
MONTHLY **POLICY NOTE**



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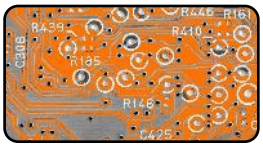

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Mr Anil Chaudhary *– Group CEO (Metals and Mining), Essar Group and Former Chairman, SAIL*

We hear you!!
Participate in our polls on LinkedIn and tell us what you want to read in the next edition.

Policy Square | A Primus Partners initiative to understand the more fundamental questions in policy making

Primus Partners on 28th December 2021 launched **Policy Square**, in association with Businessworld.

Policy Square, an initiative by Primus Partners, is a monthly expert interview series wherein key constituents of the public policy ecosystem – senior policy-makers, civil society members, business executives etc. – are interviewed on critical issues and policies of national importance to explore their impact on the country and industry at-large.

The latest episode of Policy Square, released on Primus Partners' YouTube channel, hosted a conversation with **Ambassador Navdeep Suri, Former High Commissioner to Australia and Ambassador to UAE,** for an in-depth discussion on the India-UAE and India-Australia discussions in the current geopolitical scenario developments.

Ambassador Suri during the interview underscored how India and UAE's relations can be further consolidated and how the CEPA as well as the vision document plans with respect to the India Mart put things in perspective. The FTAs with UAE and Australia were also highlighted as being carefully thought of and negotiated by India as the complementarities brought out were aptly covered.

Link to the full interview: Policy Square with Ambassador Navdeep Suri

Our take

Amidst the ever changing geo political and geo economic landscape, India is fast gaining confidence in its policy of strategic autonomy and economic openness.

Other countries have increasingly recognized India's growing economic and diplomatic importance and forward looking economic policies.

India's focus on boosting export oriented domestic manufacturing is reflected in the talks on FTAs with several countries – both bilateral and regional in the last few years.

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Need for Revitalizing the Rural Economy

- A tree is only as strong as its roots

"*The* soul of India lives in its villages". This holds true even today and thus It becomes important to strengthen the core of Indian society. Rural India stands at the cusp of a golden era of growth and prosperity with the rural economy contributing to ~46% of the national income and 25-30% of India's GDP. With the recent government initiatives including Atma Nirbhar Bharat, Open Network for Digital Commerce (ONDC), Vocal for Local and One District One Product - there has been an increasing push towards development at the grassroots level.

These initiatives are weaving a new paradigm of an inclusive rural transformation that is characterised by increasing penetration of e-commerce in rural areas, increasing digital penetration (rural smartphone and internet penetration increased 30% p.a. over the last five years), increasing access to services and infrastructure, diversification in production patterns and livelihoods etc. These transformations have made rural spaces multi-layered and there is a need to further strengthen rural-urban linkages to act as springboards for regional, national and global value chains leading India towards the goal of self-reliance and in making rural development a major contributor towards the country's growth.

Currently, India is acutely suffering from one of the lowest Female Labour Force Participation rates in the world (~19% in 2021 which is on the downward trend despite a growing economy). Women contribution in the Indian economy is ~17% which is less than half the global average. Women Self Help Groups (SHGs) at village and block level are effectively addressing this malaise in the economy. In fact, India's SHG model is the world's largest federal institutional ecosystem of micro-enterprises and self-employment - owned, managed, and represented by women with a potential for huge social and economic impact. Over 70mn women have been mobilized into SHGs and the last 5 years have seen consistent rise in the number of SHGs, rural households participating in SHGs, increase in the number of Village Organizations and Revolving Funds utilization.

ONDC was also recently launched giving a chance to even the smallest of women SHGs to showcase and sell their products. Development of a SHG hyperlocal marketplace for connecting rural customers to quality products / services phygitally (Physical & Digital) with doorstep delivery of quality, climate friendly and gender inclusive products and services is a significant step. Hyperlocal marketplaces should also be developed to cater to locally developed products for local population. This will bring digital commerce awareness and usage at the village and block levels. Effective implementation of One District One Product (ODOP) should be taken up with greater rigour. Onboarding of specialized products from each district on to an e-commerce platform for local / national / international e-commerce for promoting indigenous products as well as training to SHG members for the onboarding process should be further encouraged.

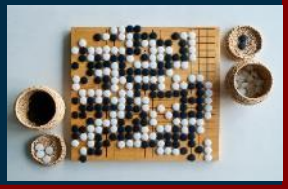
There is a need for promoting awareness of obtaining GI tags (Geographical Indications) for SHG products, particularly with India entering FTA discussions with EU where GI tagged products are given preferential treatment in imports. This will give a major boost to exports from women SHGs with GI tagged products.

With the ESG agenda taking centre stage, there is a need for specialised training for SHG members on climate change, clean energy, disaster management, water etc. Quality assurance training of SHGs on raw/finished goods, packaging, delivery and compliance should be carried out. Apart from greater flow of Revolving Funds to strengthen SHGs, efforts need to be made for CSR support, international funding and multilateral bank support so that SHGs can evolve into corporate entities.

Effective implementation of the "Smart Village Programme" is the need of the hour as development is needed in both rural and urban areas for improving livelihood. The technological and digital component will act as a catalyst in strengthening and self-sustaining villages by effective implementation of central and state government schemes for SHGs like National Rural Livelihoods Mission (NRLM). States need to focus on implementing this program for superior resource-use efficiency, empowered local self-governance and a technology driven platform in all rural economies.

CII's first rural business confidence index for October 2021 stood at 63.9 which was calculated on the back of enhanced rural credit, optimistic lending to industry, and sentiment upbeat on rural economy in the country. Women SHGs focusing on technology and innovation have strong potential to dominate the rural economy and mainstreaming women entrepreneurs.

With over 70mn Indian women being members in almost 6 million SHGs in India – they are an appropriate channel for rural economy's growth



The Indo-Pacific Economic Framework (IPEF)

- Acronyms that are more than just a bunch of jumbled letters

IPEF is a framework led by the US seeking to solidify relationships between partnering nations and engage in critical economic and trade matters that concern the Indo-Pacific. Comprising 14 countries that account for ~40% of the global GDP, the US views IPEF not as *a traditional trade agreement*, but rather, a comprehensive framework with different modules covering "fair and resilient trade, supply chain resilience, infrastructure and decarbonization, and tax and anti-corruption". It also offers a unique flexibility to participating countries to not necessarily have to participate in all modules, despite signing for all of them.

The major pillars of IPEF focus around :

- Trade, which covers aspects relating to digital economy, emerging technologies, labour commitments, environment, trade facilitation, transparency, and good regulatory practices. It also includes corporate accountability, standards on cross-border data flows and data localisations, which is of growing importance with respect to data-related policy developments in India.
- Clean energy and decarbonization which include agreements on 'high-ambition commitments' such as renewable energy targets, carbon removal purchasing commitments, energy efficiency standards, and new measures to combat methane emissions.
- Taxation and anti-corruption which includes commitments to enact and enforce effective tax, anti-money laundering, and anti-bribery schemes.

In essence, IPEF signifies one of the largest multilateral attempts to boost supply chain resilience, with an intent to ease global inflationary pressures and mitigate effects of future disruptions, particularly key raw materials, critical minerals, and semiconductors.

An emerging broader perspective on the IPEF is that it internationalises the US' economic agenda to protect and prolong its economic leadership across Asia while chipping away at China's ascendance. It is also being viewed as a means for the US to try and regain credibility in the high-stakes Indo-pacific region after former President Donald Trump pulled out of the Trans-Pacific Partnership (TPP).

China on the other hand has been looking to play a stronger role in these multilateral/regional agreements as it been seeking a membership in the Comprehensive and Progressive Agreement on Trans-Pacific Partnership (successor agreement to the TPP) and is also in the 14-member Regional Comprehensive Economic Partnership (RCEP), of which the US is not a member.

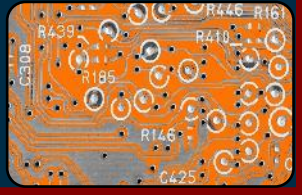
India is one of the key signatories to IPEF, in line with the goals of:

- Having high-standard, inclusive, free, and fair-trade commitments along with the intent to develop new and creative approaches in trade and technology policies that
    - advance a broad set of objectives fuelling economic activity and investment, while also
    - promoting sustainable and inclusive economic growth, and
    - coordinating crisis response measures and expanding cooperation to better prepare for and mitigate the effects of disruptions to better ensure business continuity; and
- Accelerating development and deployment of clean energy technologies by also mobilizing finance, including concessional finance, and on seeking ways to improve competitiveness and enhance connectivity by supporting the development of sustainable and durable infrastructure.

It is estimated that by 2030, India's semiconductor demand will reach $110 billion. By that time, it may constitute 10% of the global demand. In that context, India needs supply-chain security that its demand for semiconductors is not held hostage to the vagaries of supply chains disruptions. This gap can be catered to by building resilient supply chains through IPEF.

The Indo-Pacific is increasingly becoming the world's economic hub. India's concept of Indo-Pacific is inclusive having an ASEAN centrality but traversing across oceans.

However the rise in the expansionist intent of China, has challenged the established international rules-based system in the region. For India, which is not part of the China-led Regional Comprehensive Partnership (RCEP) trade agreement, the IPEF offers a more reliable and credible alternative to creating new mechanisms in the Indo-Pacific.



Innovations in transport:

- The affluent using public transport reflects a developed country

India's transport sector is large and diverse, contributing to roughly 6.3% of GDP and is dominated by the road sector. Increasing Government as well as private investments, rising exports, rising disposable income and interstate movement are the major drivers of the sector.

The Government has announced many schemes and programs to accelerate the pace of development for the sector. However, the sector has not been able to keep pace with rising demand. Hence, there is a need for innovative solutions.

Innovations can be a critical driver not only for increasing productivity and competitiveness, but also for poverty alleviation. This is especially true for the transport sector where innovations are already helping millions improve their lives - through better access to health, education and jobs.

Transportation in India is evolving towards novel modes and smart energy sources accompanied by physical and digital infrastructure. The current transportation sector will witness an overhaul with its pursuit of cleaner and greener low carbon energy fuel with **electric-mobility, biofuel driven, and hydrogen-powered vehicles** taking a lead.

The transformations will also come from major disruptive technologies **based on intelligent transport systems driven by Industry, data analytics, IoT, and artificial intelligence.**

Two common themes in transport innovations can be bucketed into:

- Smart technology
- Electrification

Smart Technology: The advancement of Artificial Intelligence (AI) is one of the key driving forces currently shaping the future of all modes of transport.

Advanced AI can calculate optimized routes and transport velocity by combining weather and sea current data. Traffic management is another area wherein many new innovative solutions are being researched and implemented in this space regularly.

Within an intelligent transportation systems, what is called as a V2X (Vehicle to everything) is designed to enable vehicles to communicate with any system that is directly or indirectly affected by the vehicle or vice versa.

Cargo transport is also another area where AI is being used to streamline movement of goods from one point to another. Performance forecast measures are used for transport systems across mediums– be it rail, road, sea or air.

Electrification: Besides this, India aims to achieve global scale and competitiveness in cutting-edge battery technology, higher energy densities, faster charging, and reduced battery degradation from charging. The Government has set a target of **electric vehicles** making up 30% of new sales of cars and two-wheelers by 2030.

The Government, under the National Electric Mobility Plan (NEMMP) 2020, has set an ambitious target to achieve 6-7 million sales of hybrid and electric vehicles year on year. The FAME 2 scheme provides subsidies on the EVs being used as transport vehicles. Several states have also waived the road tax on EVs, thereby reducing the cost of acquisition of these ecofriendly vehicles.

Humanitarian challenges and advances in technology are leading a wave of transportation innovation across the globe. Issues such as overcrowding, climate change, and wealth inequality make these advancements especially attractive to cities and companies, despite the many regulatory and logistical challenges these new ideas bring to the table. The field of transportation is in constant flux. It is imperative to therefore take careful and evaluated steps forward.

India also is facing its share of challenges with declining ridership in public transport due to the growing need for speed, convenience and comfort of the public supported by growing disposable incomes. Therefore, the Transport4All Digital Innovation Challenge by MoHUA sought to focus on digital innovations including fare products, payment solutions and passenger interactions among others. Smart cities are being planned keeping public transport in mind to ensure hassle free timely commute for the public.

A lot has been done but a lot more can be further done to ensure that transport – especially public transport which is a lifeline in many major cities in India – is convenient without burning a hole in the public's wallet.

Herein, it is also important to ensure that the innovations being sought are sourced or serviced by domestic entities to ensure no adverse impact in cases of global adversities.

As technology evolves, innovations will continue in the transport industry - adaptability is in the hands of the policy makers, operators and the end users

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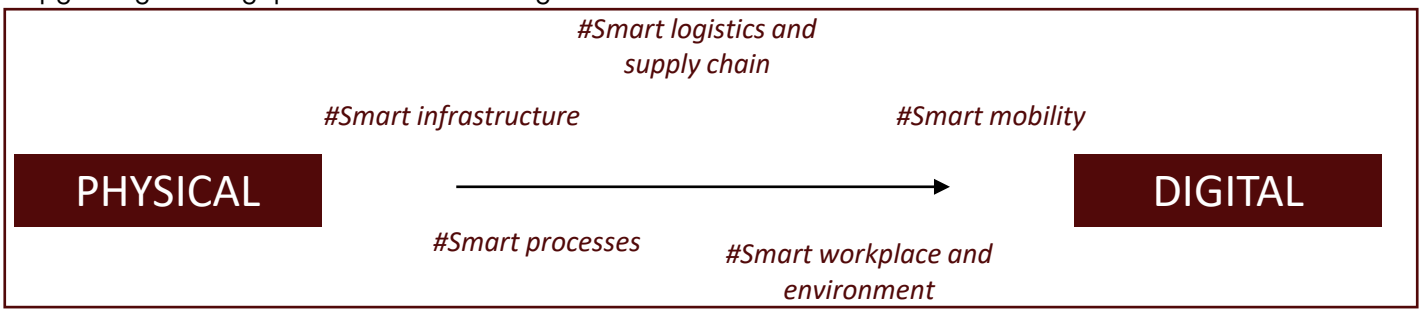
Smart manufacturing in Aerospace and Defence

- Skating where the puck is expected to go, rather than where it is currently

With the potential to add billions of dollars to the global economy coupled with improvements in overall efficiency, smart manufacturing (a.k.a. Industry 4.0) is the future. In an era where technology evolution is growing at an exponential pace, it is important to be in sync with the changes else it always remains a game of catch-up.

Developing new cost-effective products and services, leveraging advanced manufacturing processes, upgrading existing products and utilizing the latest technologies and adding on to them to create futuristic technologies are a few areas which should be worked on.

The journey from physical to digital is an important change that goes parallelly with Industry 4.0. Events like the COVID-19 pandemic or the more recent Russia-Ukraine crisis highlight the importance of having a more agile and resilient ecosystem that can ensure continuity of business-as-usual to the extent possible.



Being one of the member countries of the Industrial Development Board (a government body of UNIDO), India looks at I-4.0 as a national strategy. Earlier this year a national strategy on additive manufacturing was also released which reflects on the importance of smart manufacturing. Smart factories will need to talk to each other – hence will be a mix of production, information and communication technologies.

Like other sectors, the aerospace and defence sector also has a need for smart manufacturing. Especially given the focus on indigenization in the sector, it is important to tap into the companies investing in and / or researching on advanced innovative technologies with a digital footprint.

India's current population of start ups stand at more than 65,000! This is spread across more than 600 districts and 56 diversified sectors from fintech to AI to nano technology. It is important to bring all such start ups into the formal ecosystem so that there is a centralized effort towards research and innovation.

For smart manufacturing to showcase its results in the aerospace and defence sector in India, it is important that while the implementation may or may not be taken up in silos, there needs to be a larger plan at the outset itself to cater to the entire life cycle in the A&D business from design to engineering to manufacturing to MRO to aftermarket be catered to simultaneously. This is already a work in progress but needs to be further extended to all strata of the ecosystem.

Key functional use cases within this sector that yearn for smart manufacturing practices include:

- **Production** - Agility in production ensuring dynamic adaptability within the supply chain
- **Quality control** - Automated quality inspections using AI ensuring optimization
- **Supply chain** – Inter-connected supply chain ensuring secure and seamless flow of information and monitoring of each component within
- **Aftermarket and MRO** - Predictive maintenance and inventory upkeep ensuring a proactive rather than reactive steps
- **Robotics** – Accomplishing physical work automation

Specific interventions that can potentially further help in scaling smart manufacturing within the aerospace and defence sector in India will enable such transformation. Digitization of production coupled with managing of the knowledge being so gathered, as well as product management using analytics to integrate both hardware and software are some such of interventions that need to be implemented at a company level.

However, the implementation of I-4.0 will be a long haul exercise and will require investment. While an integrated policy covering the entire gamut of smart manufacturing while linking with existing programs like Startup India, Digital India and Skill India will be a good starting point – companies especially MSMEs would require financial support to gradually transform. Technical trainings and adaptation of cost-effective solutions will need an initial investment and hence Government schemes taking the required into account will be essential as part of the policy interventions.

Technology is evolving at an exponential pace – be at pace with it or continue to play catch up!

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Carbon trading

- Perpetually perambulating in the vicinity of climate change

Carbon credits are essentially permits or certificates, establishing the right to emit one tonne of CO2 or the equivalent amount of different GHGs, tradable in a carbon market. Carbon markets are pan-national endeavours that aim at reducing GHG emissions. Companies are allotted a prescribed limit of credits which are then traded to balance overall emissions, with the larger objective being to lower the cap on the overall amount of these credits over time and promote viable ways of cutting down emissions. **Succinctly, carbon credits were formulated as a market-oriented mechanism to curtail GHG emissions.**

Trading systems around the world are on the rise: Global carbon markets have been playing a critical role in reducing emissions in a cost-effective manner. **Trading systems are operating and / or are under development in countries like the US, China, Canada, Japan, South Korea, New Zealand, and Switzerland**. The value of traded global markets for CO2 permits increased by 164% to a record $851 bn in 2021 while the voluntary carbon markets reached a record high of $1bn.

The Paris Agreement offers a robust and ambitious base to be used by international markets, thus reinforcing targets, transparency and accountability of parties. Article 6 of the agreement allows parties to use global trading of emission allowances to achieve emission reduction targets establishing a common framework and encouraging a more ambitious market mechanism.

India's stance on curtailing GHG emissions: India is the world's third largest emitter of GHGs, with 74% of its carbon emissions attributable to methane from livestock and cultivation, and another 17.5% of derived from rice cultivation. Leveraging the same, India has the potential to be one of the largest carbon credit markets globally, as the government pushes for a uniform carbon trading system. Carbon trading in India equalled approximately $300 mn in 2020 and is expected to touch $100 bn by 2030. A carbon trading scheme is also being developed for the energy sector by broadening the scope of existing energy-saving trading mechanism in March 2022.

Today, India is on the path to decarbonise its industrial sector and meet commitments. A few carbon projects towards this end include:

Jindal Vijaynagar Steel: Within the upcoming decade, the entity shall sell ~$225 mn worth of saved carbon. This assurance has been made in light of their facility that uses Corex furnace technology. The said technology is capable of mitigating ~15MT of carbon emissions.

Handia Forest in MP: It is projected that 100 financially aggrieved villages would collectively earn at least $0.3 mn p.a. from carbon payments by restoring more than 10,000 hectares of community forests.

Powerguda in Andhra Pradesh: Has sold 150 tonnes equivalent of saved CO2 credits. Additionally, 147 MT of CO2 has been saved by extracting biodiesel from more than 4500 Pongamia trees.

Mechanism of securing carbon credits in India: The paradigm of carbon credit trading seeks to incentivize nations to minimize their GHG emissions, as it rewards those nations which fulfil their targets and facilitates financial incentives to others to do so as promptly as possible. Carbon credits are open to entities engaged in developing renewable energy projects that counterbalance the utilization of fossil fuels. Developed nations have to invest nearly $500 for each tonne of reduction in CO2 as against $10-25 to be spent by developing nations who are obligated to trade surplus credits with developed nations. This is where the concept of trading comes to the picture. Overseas entities who are unable to meet norms can buy such credits via trading. India is the largest beneficiary, claiming 31% of the overall global carbon trade via the Clean Development Mechanism (CDM), and is projected to reach $5-10 bn over time.

A regulatory structure backed by policy support and legislation is primed to accelerate trade in this developing market: The Indian government is pushing for a uniform and consistent carbon trading market through policy changes and set guidelines. The commitment made to achieve 'net zero' emissions by 2070 at the COP 26 shall help in catapulting the carbon credit market in India to new heights. With India being the largest exporter of carbon credits, the government is focused on implementing a carbon trading scheme that shall subsume the present tradable certificates. The government is intending to create a robust domestic market for clean certificates.

Presently, India is well positioned to pioneer agriculture-associated carbon credit trading. The Renewable Energy Certificate (REC) mechanism is a market-based instrument set up in 2010, offering a platform to address the dispersed availability of renewable energy sources across the several states of India.

India has a huge number of carbon credit sellers however, buyers based in the European region are not permitted to enter the market. In order to increase the market for carbon trading, the Forward Contracts Amendment Bill has been introduced in the parliament. This amendment shall help traders and farmers to utilize NCDEX as a platform for carbon credit trading.

Telemedicine growth Post-COVID

- The pandemic that turned healthcare delivery on its head

The world is now divided into Pre-Covid and Post-Covid eras for ever. The Pre-Covid times invited debates over "Technology vs Touch" to understand whether technology can ever replace the brick-and-mortar system of healthcare delivery in the country. In the second most populous country that is still largely rural, the answer would always be that technology or telemedicine will bridge the gap in accessibility of quality medical care in the remote areas but never be a substitute to physical consultations. Then came along the pandemic and changed the game to propel telemedicine right into the spotlight.

Now, telemedicine is no longer the last resort or a matter of convenience but a vital option to sustain the healthcare delivery system in the country. What started as an ambitious project by ISRO and Apollo Hospital back in 2001, is now an integral part of healthcare practice. So much so, that the Medical Council of India with NITI Aayog realized its potential and released the **"Telemedicine Practice Guidelines" in 2020** to give clear definitions to the scope of services and the practice guidelines under telehealth.

In the last two years, the **market share of telehealth in healthcare IT rose to 47% from less than 5% before Covid-19**. A number of start ups sprouted during this period and the all the major private healthcare players dove into the practice with urgency. Even the Health Ministry's flagship telemedicine service **"eSanjeevani" recorded 3 crore consultations by March 2022**.

As we move further, the country's telemedicine market is expected to **grow by 31% CAGR to reach up to $5.5 Billion,** driven by teleconsultations and e-pharmacies. Start Ups like Pristyn Care, PharmEasy, and Innovaccer drew major investments and gained Unicorn status.

The growth in telemedicine is breaking the barriers of reluctance of doctors and patients alike in adopting technology in healthcare. With lowest data tariffs in the world and increasing internet penetration even in the most remote areas of the country (over 646 million active users), telehealth services are readily accessible and a more cost-efficient option to both the user and the provider.

In a progressive step by the government, Hon. Finance Minister announced the National Tele Mental Health Programme in the Union Budget 2022-23.

There will be a network of 23 mental health centres of excellence with NIMHANS being the nodal centre. The objective of this program is to provide accessible, affordable and quality mental healthcare to people all over the country. With advancements in Machine Learning and Artificial Intelligence, the day is not far when patients will only need to visit the doctor physically for critical care or surgeries. The increasing adoption of telehealth is also good news for preventive medicine in the country with the rise of applications like Cure.fit that focus on holistic wellbeing rather than treatment of ailments.

Source: CIS Consulting- Telehealth Solutions for Covid-19 and Beyond

Telemedicine is definitely here to stay but it is not without its issues. If the telemedicine market is to thrive in India, some of the key challenges need to addressed through policy interventions from both government and private players:

Data Privacy: Since the industry is still evolving, there are many concerns regarding information security and data protection. A robust set of regulations would ensure that the patients' data is secure and not misused by large multinationals. Ayushman Bharat Digital Mission (ABDM) is aimed at enabling that security by providing the patients complete ownership of their data.

Reluctance to use technology: While there has been increasing acceptance within the population for telemedicine, there might still be resistance from Tier 3 or rural population in using apps for their pharmacy and consultation needs. Practo reported that 85% of their traffic comes from metro cities. There is a need for sensitization as these geographies stand to benefit the most through telehealth.

Maintaining the quality of care: One of the biggest challenges when pushing teleconsultations is the quality of care given to patients. Often people reject telemedicine because they do not feel satisfied or convinced with the experience and would rather see a doctor in person.

Combatting Climate Change with Technology

- Futuristic solutions to age old challenges

Climate change, for multiple reasons, poses a global threat to the world, with release of carbon emissions in the atmosphere being a major contributor.

Climate change mitigation and adaptation can be addressed with advanced technologies with studies suggesting that 60% of the solutions could be achieved by widely deploying proven, mature technologies. The solution for the balance is either in the research phase or still continues to be evaluated. Three modes of innovation currently exist in the technology regime: (1) **Incremental Change –** Encompasses upgradation and improvement within a technological regime, viz. improvements on the fuel economy of engines (2) **Disruptive Change –** Introduction of a new functionality within a new or existing technological regime, such as fluorescent lights replacing incandescent lights (3) **Radical Change –** A complete shift in technology, from mechanisation to electrification to hydrocarbon energy system.

Any effective plan to drastically cut GHG emissions may need steps for both, deploying the low-emission technologies already in use and also promoting the development of new, need-of-the hour technologies. Some suggested technological interventions recommended to bring about a breakthrough in the climate change mitigation space can be broadly categorized into the above categories.

Carbon Offsetting and Offset Integration: With an anticipated potential market size of $200 billion by 2050, the carbon offset market is crucial for countries and organisations to achieve their net-zero emissions targets globally. Plagued by issues with trading and certification of carbon offsetting, the technology can facilitate near-real-time Renewable Energy Certificate (REC) validation and provide a market for quick and inexpensive carbon offsetting. Offset integration would give an organisation access to a large pool of offsets from across the globe, facilitating trade and emissions planning, easing administrative burdens, and optimising timing of REC purchases and retirement.

Air Cleansing through DAC Systems: Technologies that remove carbon-dioxide from the atmosphere are helpful if we want to get to net-zero emissions, and critical if we want to drive down CO2 levels to where they were before the Industrial Revolution. The Direct Air Capture (DAC) model is powerful and can be replicated with ease across settings.

Solar Microgrids: Climate technologies may be adopted quicky if they also address pain points of energy consumers in today's times. Solar microgrids which generate, store and distribute clean energy to homes and facilities in a local network are potential solutions that may help accomplish climate mitigation and adaptation at the same time.

Switching to Electric Vehicles: Electric vehicles have the largest decarbonisation potential in the current times, due to high dependence of people on motor vehicles. Increased movement towards electric vehicles has delivered significant emission reductions and with subsequent innovations in EV batteries, we can witness faster adoption of Electric Vehicles.

Unleashing Hydrogen's Potential: While solar and wind are renewable sources of energy which are proven to reduce emissions, they are also highly nature dependent sources (weather, season geography etc.). Hydrogen, which produces no carbon emissions when burnt, is a potential option. It can be produced by splitting water using electricity from wind and solar sources and provides a way to store renewable energy for later use. With the declining cost of renewables, and the scaling-up of hydrogen deployment, hydrogen production costs are expected to fall by 30 percent by 2030. Increasing hydrogen energy storage technologies could lead to further reductions in the cost of variable renewable electricity systems.

While these are some of the suggested interventions that have already been initiated and / or maybe undertaken in the near future, leveraging technology and innovation as a response to climate change can effectively prepare the populations to undertake pre-emptive measures. What must be noted is that individual breakthroughs may only account for minute changes, it is only with institutional support that policy/structural changes (tax subsidies, R&D programmes, regulations, tariff reductions etc.) can be introduced and executed.

The challenges posed by climate changes are real and need to be addressed

Expert Interview

Majority of the enablers for the Indian steel industry are in place to reach expected capacity levels

Anil Chaudhary is the Group CEO, Metals and Mining Vertical of ESSAR Group, Mumbai. Previously he has been the Chairman of SAIL, ICVL and mjunction services ltd. He had served as Director (F), SAIL for more than seven years. With an experience of over 38 years in the steel sector, Mr Chaudhary is known for his balanced decision making based on analysis of techno-economic parameters.

The steel industry is hugely dependant on global macros and has a very dynamic relationship with them. Given the recent but ongoing and potentially further developing crises, how do you foresee their impact on India's steel demand and supply equation ?

Absolutely, steel is one of the industries where fortunes are directly related with the developments in the global markets. Domestic demand and prices of steel follow the international market, albeit with possibly a slight gap.

The slowdown in consumption and prices of steel in Asian and European markets in the last three months have also impacted the demand and consequently prices in the country. The major producers have accumulated huge inventories of steel products since the beginning of the current fiscal and the prices have crashed by almost 25% when compared with the beginning of April 2022.

Likewise, supply chain disruptions, consequent to the Covid pandemic driven lockdown in China and the Russia-Ukraine conflict, had created opportunities for Indian steel exports, which has since been dampened by imposition of export duties last month.

It is expected that in the next three months there would be a pressure on steel production arising out of lower demand and anxiety of the producers to bring down the inventories. It is apprehended that there may be a further correction in the prices in the coming months.

However, all the above concerns are temporary and may not affect the steel demand and production in the medium to long term, backed by robust infrastructure developments and withdrawal of export duties.

With respect to India's ambitions of a 300MT annual steel production capacity by 2030 (~120MT currently), do you see that being fulfilled now, given raw material issues and investment timelines?

The National Steel Policy always talked of creation of steel capacity (and not production) at 300 MTPA by the end of 2030. The current capacity for steel making available in the country is about 144 MTPA.

Taking the ratio of production to capacity @80%, the production expected by 2030 is 240 MT. Most of the major producers viz. JSW, JSPL, AMNS, Tata Steel, Vedanta Steel, SAIL, etc. have already announced plans for large capacity enhancement in the current decade. At least, 35 MT capacity is already under construction at various stages.

The major raw materials required for steel making i.e. iron ore may continue to be available in abundance due to proactive action of the GoI in amending the Mines and Minerals (Development and Regulation) or MMDR Act and bringing in reforms in extending approvals/ clearances for facilitating mining operations.

New technologies for conversion of thermal coal into Syn Gas and its use in steel making will help in reducing dependence on imported coal required for BF-BOF route of steel making.

Furthermore, investments by the existing steel players may not be an issue as they have seen huge cash flows in the last two years and have highly deleveraged financial statements. In addition, huge investment is also expected from foreign steel producers, funds and traders.

Given the infrastructure development expected in the country as well as in some of the other Asian countries and the quality & cost competitiveness of Indian steel, it may not be difficult to consume the enhanced production either within or by way of exports.

In a nutshell, I feel that most of the enablers are available for the Indian steel industry to reach the capacity level as expected. However, industry expectation would be that Government policies are such that they don't tinker with the free play of the market and promote export of steel products.

What are the top 3-5 initiatives that can be further worked upon in India to ease the supply constraints for the more important inputs that go into the steel industry viz. coal, coke, iron ore?

The following initiatives from the Government will go a long way in sorting out the issues related to supply of raw materials and in turn making the steel industry more efficient and cost competitive:

- Modification in auction process for iron ore mines, thereby linking the premium with revenue rather than per ton price.
- Rationalisation of royalty rates on minerals in line with other mining countries.
- Development of technologies for extensive usage of Indian coal for steel making
- Maintenance of current status of duty free imports for major inputs for steel making including coal, coke, scrap, etc.
- Provision of land for development of new steel projects near the Bulk Handling Ports.
- Improvement of rail infra from mines and ports to the existing steel plants for timely delivery of inputs at reduced cost.
- Faster Environmental and Forest Clearances for start of new mines as well as removal of minerals lying in the lease areas.

The slurry pipeline construction is critical from an environmental perspective but there are only a couple in India currently. What in your opinion is holding this back?

The use of slurry pipelines are not only the most sustainable way of transporting bulk materials but the cheapest too. In fact, ESSAR has been the pioneer in putting up slurry pipelines in India for transportation of 20 MTPA iron ore concentrate from Kirandul to Vishkapatnam and Dabuna to Paradip in the last decade. ESSAR has also planned another 14 MTPA slurry pipeline along with return water pipeline between Keonjhar and Paradip, for which most of the clearances have already been obtained.

The main reasons hindering the fast construction of slurry pipelines are the long time requirement for land acquisition and right of ways approvals, high initial capital cost, lack of BOO contractors offering the service on take or pay basis, safety and security of pipelines, etc.

How near or far away is the idea of sustainable and / or green steel for India. What do you see as the most strategic and key challenges in its execution?

Unfortunately, India is having a dearth of sustainable sources of energy including natural gas, CBM, hydro/wind/solar power as we started too late in developing them.

Today, the Indian steel industry is completely dependent on coal (except for some special steel units using scrap in EAF furnaces), irrespective of the BF-BOF or DRI-EAF steel making route. As against World's average of 1.85 ton CO_2 emission for one tonne of steel, the Indian average is 2.64 tonne

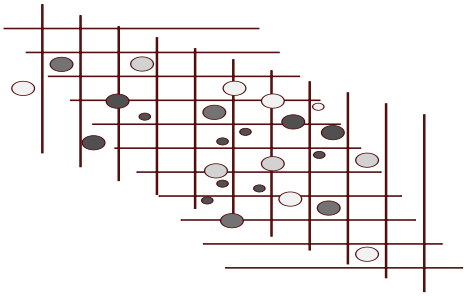
India is a price sensitive country and the cost of natural gas/ green energy/ green hydrogen and ultimately green steel is not economical at this moment.

Technological developments are taking place globally and India may be able to adopt green initiatives, once the technologies to produce green hydrogen are matured and competitive to the existing energy resources.

It may not be out of context here to mention that for producing one tonne of steel approximately 72 kgs of hydrogen is required. Thus to compete with coal for steel making (presuming average coking coal price of $300 per tonne and consumption of 800 kgs for one tonne of steel), the cost of green hydrogen has to be within $3 per tonne, which is definitely a distant reality.

Moreover, the 50 MTPA capacity created recently or to be created in next two to three years will be based on BF-BOF route which may last for another 40 years say till 2060-2065.

In view the above, it appears that production of green or sustainable steel, on a wholesome basis, is likely to take much longer than expected.



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Contact Details

Amit Dugar

amit@primuspartners.in

Bengaluru
5th Floor, 91 Springboard,
Bannerghatta Rd, JP Nagar
Bengaluru - 560078

Chandigarh
2nd Floor, Netsmartz,
Rajiv Gandhi Chandigarh
Technology Park,
Chandigarh - 160019

Delhi
Rear Block, Upper Ground Floor,
ALPS Building,
56 Janpath,
New Delhi - 110001

Mumbai
601, 6th floor,
Raheja Centre,
Nariman point.
Mumbai - 400021

Primus Partners India @partners_primus