WP No-01/2024

EGROW
FOUNDATION FOR ECONOMIC
GROWTH & WELFARE

EGROW WORKING PAPER

India Vision 2050: Bharat, a Civilisational Power

Arvind Virmani

May 2024

EGROW Foundation

Working Paper No-01/2024

India Vision 2050: Bharat A Civilisational Power

Arvind Virmani*

May 2024

Abstract

This paper presents a Vision of a developed India in 2050. Two objectives drive this vision. One is fast catch-up growth that closes the gap with countries which were at the same stage of development as India in the 1960s & 1970s but have moved ahead since then. An understanding and utilization of global & domestic trends is critical to fast growth, which can be used by Indian government and its people to leapfrog to a better life. The second is equality of opportunity for every Indian citizen based on personal motivation & inherent capabilities. Equal access to quality education, skills, public goods, social and governance services is critical to both these objectives. Provision of social services to 1.6 billion Indians, at the quality available to 1.4 billion citizens of the Developed countries, is only possible in 30 years through comprehensive use of digital systems like e-governance, e-learning, tele-medicine, and artificial intelligence. AI driven expert systems like E-Kautilya, E-Chanakya, E-Manu will drive a transformation in governance. Expert systems like E-Acharya, E-Guru and E-Vaid will drive the transformation in education, skilling, and health services. We envision a Hybrid (Phygital) architecture which marries India's vast human resources to a pervasive digital infrastructure to accelerate structural transformation and inclusive growth. Government will ensure the provision of hard & soft infrastructure to every habitation in India, develop a policy structure that creates competitive markets in which private entrepreneurs can innovate and thrive, and a welfare system that protects the weak & vulnerable while giving ample scope for civil society to provide a multiplicity of non-marketable services. The key policy & institutional reforms required are also discussed.

* Author is founder-chairman of the Board of EGROW foundation. He resigned from board in November 2022, before becoming Member NITI Aayog. This Working paper is based on the policy paper, "India Vision 2050," PP No-01/2021, EGROW Foundation, May 2021. Author thanks Dr Charan Singh for comments on previous version of this paper.

Table of Contents

Figures

Tables

1. Introduction

India is a democratic market economy, which has a population equal to the total population of all 78 western democracies (~1.4 billion). With 28 States & 8 Union Territories, 23 official languages and 456 living languages, it is far more diverse than the European Union (EU) with 28 countries and 24 official languages. In contrast to these countries which are upper middle income or high-income countries, India is still a lower middle-income country. India's population has recently overtaken China's; The combination of large population and relatively lower middle income, makes India the fifth largest economy in the World.

The key to India's future is the development and exploitation of our comparative advantage, to become an Upper middle-income country in a decade and a high-income country in 25 years. The economic reforms under way and the economic & institutional reforms on the agenda for the next few years, will sustain growth of per capita GDP at 7% during the decade of 2020s, to make India the third largest economy in the World in a few years. The challenge is to broaden and deepen these reforms to transform the quality of our human resources, to take advantage of the new trends in global polity and economy, so that fast growth is sustained for three decades.

The next section lays out a vision of equality which is the foundation of fast inclusive growth in a free, open, plural democracy. The subsequent section examines the demographic, digitization, and de-carbonization trends, which will determine India's global comparative advantage. The following sections outline the macro-economic & structural evolution of the Indian economy over the next 30 years and a future knowledge economy. We then delve into the Hybrid, digital-physical (Phygital) systems that are critical to translating the vision into a reality. This is followed by a sketch of key elements of the Green economy and a Geopolitical vision for India in the World of 2050. Section 9 presents a policy vision of reforms needed to accelerate and sustain fast growth for three decades.

2. Equality of Opportunity

India's constitution is based on the philosophy that all citizens are equal under the constitution, under the laws enacted under its umbrella and the governance and administrative institutions which implement these laws. The original vision as best explained by Ambedkar, has been distorted by political purpose and expediency. Further the administrative reality of how the constitution and laws are implemented remains too far from the vision. We envision

an India in 2050 in which the original vision of human equality embodied in the fundamental structure of the constitution is restored, the laws reflect the fundamental right to equality and the Governance institutions are reformed to reduce the gap between the laws and their implementation. We envision that the jungle of economic laws, rules, regulations and controls, introduced in the first three decades of independence, will become a distant memory.

Indian society is more unequal today, then the framers of the constitution envisaged or imagined it would be 75 years after its promulgation. Reservation for Scheduled Castes and Scheduled Tribes, which was made for 10 years, with the expectation that it would be enough to eliminate handicaps & restore equality, has been extended for 70 years., with limited success. Part of the success in reducing inherited discrimination, is attributable to facelessness of the market economy and the anonymity of urban life. The founders could never have envisaged that instead of reservation being eliminated a few decades after independence, it would be extended further to OBCs after 40 years, with further demands for expansion arising after 60 years. Political discourse and contestation have also hampered the elimination of discrimination based on religion by each religious group. We envisage an India in 2050, where residual discrimination is reduced to, or below, the level prevailing in other large plural democracies like the USA.

India was one of the first democracies to enshrine full gender equality in the constitution but has failed to translate it into societal norms and rules. We envision an India in which women working from villages, small towns and urban homes, provide more than half the high skill labour force of India. We envision an India in which women's labour force participation rate is in the highest global quartile and the wage differential is in the lowest global quintile. An OECD study (2015) suggests that gender parity in labour force participation and wages, can raise India's GDP growth rate by 1.5% to 2.4%. The IMF estimates that equal participation of females in the economy could add 16% to GDP on average across countries. The estimate for India is higher at 27% of GDP.

Social mobility is an economic imperative, as full use of the productive potential of the population, benefits not just the individual, but increases the total productivity of the economy. We envision an India in which there is equality of economic opportunity for all citizens and their children, independent of the class, caste, religion or ethnic origins of the parents, or gender. This requires an education system that provides basic education and job skills of highest quality to all, and skills & higher education to each according to her capabilities & talents (IQ, EQ, SQ), interests & motivation, tempered by the need to promote public (viz

personal) interest.[1] Learning to learn, the scientific method, and ability to question assumptions buried in our psyche, is an important function of good education. To the extent that humanities are designed to produce this result, they can be as valuable as STEM (science, technology, engineering, and mathematics) in promoting innovation. Education must inculcate Gandhian notions of social, civic, and national responsibility, in contrast to Stalinist-Maoist notions of, "ends justify the means."

Equality of opportunity requires a competitive market economy, in which natural monopolies are rationally identified and professionally regulated, and the adverse effect of asymmetric information on equality of opportunity is corrected. Society has at times to create monopoly rights because it is in the public interest to do so, such as in the grant of patents, or the production of major Weapons systems. This must be done with due consideration of the public benefits and costs.

Socio economic equality also requires equal access to Public Goods of equal quality[2], as inequality in the provision of "Public goods" by the Government is a source of inequality. "Public health" and "Public health education" are classic "public goods" for which Government bears full responsibility.[3] Communicable disease is the best example of the Public good referred to as "Public health", and vaccination, vector control, sewage, sanitation, clean drinking water, and public education are the means of controlling it. Control of pollution (air, water, land) is also closely related to public health. Provision of good quality "Public health" services to all is a foundational pillar for equality of opportunity.[4] We envision an India in which health insurance covers 100% of residents for all testing, & treatments (including minor surgery), with major surgery, chronic disease and curable cancers covered by the govt tertiary health system.[5]

We envision an India in which all have equal access to high quality drinking water, clean air, and land unpolluted by chemicals of all kinds, where all have access to the same urban

[1] IQ = intelligence quotient, EQ = emotional quotient, SQ = social quotient.

[2] E.g open sewage drains vs septic tanks or sewage pipes; differential quality of teachers & doctors in rural vs urban areas or viz slums in latter.

[3] On par with roads & highways, judicial system, internal security & police, and defense. For examples of "Private goods" see next footnote. Health is in the State list of the constitution.

[4] "Public health," needs to be distinguished from "individual health" issues like pneumonia, heart problems, cancer, kidney & other organ diseases and failures. For the latter, society & polity have the choice of different health systems (UK, Canada, Europe, USA), or a private-public partnership version, suited to our tax capability and demands on tax resources.

[5] This requires having State Primary, secondary and tertiary health centers which provide health services which are credible to patients and insurance companies. With the provision of universal broadband connectivity, Telemedicine will make universal personal health insurance feasible.

facilities and environment from large metros to small towns and habitations as they do in advanced countries. We envision an India in which equality of opportunity is achieved in fact and is visible; The poor, the middle class and the rich, the urban dweller and the rural villager, are virtually indistinguishable in public parks, metro rail (a quasi-public good), airports, and footpaths & roads.

We envision a social security system which functions seamlessly from the poorest to the richest. From those who need transfers to those who pay taxes. A net income transfer system which implements the saying, "from each according to her capability to each according to her need," without compromising the incentives for work and honest deceleration of income. A system which ensures that every citizen is part of it and is treated neither like a supplicant at one end, or a potential criminal at the other.[6]

Being a lower middle-income country, there is a big gap, between the income & "quality of life" of the average Indian citizens, and those of upper-middle & high-income countries. We envision an India in 2050, in which this gap is closed, so that Indian metros and the people in the streets, public and commercial spaces, look as well off as in any city of America, Europe or Asia. It will be an India, where NRIs and PIOs are eager to come back and settle in and to send their children to study and work in.

We envision an India which is the third most powerful in World, which neither bows its head before any country nor looks down on any country. An India which deters totalitarian aggressors, and provides a voice to the low income & lower middle-income countries in international forums & organizations. As an example of the latter, India has always provided high quality foreign aid (grants & loans) to other developing countries, based on their needs and requirements, without trying to extract special favours & rents, as others have done. As India's income & resources rises, it will be able to step up this assistance. India is currently the fifth largest economy, but will become the third largest in a few years, a potential great power, part-way to becoming a potential super-power by 2050.[7]

[6] The foundation of the tax-transfer system will be a digital, AI assisted, tax system (PIT, GST, Customs), which actualizes Kautilya's concept, which is like a bee sipping honey from a flower.

[7] We measure power with VIPe index of economic power and define a Great power as one with VIPe > 25% of the strongest economic power and supper power as one with VIPe > 50-60% of the strongest economic power. India is projected to meet this technical criterion of Potential Great power by 2030, and Potential Superpower by 2050.

Sustained, fast, inclusive, green growth is necessary condition, for this vision to be achieved. Inclusive growth generates private income for all, but also generates government revenues, which are critical for providing the public & quasi-public goods and safety net needed to achieve the vision.

3. Global Trends

3.1 Demography

Demographic change is the most important driver of changes in global comparative advantage. India has been unable to utilize its demographic dividend as well as the countries of East & South East Asia have since 1960s. The working population of most of the high-income countries (HICs) and many of the upper middle-income countries (UMIC), has declined in the last 30 years, while that of India has increased (**Table 1**).

Table 1: Working Age population shares and Change

Country share of World's 20-59 yr olds (WAP)					
	Change in share(%pt)		Share of world WAP (%)		
	2020-1990	2050-2020	1990	2020	2050
High income countries (HICs)					
USA	-1.0	-0.5	5.3	4.2	3.8
W Europe	-1.4	-0.6	3.8	2.4	1.8
UK	-0.3	-0.1	1.2	0.8	0.7
Japan	-1.3	-0.6	2.7	1.5	0.9
S Korea	-0.2	-0.4	1.0	0.7	0.4
Taiwan	-0.1	-0.1	0.4	0.3	0.2
Upper middle income countries (UMICs)					
China	-3.4	-7.8	23.5	20.1	12.3
Russia	-1.2	-0.7	3.1	1.9	1.3
Thailand	-0.1	-0.4	1.1	1.0	0.6
Indonesia	0.3	-0.2	3.3	3.6	3.5
Mexico	0.3	-0.1	1.4	1.6	1.5
Lower Middle Income countries (LMICs)					
Viet nam	0.2	-0.2	1.1	1.3	1.1
India	**2.9**	**0.3**	**15.4**	**18.3**	**18.6**

Source: UN population data and projections (2022). Authors calculations exclude the age group 15-19 from WAP on the assumption that they would be occupied in education & job skilling

The global share of working age population, for the largest developed countries like USA, Japan, Germany will decline, while India's share will increase by 0.3% points by 2050. The share of Western Europe in working age population will decline by -0.6% points, with Italy, France UK all losing share. Even more important, China, which is India's direct competitor in

terms of factor endowments will lose a significant 7.8% of its share in global work force by 2050, providing an opportunity to attract labour intensive production from China to India. All potential (UMIC & LMIC) competitors for low-medium skill intensive manufacturing will also lose share (**Table 1**).

The current advantage of India, in low skill labour intensive production will, however, be eroded over the next 10-15 years by the expansion of labour force in Africa. So, India's comparative advantage will shift to semi-skilled or medium skill labour-intensive manufacturing and services, over the next 30 years. The low ratio of educated and skilled labour in total labour force of India in 2020, provides an opportunity to raise India's share to double digits by 2035.

The global share of skilled labour force will decline along with the share in total labour force, for the countries mentioned earlier. In addition, the Republic of Korea, Brazil, rest of N & S. America's share of educated and skilled labour force will also decline. R&D by MNCs in Emerging economies has increased significantly over the last few decades, with Israel, India and China being the key beneficiaries of this diversification.

A third aspect of demography is the aging of the population. Except for the countries in which total and working age population is rising, the ratio of aged population to WAP will rise, China's aged population to WAP will triple in 30 years, from 30.5% in 2020 to 84% in 2050. Even India's aged population to WAP will double over this period from 18.7% to 38.7%, but remain less than half that of China's. Age related health care, drugs & pharmaceuticals and medical equipment will expand rapidly.

India can become a major provider of *hybrid health services* (online & offline), medicines, and medical equipment to the World. Training of technicians, nurses, physical & mental health therapist and an army of niche skills like speech therapist, will be necessary.

Because of the Pandemic, Public Health & public health education issues will take centre stage in the next five years. But India is well placed to become the Pharmacy of the World by 2035. Govt must provide professional regulation of the entire process of drug research, discovery, testing, approval, and post-production pricing, to minimize regulatory costs and maximize the public health benefits.

3.2 Digitization

Two other global trends are especially important for India of 2050. Digitization and Green economy. The Developed countries and China have been digitizing at a much faster rate than

India. Important steps taken by the Government to develop digital infrastructure, like Aadhar, UPI, ONDC, Digi Locker and financial & health stacks, need to be broadened & accelerated. The Pandemic has given a great impetus to digitization worldwide and in India; Remote work and work from home, and Global demand-supply of over the wire services and export of services, has grown by hundreds of per cent in the last few years and will continue to grow swiftly over the next decades. With a supportive environment provided by Govt to Tech entrepreneurs, India can and must close the gap, and benefit from the new possibilities like work from home and work from anywhere which have opened.

Digital provision of human and social services will be critical to delivering high quality education, skills, health, and government services to a population which is more than the continents of Europe and North America combined. The trends in Artificial intelligence, machine learning and *expert systems* will complement the process. Hybrid models will be developed in India to optimise the balance between the benefits of direct human contact & socialization and better quality of information & knowledge provided digitally by a few to many.

The "work from home (WFH)" trend offers a way to work around the social discrimination faced by women in working outside the home, especially in rural areas. The work from anywhere (WFA) trends, provides an opportunity to close the existing and emerging skill shortages in India and the World. India must urgently utilise the unused potential of highly educated women who are confined to their homes or limited to small hometowns, with few job prospects for the highly educated.

3.3 Climate Change

Historically India's utilisation of carbon space is estimated at 52Gt (during 1850-2019), amounting to ~1.3% of the total carbon space available under 2 degree warming scenario. India's per capita emissions are about a third of the global average. Government has set a target of reducing carbon intensity by 45% between 2005 and 2030, and increasing forest & tree cover, to absorb 2.5-3.0 billion tonnes of carbon dioxide equivalent by 2030.

India's environmental challenges are related to the scale, diversity and geographical spread of its population and the diverse weather/environmental conditions. To the consequent challenges related to air, land, water pollution and depletion of underground reservoirs, is added the effect of global climate changes on Indian weather. Unlike EU, Japan, and USA, we face a greater

problem of hot weather & evaporation. The need for cooling and refrigeration is extremely high in summer.

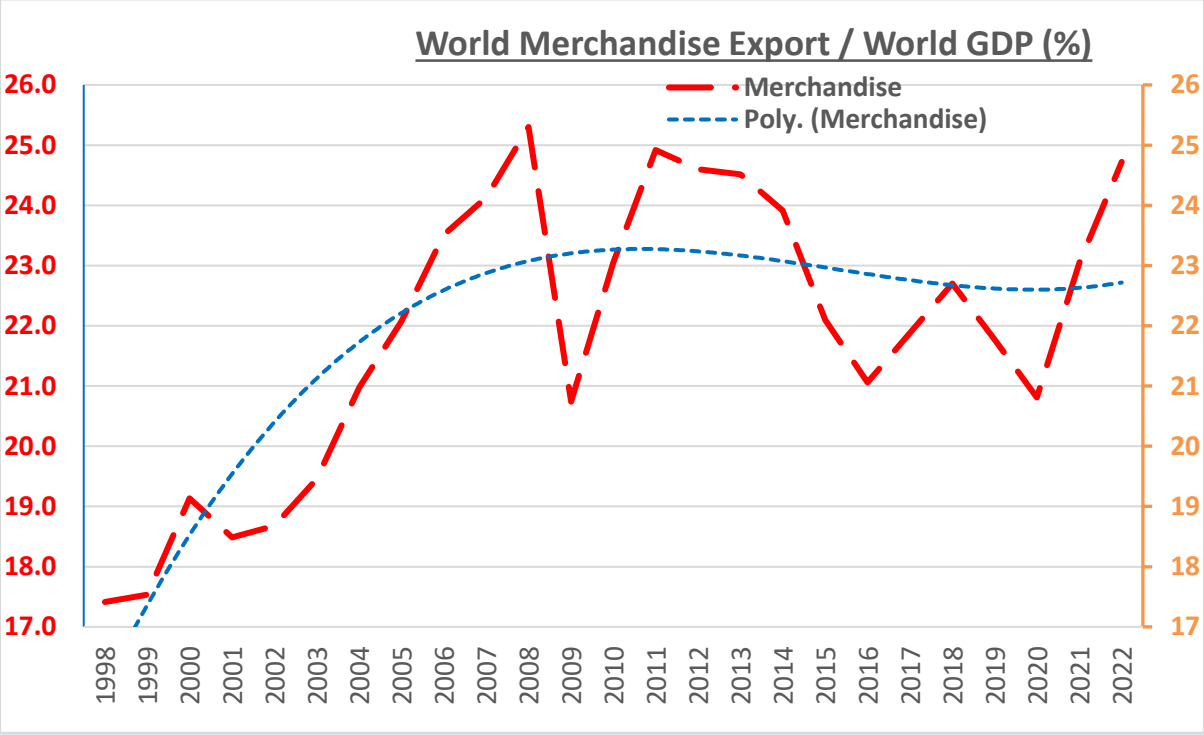
India has decided to take on the challenge, by announcing its target to achieve net zero by 2070 at COP 26 in November 2021, with the adoption of a holistic approach, and a proactive stance on Solar power and electric vehicles, we are gearing up to participate in a whole range of new activities opened by the trend towards a greener economy. Urban planning and housing design must minimize the costs of climate moderation to the economy. Climate change is also leading to freak weather conditions, which must be anticipated and built into the design of rural and urban habitation. An optimal combination of incentives for generating better design of systems and disincentives for environmental degradation will emerge.

3.5 Globalization, de-globalisation & de-risking

The trend in de-globalization which started with the global financial crisis, has continued with a declining trend in the ratio of World merchandise exports to World GDP (China's share of manufactured exports, however, continued to increase, rising from less than 9% in2009 to 15% in 2021, while its share of manufactured exports has risen from 12% in 2009 to 20.5% in 2021 (**Error! Not a valid bookmark self-reference.**),

Figure 2).

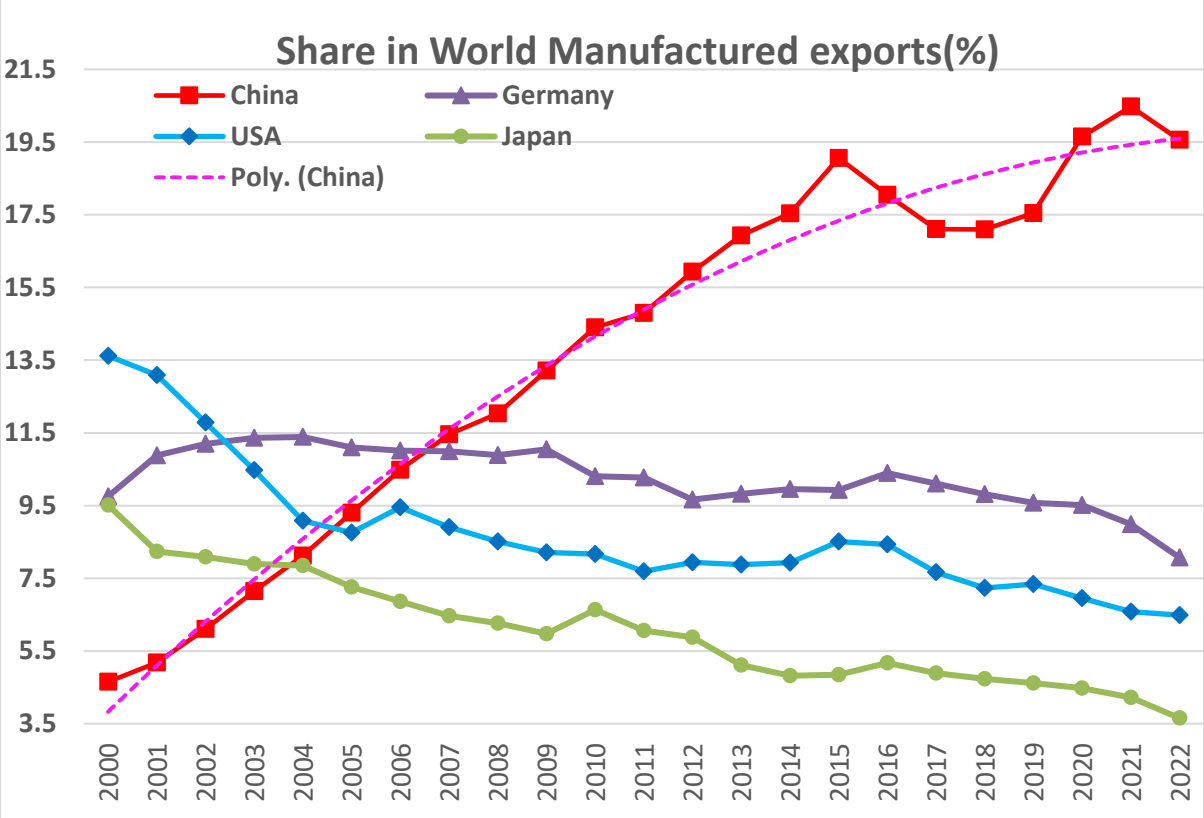
Figure 1: Globalization & de-Globalization of Merchandise Trade



Source: World bank, WDI data base. Authors calculation

China's share of manufactured exports, however, continued to increase, rising from less than 9% in2009 to 15% in 2021, while its share of manufactured exports has risen from 12% in 2009 to 20.5% in 2021 (**Error! Not a valid bookmark self-reference.**),

Figure 2: Share of World Merchandise Export – USA, Germany, China



Source: World bank, WDI data base. Authors calculation

Till China was admitted into the WTO in 2001, USA, Germany and Japan were the top three exporters in the World. USA share of World manufactured exports has the highest till 1968, after when Germany overtook the USA. The latter's lead lasted till 1992, after which the USA re-took the top spot till 2003. During the post-war period the US approach to free trade and industrial policy has varied. The rise of Japanese exports during the 1980s had led to the US orchestrated Plaza accords (1985), which were seen by many as a reversal of the unalloyed free trade policies promoted by the USA during the three decades after WW2. After facilitating the rise of Chinas manufacturing exports for two decades, under the guise of free trade, another turn of the cycle is now at hand.

The success of China's manufacturing exports is due, partly to the free trade ideology of the West, and partly to the success of China's asymmetric mercantilist industrial policy.[8] Since 2018-19 importing countries have started realising the risks of depending on one country that holds a virtual monopoly in many manufactured exports, particularly Telecom equipment, Automatic data processing machines and electronic products (**Table 2**). This recognition has heightened after the disruption in China linked supply chains during the pandemic and after (2020-2021). There is also a recognition of the relative advantage of India as a location for diversification of manufacturing supply chains out of China, with India being the 4th highest gainer of USA diversification of manufactured imports.

[8] ELISID policy pursued since the mid-1980s-early 1990s, complemented by the sREAD policies followed since joining the WTO in 2001. China laid out the red carpet for MNE/MNC anchor investors in the 1990s, with fully developed industrial infrastructure & connectivity provided by Eastern provinces in months. After exports from these enterprises boomed in late 1990s ,early 2000s, investment thrust shifted to import substitution & real estate. ELISID = Export led, Import substituting, Investment driven, and sREAD = spy Reverse Engineer and Develop. China's Socialist Market Economy also provides an environment in which Companies owned and/or backed be Provincial communist parties compete fiercely with those from other provinces after obtaining the technology from the centrally owned technology institutes who do major reverse engineering & development

Table 2: China's Share of World manufactured exports, 2021 (%)

Product	Share
Pottery	67.4%
Lighting fixtures & fittings, nes	67.4%
baby carriages, toys, games & sporting goods	59.0%
Household equipment of base metal, nes	57.7%
Prefab building, sanitary, heating & lighting fixtures,nes	55.7%
Fabrics, woven, of man-made fabrics	55.4%
Knitted or crocheted fabrics, nes	53.8%
Made-up articles, of texile materials, nes	48.5%
Trailers & semi-trailers	48.5%
Cotton fabrics, woven	48.4%
Cutlery	45.8%
Automatic data processing machines, nes	44.0%
Tulles, trimmings, lace, ribbons & other small wares	43.3%
Household type equipment, electrical or not, nes	42.7%
Clothing accessories, of textile fabrics	42.1%
Women's clothing, of textile, knitted or croacheted	40.9%
Optical instruments & apparatus, nes	40.1%
Telecommunication equipment, nes ; and parts, nes	39.9%
Travel goods, handbags, etc.	37.2%
Sound recorders or reproducers	36.9%
Radio-broadcast receivers, whether or not combined	36.6%
Television receivers, whether or not combined	35.9%
Articles of apparel, clothing access., excluding textile	35.4%
Motorcycles & cycles	35.0%
Source: UN Comtrade data. Authors calculation	

India can learn from China's experience and use the same policy to dilute its monopoly of manufactured exports. The key lesson is the integration of infrastructure, foreign investment, export-import, phased manufacturing and technology reverse engineering and development policies. India has to lay out the red carpet for MNCs/MNEs from USA and EU to quickly make up for a lost half-century. It also need a carefully crafted & implemented, plan to integrate the entire set of infrastructure, industrial, trade & technology policies to substitute intermediate and capital goods imports from China with domestic production by Chinese-Indian the same goods produced by Chinese-Indian JVs followed by full spectrum competition from Indian companies, using skills & technology learned from India-China JVs.

The discovery of massive leakage of advanced technology from the high income developed countries (HIDCs) to China, over the last 20-30 years, and the overdependence on imports of Telecom equipment, ADP machines and electronics goods (IOT), with high potential for

injection of trojans and malware, has raised serious national security concerns.[9] This adds to the attractiveness of diversifying manufacturing value chains into India. The US-India ICET is mark of trust, with respect to Strategic & Dual use technology. This is particularly attractive for value chains involving software elements, given that India is already an attractive destination for R&D in software solutions.

India's comparative dis-advantage viz China, in terms of economies of scale and scope, is being partly addressed by the new Product Linked Incentive (PLI) scheme, but more will have to be done with respect to other bottleneck and high-tech education & skilling. Online education & training processes and expert systems are the only way of delivering quality education and skills to the large population of India in the short time available.

3.4 Comparative Advantage

India's population size and economic diversity means that, (a) The availability of skilled labour at any type or quality of skills, is larger than any middle-income competitor & can be larger than all of them put together. (b) Out of 28 different States some have (or can have) a comparative advantage in agriculture, others in manufacturing and the rest in different types of services. This is reflected in the export of agricultural goods and a range of business & professional services, including Global competency centres doing R&D for MNCs. However, viewed from a national perspective, India's overall comparative advantage will shift from low skilled labour-intensive and medium/semi-skill labour intensive manufacturing during 2020-35, to medium/semi-skilled manufacturing and (high) skilled services during the 2030-45.

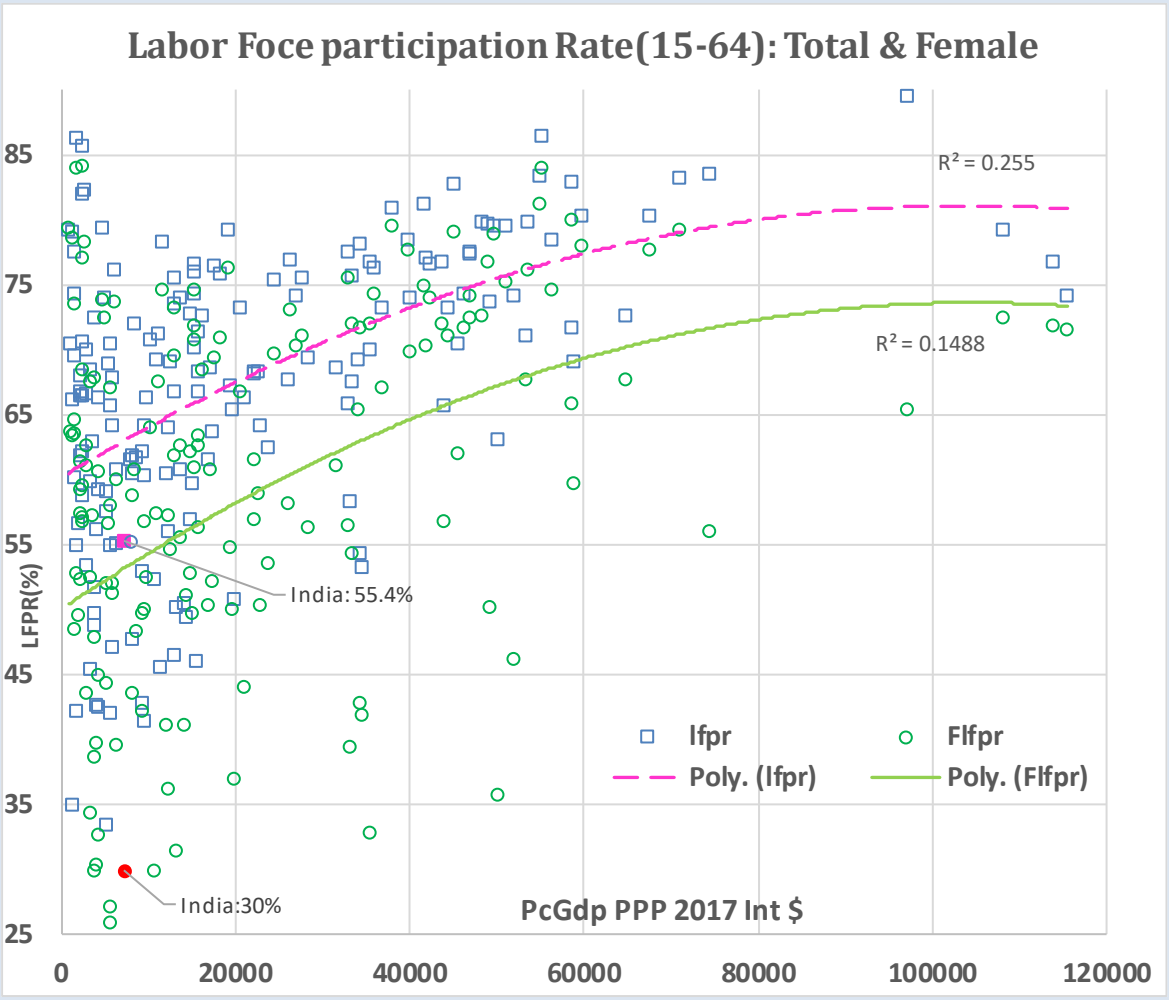
As the working population of the Developed countries and Emerging economies declines (**Table 1**), their share of semi-skilled and skilled labour force reduces, the cost of skilled labour will increase relative to the cost of capital. These countries' comparative advantage will therefore shift to high-tech capital-intensive products like robotics, automated machines & automated production lines, artificial intelligence (AI), and machine learning systems. India need not ape these countries with respect to automation but can use AI and machine learning to enhance the quality of its skilled labour force and magnify its reach & effectiveness (up-scaling). This will give India a potentially unique competitive advantage between the countries

[9] The sREAD strategy, developed in the 2000s, was focused on high technology in mid-2010s through "Made in China, 2025" plan (2015). Recently, even non-electronic equipment, such as electrical and mechanical machinery & equipment, has been found embedded with electronics components, which could be used as a kill switch to deactivate the equipment.

with rapidly expanding labour force in Africa & West Asia and declining labour force in Americas, Europe & E & S.E. Asia, including China.

A critical aspect of the exploitation of this comparative advantage is the labour force participation of women. There is big gap between the labour force participation rate (LFPR) in India (India, 55.4%) relative to that expected at its per capita GDP level (pink line), because of the huge gap between the LFPR of Indian females (India:30%) relative to that expected for its per capita GDP (green line) in **Figure 3** .

Figure 3: Labour force participation rates (total, female) India & World



Source: World Development indicators, Author's graphs (corresponding graph for male LFPR not shown)

As the LFPR of males is already very high, it is not expected to increase much in future. Increased employment of females is therefore critical to full exploitation of India's potential comparative advantage in a spectrum of skills, from low, through medium, to high end.

India's comparative advantage is envisioned to shift to Innovation, in the 2040s. This requires Innovative entrepreneurs and associated skills for translating innovations into marketable products & services. According to WIPO (2023), India was the sixth highest recipient of patent

applications in 2022, representing a growth of 25% from 2021.[10] Though India can aim to become the third ranked patent producer in a decade or so, the institutions needed to generate an environment that promotes innovation on the frontiers, have a long gestation period. India must accelerate the creation of such institutions and generate the required comparative advantage.

4. Economy: Growth & structure

4.1 Indian Economy

Sustained fast growth in per capita GDP over three decades, averaging 6-6.5% per annum, is possible, given appropriate policy and institutional reforms. Catch-up growth requires institutions for imitation and adaptation of technology, which is widely available in the advanced countries, and takes a country from lower middle income to upper middle income. The move from upper middle income to high income requires institutions which promote the generation and implementation of innovation at the frontiers of technology.

The fast-growing East and South East Asian economies (NICs, New-NICs & China), which have moved rapidly from lower middle-income levels to upper middle income and subsequently to high income, have served as an inspiration and incentive for India's economic reforms since 1990.[11] When we look closely, we find that they have had a wide variety of experience with respect to capital formation, FDI, exports & imports and manufacturing value added (in terms of ratios to GDP). While drawing lessons from them, India has and will continue to carve out its own path, given the global environment in 2020s & beyond.

Based on their experience, we judge that it to be realistic for us to expect, (1) a rise in the real investment rate by 2% of GDP in the next 10 years and another 3% points thereafter, (2) an increase in FDI from the current 1.8% of GDP to 2.5% of GDP. (3) A rise in the share of Value added in manufacturing by 3% points of GDP in the next five years and to target an increase to 30% of GDP over the next two decades. Institutional changes, particularly at the States level, will be critical for the latter. More ambitious targets can be achieved with greater reform effort at all levels of government, particularly with respect to the behaviour of the Union & State govt, and Nagarpalika/Panchayati raj, bureaucracy located/based at the ground level.

[10] Patents filed during 2022 are China (1,464,605), USA (252,316), Japan (218,813), Republic of Korea (183,748), EPO 984,074) & India (38,551).

[11] In the 1980s the NICs (Singapore, Hong Kpng, South Korea & Taiwan) were lionized as the "miracle growth" economies.

Reforms of product markets (goods & services), factor markets (capital, labour, land, and management), natural resource exploration production and marketing, social services (education, health, govt services) and public sector monopolies & monopsonies (defence), are at various stages of implementation. Some of these reforms (financial sector, labour, electricity generation & transmission, defence production, corporate tax) have already been undertaken but may need to be refined, over time.

Micro, small & medium enterprises (MSMEs) constitute 85-90 percent of the India's producers, and start-ups and tech entrepreneurs to power India in the 21st century, will arise among them. Ease of regulatory compliance is more valuable in cost and time for MSMEs than for Companies. Goods and services tax (GST) simplification, and rationalization of the Direct tax code are critical to providing a level playing field to MSMEs. Customs duty simplification is needed both to level the playing field for MSMEs but also as part of an industrial policy for facilitating the growth of global supply chains in India.

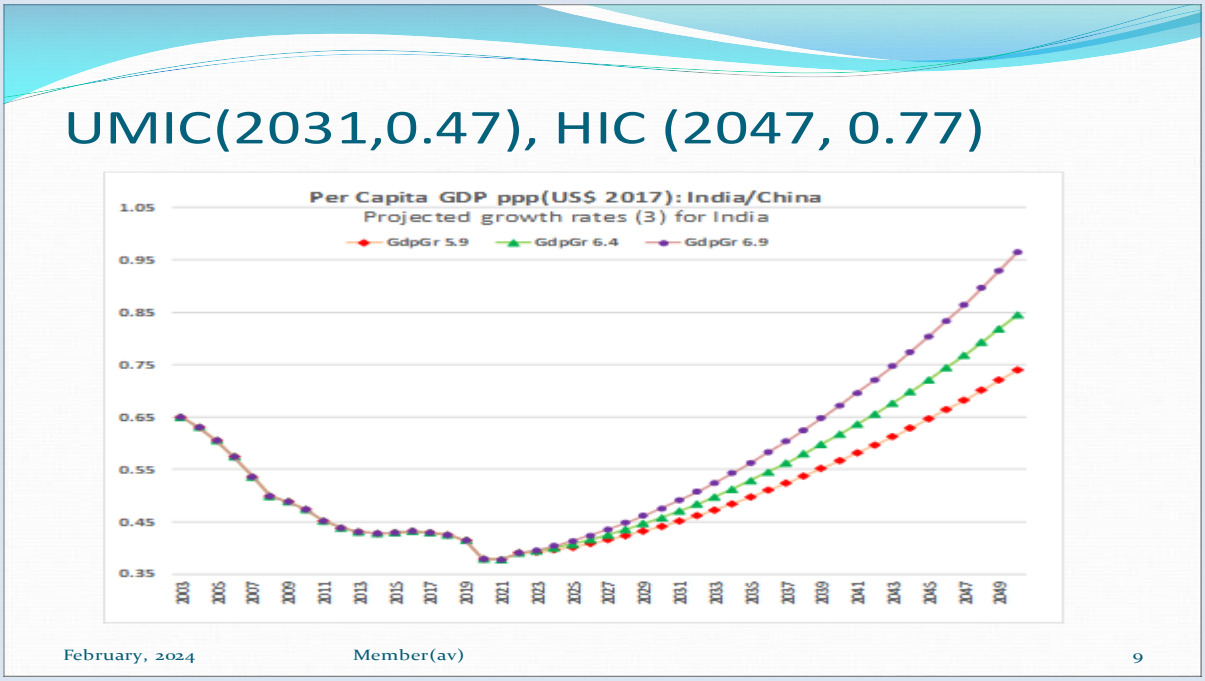
Legal reforms, welfare reforms and reforms of the transfer-subsidy system are pending. Further reforms will also be necessary to transform the structure of the economy, leapfrog over known weaknesses and address new bottlenecks that arise with growth.

Figure 4 presents India's Per Capita GDP relative to China's based on three scenarios, which result in average per capita growth till 2050 of 5.9%, 6.4% and 6.9% per annum. According to the middle projection, India will become an Upper middle-income country around 2031 and a High-Income country around 2047.

4.2 India in World Economy

We build three scenarios for real Per capita GDP (PCGDP) growth in PPP, constant 2017 international dollars. A conservative one, with average growth of 5.9% per annum, a median of 6.4% per annum and an optimistic of 6.4% per annum, which assumes that India undertakes the required policy and institutional reforms. Average growth of GDP at PPP will be 6.5%, 7% and 7.5% respectively, based on average population growth of 0.6% per year(**Figure 4**).

Figure 4: Projections with average PcGdp growth of 5.9%, 6.4% & 6.9% per year



Source: Data from WDI & UN population projections. Author's forecasts use IMF & OECD projections as base

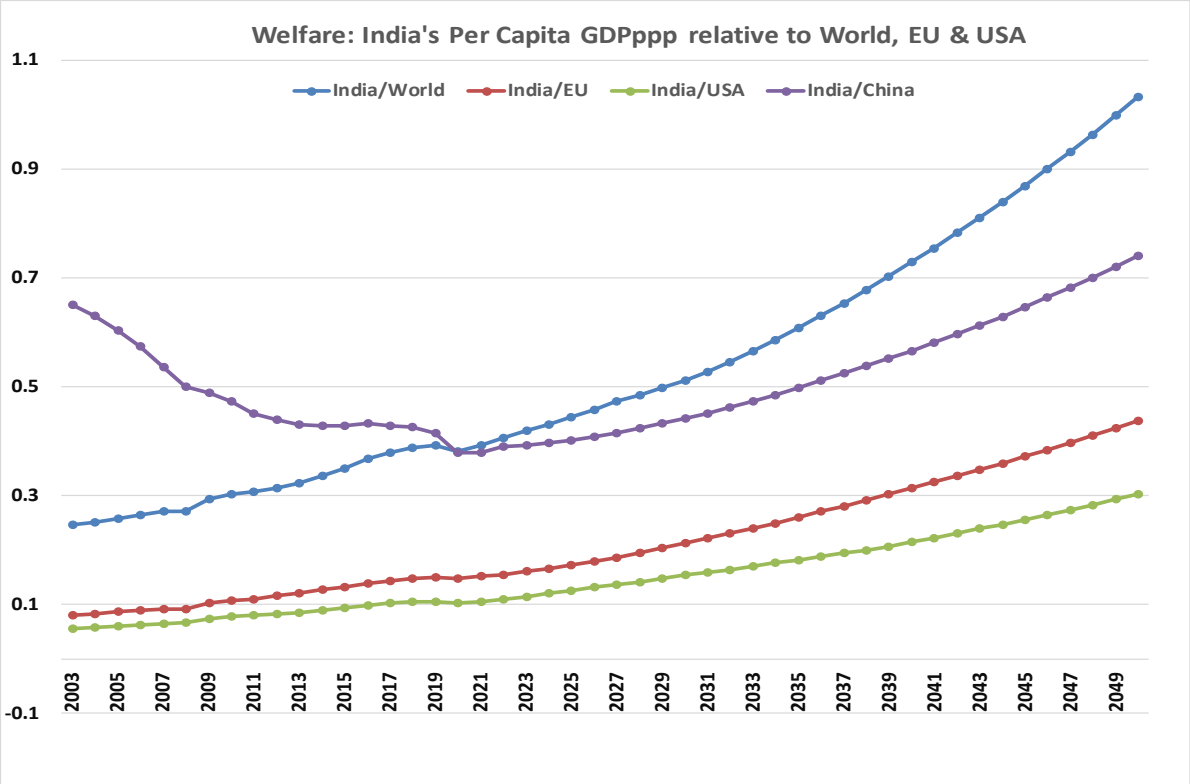
In the conservative scenario, India will have a PCGDP in 2035, equal to 50% of China's and 18% of USA (**Error! Not a valid bookmark self-reference.**). In the same scenario, India will have a PCGDP in 2050 equal to the World average, but less than 75% of China's and 30% of USA. In the conservative scenario India will become an Upper Middle-Income country (UMIC) around 2031 and a higher income country (HIC) after 2050.[12] In the optimistic scenario India will become an HIC 2047. India will overtake both Japan and Germany in the next few years to become the third largest economy behind USA and China.

India's economic power, as measured by the VIPe (/VIPP) index will, in 2050 (2035) be 80% (39%) of China's and 75% (34%) of USA's (**Figure 6**).[13]

[12] Citigroup and Price Waterhouse predicted India would become the largest or second largest economy by 2050. Our projections are more conservative, assuming a compound annual growth of per capita GDP PPP of 5.8% for India, 2.8% for China and 2.0% for USA. As Indonesia & Romania, recently became UMIC and HIC recently we take their PCGDP PPP in 2017 Int $ as benchmark ($11600 & $31000 respectively)

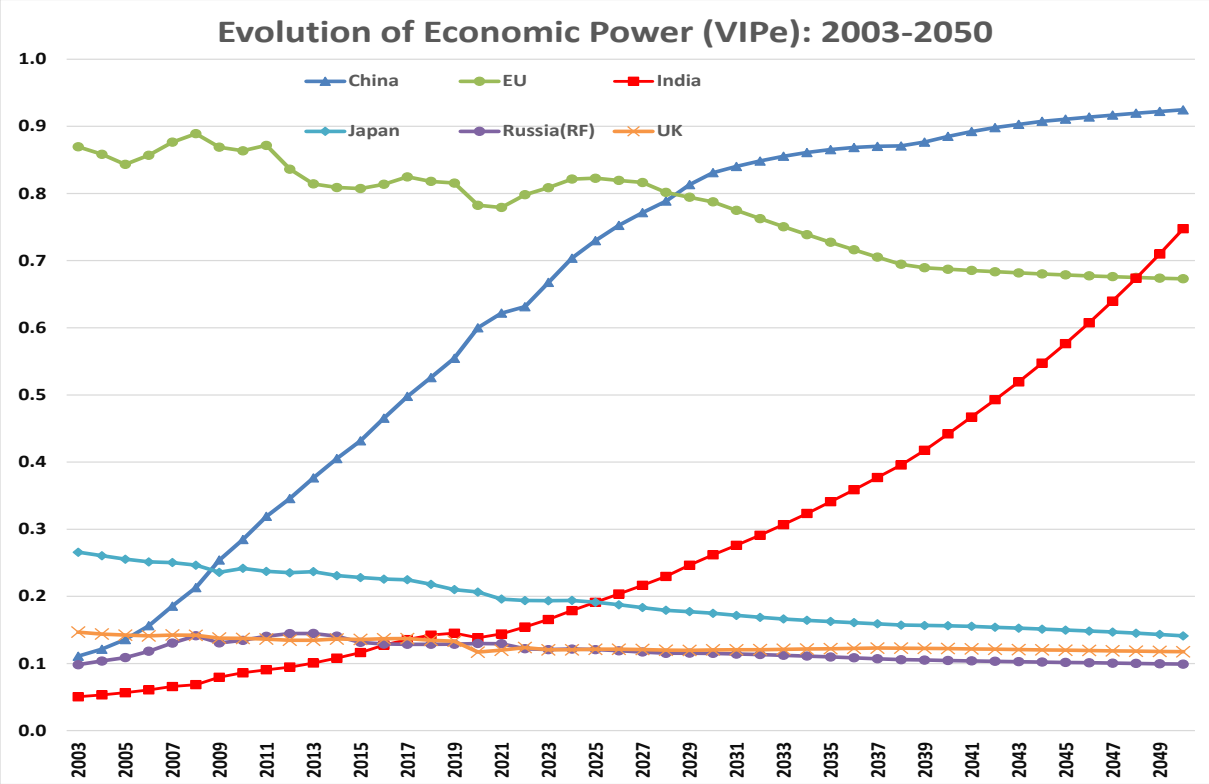
[13] Historically relative GDP in current USD approximates economic power as measured by VIPe.

Figure 5: India's Per Capita GDP (at PPP) compared to China, USA, EU, World



Source: As in figure 4. Note: India/China = India's per capita GDP divided by China's per capita GDP. Similarly, India/USA (India/EU, India/World) is Ratio of India's per capita GDP to USA's (EU, World).

Figure 6: Global Economic Power of India & China as measured by VIPe

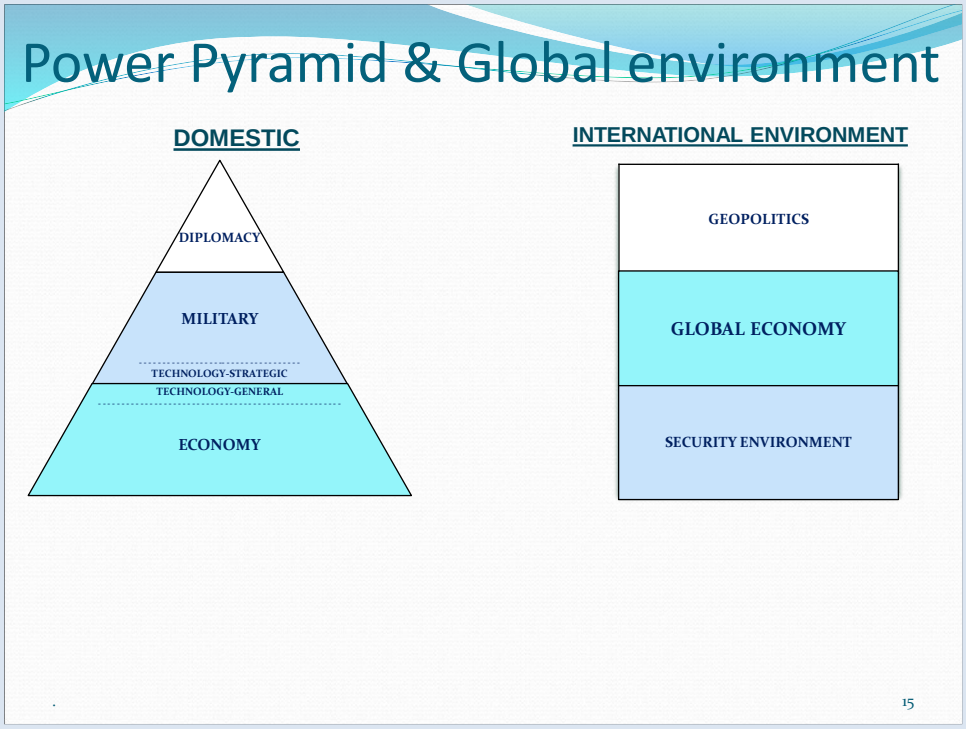


Data sources: as in figures 4 & 5. Note: VIPe = Virmani Index of economic power, measures a country's economic power relative to that of the strongest power (USA). India/China = India's VIPe as % of China's VIPe.

Economic power is the foundation of overall power. It forms the base on which layers of Military power, diplomatic power, sift/cultural power can be built ***(Figure 7)***. After building economic power, an additional goal should therefore be to become the third strongest Military power with the third largest military-industrial complex and a sizable R&D hub. [14]

Having already become the third largest economy by 2030, India will be among the top three driver of global growth (with USA, EU), because of its direct effect on rest-of-world demand through net imports of goods & services from the rest of the World.[15] It will also be the third largest capital market in the world, after the USA and China, attracting larger amounts of capital than any other country, because of high investment levels reflected in the current account deficit.

Figure 7 : Pyramid of Power



India will become the Middle and Back office of the World and the largest provider of online, managerial (industry, agriculture), professional (fin tech, data analytics, advisory) & social services (health, education), by utilizing its demographic dividend, as educated, young

[14] VIPe = Virmani Index of Economic Power; measures a country's economic power relative to that of the USA. Economic power is geometric average of an economies real relative size and a measure of general technological prowess (per capita GDP relative to USA). VIP = Virmani index of (overall) power, is a geometrically weighted average of VIPe/VIPP and military power. This is based on the conservative scenario of average PCGDP growth of 5.9% 2020-2050.

[15] Reflected in the absolute value of the current account deficit. Note that a driver of growth for the rest of the World, is measured by the elasticity of ROW GDP because of an autonomous change in country GDP. It is different from arithmetical contribution to World growth, which Is just the ratio of the increase in country GDP as ratio of increase in World GDP.

workforce declines in rest of Eurasia. It can also become a manpower supplier to the world for economic activities which require physical presence of technical & professional personnel at the site, like surgery, physiotherapy, nursing, house construction & repair. India will innovate *hybrid services*, where a worker with purely physical capability works under a personal supervisor, who guides, monitors, and inspects the work in real time.

India is the fourth largest producer of manufactured goods in the World, but on the 15th largest exporter of manufactures. This is large gap reflects the failure since the 1960s to understand the role played by MNE/MNC in driving international trade in manufactured goods, in the post-world war globalisation. Though every country in East & S.E Asia which moved from Low income to upper middle income & high income has understood & used this fact, China alone has transformed it into a mercantilist tool for expanding its net manufactured exports.

Whether India enters the ranks of the top three *manufacturing goods producers* in the world depends on the degree to which India and the free market, open democracies adopt a dualistic trade policy; First prong is a policy of strict reciprocity and symmetry with respect to totalitarian, non-transparent States which use asymmetric trade, technology & FDI policies to monopolise the production and export of manufactured goods. Second prong is a policy that marries the comparative advantage of High Income Developed economies (USA, EU) in technology, with the abundant low, medium & high skilled workers of India. The approach towards the Rest of the World, would continue to be conducted on conventional free trade principles.

4.2.1 Connectivity & Trade

The global economic turmoil since 2008 has been accentuated by the Pandemic & geopolitical turmoil since 2020, introducing greater volatility and uncertainty in World merchandise trade. These economic, geo-political and security developments, have revealed, emphasised & re-established the importance of geography, trust and mutual gain, in international economic relations.

The geographical dimension suggests we focus on connectivity (transport, energy, telecom) in, (1) Indian sub-continent, (2) The Indian Ocean region, including the islands and littoral states. The trust dimension suggests we increase the entire range of economic relations with, (a) Countries across the World with a significant Indian diaspora (connected by ancestry, culture or social relations with Bharat), and (b) Countries which share our Secular, Democratic

principles, grounded in more than 4000-year-old Dharmic civilisation of Bharat Varsha.[16] The US-India ICET is mark of trust, with respect to Strategic & Dual use technology. This is particularly attractive for value chains involving Artificial intelligence, given that India is already an attractive destination for R&D in software solutions. (c) Minimise our import dependence on countries which have made clear, in Word and deed. that they wish us ill. The mutual gains imperative suggests we deepen our trade and technology relationship with countries whose comparative advantage is complementary (rather than competitive) with us!

India can become a hub for the Indian Ocean region, with a web of logistics companies, shipping services, air lines and internet cables linking all the countries on the shores of the Indian Ocean and the Gulf and the islands of the Indian Ocean. These could be promoted and co-ordinated by an Indian Ocean Logistics company underwritten and funded by the Govt. India's role in the Indo-Pacific will expand, to provide more options to South East Asia and West Asia. India could curate a "Gondwana Common Market (GCM), with members from South Asia, Indian Ocean, island nations, East Africa, and West Asia.[17] By 2050 this organization could have special market arrangements with ASEAN and GCC. The Free Trade Agreement with UAE and the announcement of the India-Middle East-Europe corridor (IMEC) have initiated the process.

The Trans Asian highway and the Trans Asian railway, from Vietnam through India to West Asia, has been upended by turmoil in Myanmar. These were envisaged by Asian countries and endorsed by ESCAP decades ago, but will finally come to pass, by 2035. India's North East will lie at cross-roads of East West traffic, with important Southern roads and rail lines through Bangladesh and Myanmar to Thailand and Malaysia. Afghanistan could become another logistics hub with North-South rail line from Chabahar through Afghanistan and Central Asia to Russia. Greater connectivity will also facilitate the participation of all South Asian countries in India's growth.

4.2.2 Global Supply Chains

There are two characteristics of MNE supply chains which are important. One is the reduction in market risk by matching production/supply to existing demand. The second is the reduction

[16] Hindu Secularism is based on an implicit social-spiritual contract, forged by the Bharata tribe (belonging to the Vedic-Harrapan civilization), which lived on the banks of the Saraswati (Indus-Jamuna plain). This was to respect the god of every other tribe that respected the gods of everyone else, while being free to worship their own god (or not worship any god).

[17] Another idea which can be explored is the conversion of one of India's island territories into a Hong Kong. This would only be possible if a low tax, light economic regulation regime is constitutionally feasible.

in production risk by bundling FDI, technology and human capital. The result is a consistent high product quality, and timely supply to the consumer/retailer/wholesaler. This involves a rise in the level of skills and the productivity of local suppliers.

Development of a global manufacturing hub in India will be greatly facilitated and accelerated by supply chain diversification by the High income developed countries/economies (USA, EU, EU, UK, Japan, S Korea, Taiwan).

Two thirds of the Worlds merchandise exports takes place within Multinational Enterprises (MNEs) internal supply chains. It has increased sharply during last thirty years. A third of the top two thousand are headquartered in the USA followed by Japan (12%), China (10%) and UK(5%) & India (4%).[18] The EU with an economy comparable in size to the USA probably has around a third of the large MNEs. The share will likely start rising again after the pandemic is behind us.

Trade and FDI are intimately linked; **Table 3** compares the outward FDI and manufactured imports of the countries identified above as the origin of most of the MNE supply chains, along with the numbers for India's potential competitors. Because of the disruption caused by the pandemic, it shows the data for the pre-pandemic year 2019 and the latest available year (2022).

USA, EU, Japan, UK, ROK are the source of ~ 60% of Global FDI, ie > 7x China (8%). They Import 53% of World manufactured imports, i.e. 5x China (8.5%). Japan + UK + Korea constitute as large a market for foreign manufactured goods, as China. Since 2000, China has been major beneficiary of USA & EU supply chains.

As most of the Worlds MNCs are headquartered in USA and the European Union (+UK), a plurilateral free trade agreement (FTA) between these economies and India will benefit all of them. The US-India ICET is mark of trust, with respect to Strategic & Dual use technology. This is particularly attractive for value chains involving software & AI elements. Such an FTA can help reduce dependence on totalitarian countries, which have used asymmetric policies to create monopolies, and are not shy of using this dependence for geoeconomics & geopolitical coercion.

[18] https://www.investopedia.com/ask/answers/021715/why-are-most-multinational-corporations-either-us-europe-or-japan.asp. Sample of 2189 companies; US(719), Japan(264), China(219), UK(118) & India(81)

*Table 3: **Share of Outward FDI and Manufactured Imports***

Country share of World outward FDI and manufactured imports				
	Outward FDI		Manufactured Import	
	2019	2022	2019	2022
High Income				
United States	7.6	20.8	14.7	15.4
European Union	33.5	18.4	29.7	29.3
Japan	17.0	8.4	3.1	2.8
United Kingdom	-1.4	6.1	3.4	3.0
Korea, Rep.	2.3	3.2	2.2	2.4
sub total	59.0	57.0	53.2	53.0
Upper Middle Income				
China	9.0	7.3	8.7	8.4
Malaysia	0.5	0.5	1.0	1.1
Thailand	0.7	0.4	1.2	1.1
Lower middle income				
Viet Nam	0.0	0.1	1.5	1.6
India	0.9	0.7	1.8	1.9
World	100	100	100	100
Source: WB, World Development Indicators. Authors calculation.				

4.2.3 International Finance

We envision an India in 2035 with a fiscal surplus, open capital account, double AA rating and a currency (Rupee) which is fully convertible and part of IMF special drawing rights (SDR) list. India's large and rising international reserves, increasing trade diversification & rising role of the Rupee in neighbourhood, and the third largest capital market in the free world, will make this a natural outcome.[19]

An Indian rating agency will diversify out of India, to cover all developing and emerging market economies. This could be with the equity participation of rating agencies of large, free market democracies, or as joint venture with them. GOI can facilitate this process!

An international financial centre like pre-2020 Hong Kong, Singapore or London can only be developed if the quality of life is comparable to that in these centres. If the social freedom and quality of life available in these centres cannot be provided in GIFT city, a new centre will have to be developed elsewhere.

By 2050 India in co-operation with other free market, open democracies like, EU, will have an international payment and settlement system managed jointly by these economies/countries.

[19] These are necessary and sufficient conditions for inclusion in SDR as a fully convertible currency.

4.3 Structural Transformation

4.3.1 Agriculture & Rural labour

One of the unique negative aspects of Indian economy is the failure to follow the conventional economic development pattern seen in history. A shift in employment from Agriculture into Industry, with a corresponding decline of Agriculture value added in total GDP. 50% of labour force remains in Agriculture, though Value Added has declined to 20% of GDP.[20] Labour productivity in Agriculture is therefore 40% of average and seasonal underemployment remains a substantial problem.[21] Female labour force participation is low, even lower than in urban areas, because social constraints and prejudice is much more constraining in rural areas.

Among the reasons for the lack of structural change has been the continuation of controls on all aspects of agriculture (inputs, land, farm management, output sale), which have stifled innovation and diversification. Subsidy policies have encouraged over-use of ground water, electricity and polluting fertilizer, and under-use of farm waste (& consequent open burning). Reforms have started, but must be taken to logical conclusion, to create a structurally transformed rural economy by 2050. These reforms must be complemented by upgrading of public goods infrastructure like roads, R&D, agricultural extension, 24x7 electricity, telecom cables, digital data connectivity, water supply grid, drainage, and ground water recharge systems for sustainable agriculture. Transformation of the rural economy is critical to eliminating poverty.

Modernization and diversification of Agriculture will have to be complemented by faster growth of low-skilled labour-intensive manufacturing to absorb the unskilled & less educated population in the rural areas of the poorer regions of the heartland.

4.3.2 Infrastructure

India will have national multimodal transport and logistics system matching the best in Asia, in terms of costs and transit & turn-around time. Roads/highways, ports, airports, waterways, rail lines will be upgraded to HIC standards and quality. There will be one or two deep water ports which take the largest container ships. Electricity generation, distribution and transmission operations will be optimized by intelligent systems, which are fully isolated from

[20] 2/3rd of population remains dependent on agriculture.

[21] Peak labor demand occurs in sowing season and a lower peak during harvesting, though this peak has reduced due to mechanization. There is disguised unemployment or underemployment, during most of the growing season.

foreign Cyber-attacks. Railway lines and signalling systems, gas and oil pipelines, electric goods will be run on the common carrier principle, with open access to all suppliers for running train services, transporting oil & gas and electric power, respectively. Power generation will depend increasingly on nuclear fuel, solar & wind, and hydrogen fuel.

Universal Broadband connectivity is critical to fast productivity growth, given that rate of return in digital infrastructure is even higher than in roads and highways. The objective of a national backbone, of fibre-optic land lines for web/internet connectivity to all blocks & taluks/tehsils, is a sound one. Mobile/digital network for 99% geographical coverage including India's coastal Exclusive Economic Zone will be achieved. We envisage a telecom and 6G infrastructure that is thoroughly firewalled from hostile & unfriendly countries and international mafia operators.

The first phase of the Swaach Bharat mission focussed on providing toilet facilities to households to reduce open defecation. The har ghar Jal mission aims to provide clean water to households to reduce incidence of water borne disease. The next phase of Swaach Bharat should take a systems approach, to create State & National, Water grids, Sewage grids and solid waste grids. Every urban and rural household, & every village & town will have a modern sewage and solid waste collection system, connected to a State recycling and hazardous waste disposal system. These measures will wipe out environmental enteropathy, which is the main cause of child malnutrition in India.

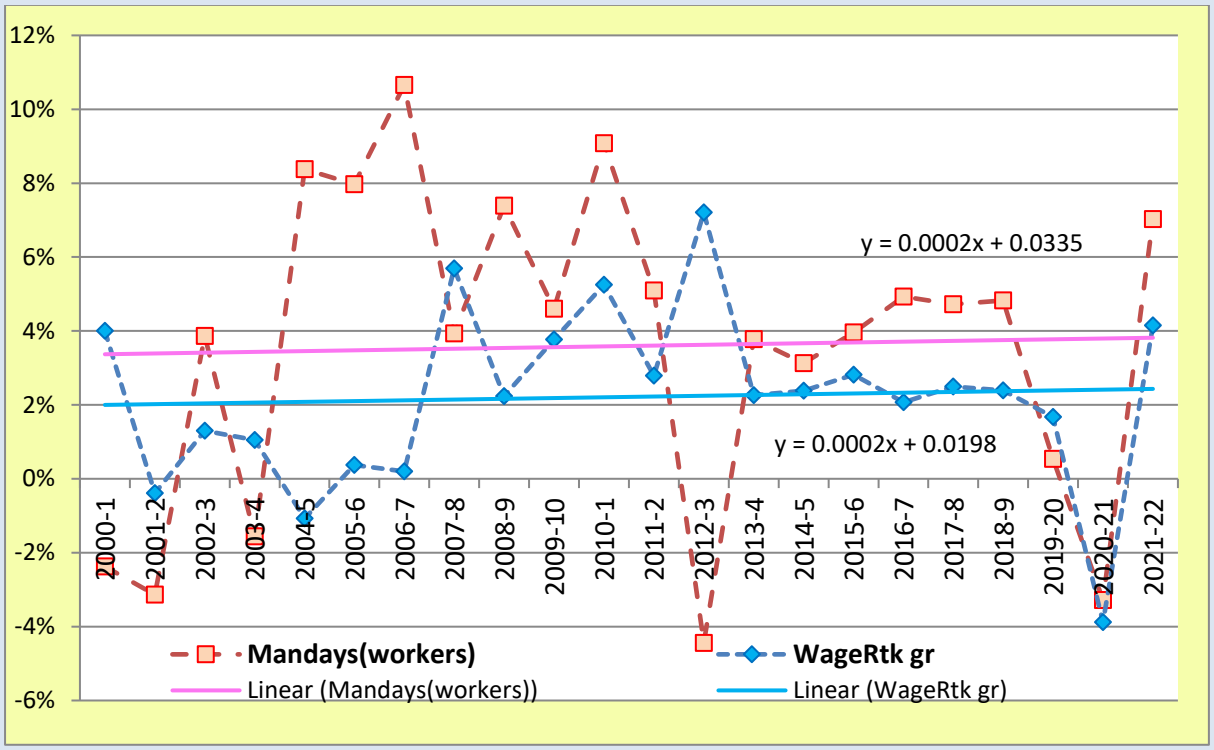
4.3.3 Manufacturing

The historical pattern of structural with respect to agriculture and manufacturing has been remarkably similar across continents. The share of manufacturing in GDP and total employment rose with the decline in agriculture, reached a peaked and declined thereafter. There were however, differences in detail. Compared to the standard pattern in Europe & USA, in Latin America, the peak was earlier and lower, while in East & S.E. Asia it was later and higher.

India is a major exception to this pattern, with share of manufacturing Value added & employment shares, rising and then plateauing early (& then following a wavy pattern). The reason for this was a host of anti-manufacturing policies introduced during 1950-1980, which were slowly reversed and corrected during the following two decades. During the last decade a positive policy & institutional environment has been created, for a revival of manufacturing to its potential peak. The formal manufacturing sector has responded to this changing policy

environment through a gradual acceleration of the rate of growth of employment and real wages (Figure 8). The trend growth rate of employment has accelerated from about 3.4% in 2000-01 to 3.8% in 2021-22 and of real wages from 2.0% in 2000-01 to 2.4% per year in 2021-22 (Figure 8).

Figure 8: Formal Manufacturing (ASI): Growth of Employment & Real Wages



Source: Authors calculations based on, ASI, CPI industrial workers & CPI (2012)

A necessary condition for faster growth of low & semi-skilled labour-intensive manufacturing, is a large improvement in the quality of basic education (functional literacy and numeracy) and job skilling of rural youth. The scale of Indian manufacturing is exceptionally low compared to that of China. Labour reforms coupled with the PLI scheme has started the process of raising manufacture of consumer goods to minimum efficient scale (MES). The next stage in this process is the setting up of special industrial estates, with good quality infrastructure, to incentivise backward integration. For instance, common facilities for processing of chemical waste, would reduce costs of regulatory compliance for chemical industry. The third stage is the growth of specialized industrial towns, with overlapping input suppliers, common set of input services and labour skills, so that backward linkage can extend to common training facilities and eventually to R&D. Such towns have the added advantage of facilitating economies of scope and forward linkages to international markets, by building reputation and facilitating branding.

A reformed and simplified GST, Customs tariff structure and direct tax code are critical compliments to a successful industrial policy. Digitalization and integration of the relevant tax systems with foreign exchange management and credit flows, facilitates exports by reducing the cost of developing & servicing international markets.

On the demand side, the global diversification of Supply chains to reduce risks of disruption and over-dependence on supplies from one country, provides a once in a generation opportunity for India. A dual trade policy, which differentiates between imports from controlled, non-transparent high risk and hostile countries and the rest of the world, is critical at this stage. This must be reflected in our Export-Import policy and customs duty structure and tariff rates, as well as in our approach to free trade agreements, preferential trade agreements and plurilateral agreements such as Regional comprehensive economic partnership (RCEP) and comprehensive and progressive agreement for trans-pacific partnership (CPTPP).

As mentioned in earlier sections, the benefits of globalization can be maximized, and costs minimized, if the group of free market, open, transparent, democracies (QUAD+EU+UK) jointly adopt a dualistic trade & investment policy framework.[22] As the trade risk is largely confined to merchandise trade, a traditional free trade agreement (FTA), with zero tariffs on manufactured goods, subject to 70-80 of value addition being within the set of FTA countries, is an ideal which can be achieved in this decade. Given our comparative advantage in labour intensive and semi-skilled labour-intensive goods, an FTA with the set of labour scarce countries is more beneficial to us than an FTA's with highly populated, Asian, middle-income countries, in which the "Trade Diversion" component is much larger than the "Trade Creation," element. A plurilateral trade agreement, which includes China, raises further issues of manufacturing monopoly, potential economic coercion and national security.[23]

Value chain diversification can also be achieved if the focus is on goods, services and technology related to the manufacturing sector, as Intellectual Property agreements will be easier for services which complement manufacturing than for unrelated services, such as movies, books. Art. An agreement on Patents and intellectual property is not harmful to us if

[22] QUAD = Group consisting of USA, Japan, India, Australia.
[23] Note that this is quite different from RCEP which includes a county that has monopolized the export of many manufactured goods through asymmetric trade, technology, investment, and economic policies. It is also different from TPPP whose primary objective is to impose asymmetric IP agreements, which favor wealth countries at the expense of poor countries under the guise of "High Quality agreements."

the Developed countries are willing to compromise on the duration of patents and the number of generations to which they can be applied.[24]

4.3.4 Services

Modern Services are likely to play a much more important role in the structural transformation of the rural economy than is the case historically. Two issues need to be addressed to accelerate the process. One is the provision of the job skills needed in agriculture and the rural service sector and the other is the social constraints on females working outside the home. These can only be built on a foundation of good basic education. Public institution must, promulgate standards for the 5000-6000 globally defined technically skills. Then in co-operation with the private sector, a comprehensive system of certification and skilling must be created. The digital and online service revolution can be used to leapfrog the provision of quality education & training in job skills in rural areas and to provide the digital infrastructure for females to work from home.

The Pandemic has been a big shock to domestic and international travel and tourism. The shock will be overcome in the next few years. India's tourism market is very poorly developed and consequently has great unexploited potential. Medical, religious, and natural resource tourism has great potential in different regions of India, given the great geographical, human, cultural and religious diversity. Given the almost virgin territory, due attention must be paid to developing environmentally sustainable, green tourism.

Services provide an opportunity for a range of potential jobs with the entire range of skills from low to medium to high, each with multiple level of competence. The generation & use of medium level skills (e.g. for construction) has been relatively neglected and must receive greater attention. Even low-medium skills offer unexploited opportunity (e.g. in wellness, primary & pre-school education, primary care, aged care).

Electronically driven services e-services are the fastest growing part of service trade. It has grown by over 250% in past few years. Fortunately, the share of India in these (business) services is rising. Over the next decade, demographic decline & anti-immigration sentiment in HIDCs will drive unbundling of Social (Health, education, Govt) & personal services, and the growth of e-services related to them. We must take a pro-active role in attracting these services. This needs a change govt regulations & govt practices in USA, EU etc. to allow (a) unbundling

[24] Long duration, and multilevel/multigenerational patents favor wealthy, net exporters of IP, while shorter, more limited agreements favor poorer, net importers of IP.

of services, & on-line provision from India, (b) Provision of physical services like surgery in India, through medical tourism packages.

India should have pro-active Work from home, to facilitate the participation of educated, married women to work from home. It should also have a Work from anywhere policy, for encouraging supply of services online to the World. Remove hurdles (e.g. tax policy for allowable expenses), and provide incentives where necessary.

Social Services

There is a wide gap between the quality of education, health and other services provided in rural areas compared to urban areas. An important reason is that general quality of life in towns, and the opportunity available to better skilled persons to find employment there. Those skilled persons (doctors, teachers, nurses) working in Govt who are assigned to work in rural areas, usually have high levels of absenteeism. Result is poor quality of health and education services compared to that available in Urban areas. Digital connectivity in all villages coupled with availability of expert systems for diagnosis & prescription, and provision of teaching material & teaching aids & tools, can help lower quality, health & education providers, to vastly improve the quality of service.

A mission can be launched for providing online access to **Expert AI systems in health** (digital Doctor Susharata or Digital Vaid Patanjali) and **expert AI systems in education** and skilling (Digital Prof Drona or Guru Eklavya or E-Achaya). These should be accessible in every panchayat, and from every Primary & Secondary school and health centre![25]

The education, wage and LFPR gap between unmarried women and men (unmarried, divorced or never married) is closing. However, the LFPR gap between married men and women remains wide. One reason is the child and aged care responsibility imposed by society. Union and State govts must incentive the creation of markets for child care and aged care. The latter will become progressively more important as the share of older people in India increases.

Two other reasons are maternity and mobility. Surveys show that women have a preference for how far they want to travel (commute) from home to work. The preference is for a maximum commute of 20 minutes, though some women are willing to spend more time to commute. Govt can incentivize, (i) the creation of creches, inside and outside companies, (ii) Provision of Company transport from villages to factory premises, (iii) Provision of company

[25] There is already a good program for education called Diksha, but there is need for a Diksha Jr for pre-school & FLN. There is also a need for more teaching aids, supplementary teaching material and virtual science experiments.

housing for women within the industry premises, (iv) Last mile connectivity between public transport and home/workplace, and (v) Maternity leave policies.

5. Knowledge Economy

The key to India's knowledge economy will be innovation and entrepreneurship, for which the foundation is already being laid by the stand-up India, start-up India initiative of the Govt of India, which giving a central role to tech start-ups and new entrepreneurs in generating employment. Innovation is envisioned not just at the frontiers of (manufacturing) technology, but in the trenches of the under-developed economy; Innovation by "rural entrepreneurs" to transform agriculture, rural manufacturing & services, and by "social entrepreneurs" to scale up to a market of 1.6 billion people without diluting quality. Innovation in hybrid physical-digital (Phygital) systems, that balance the social value of human interaction and the cost effectiveness of web-based services. The foundation of innovative entrepreneurship is good education the ability to learn, think, question, find solutions & take risks.[26] The second pillar is a competitive economy, without veto power by oligopolists also plays a role in fructification of innovations. Established oligopolists whose profits are threatened by new inventions, can stop them from fructifying and spreading, by direct intervention or indirectly through regulatory capture or collusion with the political establishment.[27] Policy makers and regulators must remain alert to such and institutions must remain alert to thwart such actions.

The higher education and research system reform initiated recently is only the first step. The entire superstructure will have to be re-engineered. Further reform of Government research institutions, including the agricultural research system under the State Govts, is critical to meeting the needs of the knowledge economy. The Strategic & Defence R&D system needs to be reformed by setting up a Defence R&D Commission patterned on the successful Space commission. Such a commission would identify and develop futuristic technologies from basic research, training of high-level professors/teachers, to developing prototypes and helping productionize them. This would include pure defence systems like hypersonic vehicles, satellite defence systems & high-powered lasers, to dual use items like semi-conductors, robots, autonomous vehicles, Artificial intelligence, machine learning, expert systems & cyber tools.

[26] In contrast to credentialism, directed at getting a job based on a degree or school certificate.

[27] Philippe Aghion et all have provided research-based advice in their book, "Creative Destruction."

The global learning of Indian research systems and Indian University STEM department needs to be strengthened, by connecting them to research carried out in the universities and research labs and incorporated in new start-ups, of the developed countries.

The medical and drug research system needs to be overhauled to restore the private development of new and modified, drugs and their testing and trials. Public – Private partnership will be essential to develop new medical technologies. Due attention and support should be given to traditional systems of medicine such as Ayurveda and Unani, and to preventive (physical & mental) health systems such as Yoga.

Agricultural research and extension, basic education and mass skilling is critical to transforming the rural economy, where more than 2/3rd of the population lives, and half the work force is employed and eliminating poverty and malnutrition. Training in logical analysis and the scientific method, coupled with access to information & knowledge available in India and the world, along with appropriate incentives for local start-ups/innovation to solve local problems, will help transform this economy.

Drugs, pharmaceuticals, and medical equipment sector is the only manufacturing sector still subject to price controls. The spate of reforms during the 1990s and early 2000s was reversed since then and even new ones added. Given the enormous possibilities of new medical and pharmaceutical discoveries during the next 30 years, the entire regulatory system from R&D, drug testing & trials, production and marketing needs to be modernized into a professional *Food and Drugs Administration*.

5.1 Education

A lot has been written about the demographic dividend in India and the need to ensure that it is translated into reality This requires a national focus on basic education (functional literacy and numeracy) and job skills.[28]

A pre-requisite for, even low-level jobs, is the ability to read, understand and follow instructions. Research shows that 45.3% of children are not proficient in reading, writing and arithmetic (FLN), at the end of primary level (row 1-2 **Table 4**). Low-medium to high-medium skilled jobs would require higher levels of proficiency in reading, writing, speaking & understanding, at the lower or upper secondary school level. In both primary and secondary

[28] Education was put in the States list of the constitution, and remained there till 1996, because education has to be provided at the Panchayat & Nagarpalika level, through the Primary and Secondary schools set up by States starting in 1960s. The only reason for moving education from State to Concurrent list was to bring about some national uniformity in policy, standards and certification across States.

education our performance is worse than expected at our level of per capita GDP (**Table 4**). Lagging States need to correct this gap and reach (or exceed) the levels indicated under column headed UMIC by 2031-32 and those under column headed HIC by 2047-48.

Table 4: Indian Education Access and achievement in comparative perspective

Education; Actual & Expected based on cross-country regression						
		India		Predicted value of Indicator		
		Gap	Actual	2022	2031-32	2047-48
				India Now	India UMIC	India HIC
	Minimum reading proficiency (end of primary %)					
1	Total	-6.1	59.8	53.7	44.5	21.0
	Adult Literacy rate (% of people ≥ 15)					
2	Total	-7.9	76.0	83.9	92.0	
	School enrollment, (% gross)#					
3	Secondary	5.0	78.8	73.8	83.9	
4	Tertiary	-0.6	31.6	32.2	41.7	60.8
	Educational attainment, Primary 25+ (% pop.)					
5	Total	-6.3	62.8	69.1	78.9	99.2
6	Male	-1.8	71.8	73.6	82.3	100
7	Female	-11.2	53.9	65.1	75.8	97.5
	Educational attainment, Lower Sec. 25+ (% pop.)					
8	Total	-2.8	49.8	52.5	62.5	82.5
9	Male	1.6	58.7	57.1	66.0	84.0
10	Female	-8.6	41.0	49.6	59.8	80.4
	Educational attainment, Upper Sec. 25+ (% pop.)					
11	Total	-5.7	31.6	37.3	46.8	66.1
12	Male	-1.9	37.8	39.7	48.2	65.6
13	Female	-9.9	25.5	35.4	45.4	65.6
	Educational attainment, Bachelor's 25+ (% pop.)					
14	Total	0.0	12.0	12.0	15.6	22.9
15	Male	5.6	14.6	8.9	11.6	19.9
16	Female	-2.0	9.8	11.8	15.8	24.1
Data: World Development Indicators (WDI), 2022						
Note: Gap = Actual -predicted (based on cross-country regression)						
* For "min reading proficiency" India data is for 2017 : PcGdp(2017)=$ 6112						

The earlier neglect of outcomes and capability is sought to be corrected through Special Platform: NIPUN, the National Initiative for Proficiency in Reading with understanding and Numeracy, provides a core for Functional Literacy & Numeracy N (3Rs) which could be enhanced/ expanded to include modules for fun learning, socialization & self-control; The platform must provide information & knowledge for all stake holders [teachers, parents, students, school administrators] in pre-school & primary education. As with other critical social platforms, it should be cloud based, modular, & with flexibility for States to pick &, chose &

adapt various modules. NISTHA, the National Initiative for School Heads and Teachers, Holistic Advancement, for capacity building is also relevant..

Pratham is using some of these methods in UP and other States, but they could be recorded and used more widely. There are also examples from other countries of successful TV/video programs, like "Sesame Street" from which we can learn and adapt for our social, cultural, linguistic conditions.

In the information age, much of the new economy is related to the digital world. Among these will be the future systems of education and imparting skills. Innovations in Tele-education and the development of hybrid digital-physical (Phygital) systems will play an important role. Three-level delivery system. (1) Design of courses at every class/level in all languages, (2) Implementation and continuing provision of complementary services (including virtual experiments, training, testing, counselling), and (3) local teaching assistant/helpers who are attuned to the society and culture in which the children live.

Other aspects of education which will remain relevant and important are public health education(nutrition, hygiene, sanitation), Social, civic & moral responsibility, and educating the educators in pedagogy (ie how to teach), which is critical to the quality of education and skilling of large masses of students.[29]

5.2 Digital Teacher (E-Acharya)

Table 4 shows that India's primary and secondary completion rates are below what we would expect for a country at our level of per capita GDP at PPP. Part of the problem is that 45% of students finish Primary school without being able to read and write, making it virtually impossible to learn at the next level. The second problem is that State govt hired teachers dislike being posted to rural areas where living conditions are usually inferior to those in urban areas, so do everything in their power to avoid or minimise teaching there. Many things have been tried to correct this situation, to little or no avail The third problem is that teacher training neglects the critical role of effective teaching methods and materials.

Expert AI can solve these problems for all classes of teaching and learning, from pre-school to High school. Such an expert system can be designed for a multiplicity of tasks, like providing teaching aids and materials to qualified teachers, directing local teaching assistants in rural areas to perform at teacher level, and directly help lagging students to catch up or stimulate

[29] Citizens, old or young, men or women, will have Foundational Literacy and Numeracy (FLN).

advanced students. The Centre and State Govts should set up an NGO to design and maintain the Digital Professor or E-Guru. The E-Guru should be, multilingual, capable of modification to State and local physical and social environment, and allow private and NGO designed learning tools to be layered on top of it.

5.3 Employment and Job skills

Skills and Jobs are two sides of the same issue. Like credit availability, availability of job skills is critical to sustained growth of jobs, productivity and real wages. Markets for job skills are characterised by information asymmetries and moral hazard, similar (but not identical), to credit markets. Markets for skills are highly fragmented and characterised by missing, imperfect and inefficient sub-markets, almost like credit markets were about a half century ago.

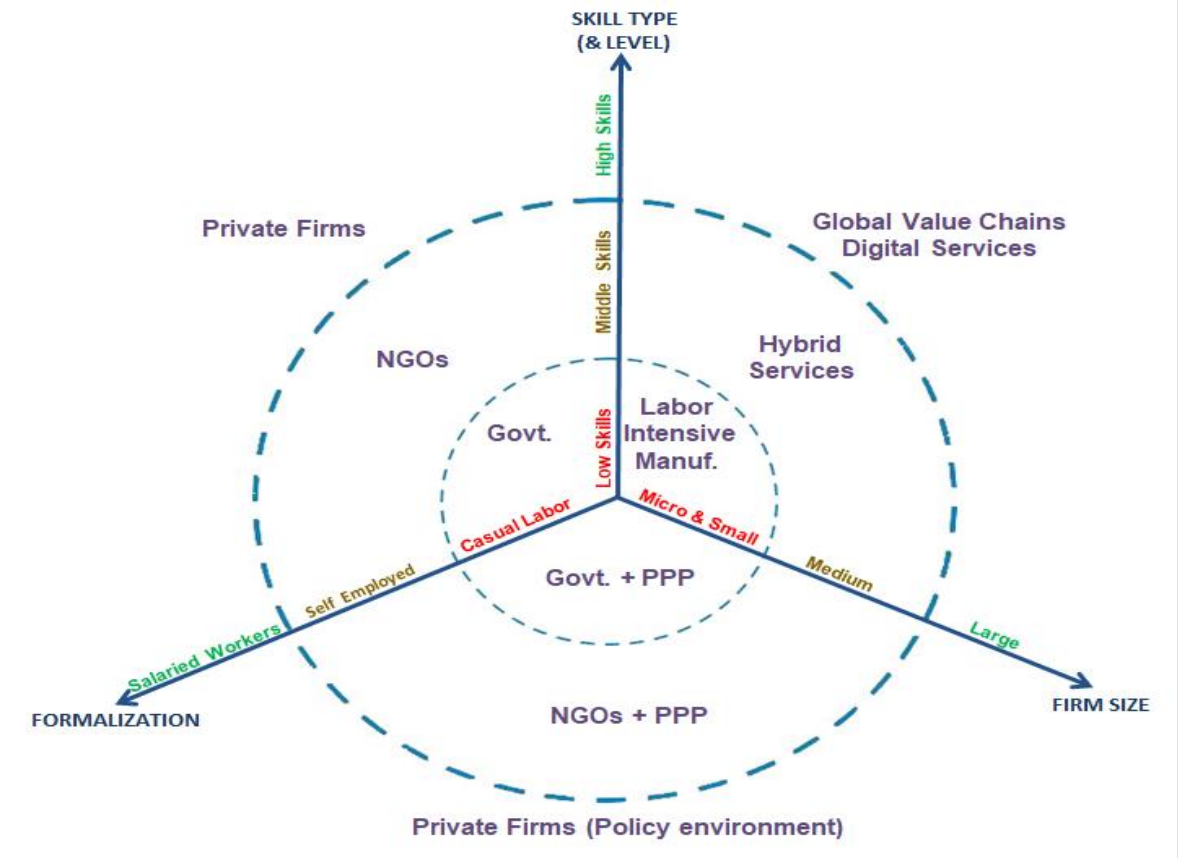
The economic agents on the demand side of the market are the same as those on the demand side of the market for credit: These are fragmented into the formal and informal sectors; Within the formal sector corporation & large unincorporated firms have distinct characteristic. Similarly in the informal sector there are large differences between the requirements and capabilities of small firms, micro enterprises & self-employed

The supply side is even more complex with every member of the working age population a potential supplier of skilled labour, and each differs from the other in terms of literacy, quality of education, and job skills acquired. Given this diversity and lack of information/knowledge about the skills required for different types of jobs, in different sectors & different industries, two related services are critical to improving the functioning of the market for skills: Skill providers (Govt institutions, societies & non-profit colleges and private training institutes) who impart job skills, and intermediaries who match the skills of the job seeker to the skills required by the employer. The connectivity between these four is critical to reducing information asymmetries and creating efficient markets for skills.

The skill industry is incredibly complex. There are many reasons for this complexity. (a) The massive size of our working age population, (b) the large informal sector, characterised by self-employment in Household enterprises & under-employment & disguised employment, (c) Different leading sectors in different states (e.g. agriculture, manufacturing, traditional & non-traditional services). (d) The demand side is equally complex given the large, multi-layered informal production system.

Skilling is a multi-dimensional problem, with multiple types, levels and providers of skills. A highly simplified depiction of the complex skilling industry is given in. Figure 9.

Figure 9: Job skilling is a 3-Dimensional problem



Source: Authors depiction based on interaction with market participants and stakeholders

There are three Axis representing firm size, degree of formalisation and skill requirements in terms of type (from unskilled through semi-skilled to high skill) & competence level from low to medium to top). Markets do not exist in the innermost circle, requiring a much greater role for the State governments. Markets are reasonably efficient in the outer most circle, and the Govt's role is to facilitate their functioning. In the middle there is a big role for NGOs to help improve skills, in partnership with Govt on the inner side and partnership with the private sector on the outer side.

From a broad national perspective, the majority of workers will move from unskilled jobs to low skilled jobs, to medium skilled jobs (UMIC) and finally to high skilled ones (HIC). However, global & Indian demographics suggest that India can provide the entire range of skills (low, middle, high) to the High income developed countries (HIDCs), either physically or online. So, "Skill for India, Skill for the World," is a great opportunity. The skilling Industry (Private, NGO, Public sector) will play a vital role in actualizing these opportunities and meeting the challenges. It is unclear whether the Central and State Govts, are fully aware of and geared up to, meet the challenges and grab the opportunity!

5.3.1 Labour force, workers, & unemployment

A key element of inclusive growth is the growth of jobs and employment opportunities. Changes in survey design, the appearance of private commercial data organisations and pandemic disruptions have resulted in a lot of confusion about employment and wages. The purpose of this section is to understand trends (in demand and supply of jobs) that have emerged in the past decade, with a view to drawing policy lessons for the future.

In an economy with a very high share of informal sector in jobs, its necessary to start with a picture of the employment scene, with the little data available on this sector. The new series of Labour force employment surveys provides a consistent series of labour force data for the years 2017-18 to 2022-23 (June to July). These show a trend increase in Labour force participation rate of 3.1%/yea r(2.7% from 2020-21) and Worker Population ratio of 3.7%/year (3.1% from 2020-21), and a trend decline in Unemployment rate (rows 1, 4, 8, **Table 5**). The growth of Worker population ratio according to currently weekly status, is even higher at 3.3% per year for 2018-19 to 2022-3 and & 3.5% per year for 2020-21 to 2022-23 (row 13, Table 5). With population growth averaging about 1.1% a year during these six years, employment has grown at an average rate of 4.4% per year during 2018-19 to 2022-23.

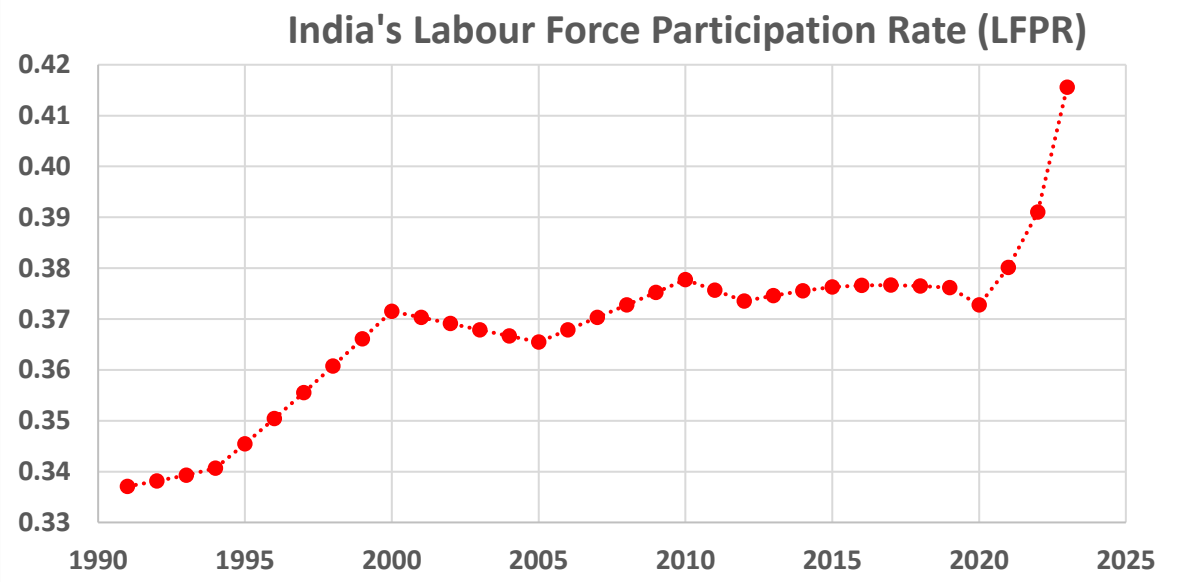
Table 5: Labour force participation (LFPR), Worker population (WPR) & Unemployment (UR)

	Employment indicators (LFPR, WPR, UR) for Ages >=15 years							Compound annual gr	
		AY18	AY19	AY20	AY21	AY22	AY23	ay23/ay18	ay23/ay20
	Usual status (US)								
1	LFPR(persons)	49.8	50.2	53.5	54.9	55.2	57.9	3.1	2.7
2	LFPR(female)	23.3	24.5	30.0	32.5	32.8	37.0	9.7	7.2
3	LFPR(male))	75.8	75.5	53.9	77.0	77.2	78.5	0.7	13.4
4	WPR(persons)	46.8	47.3	50.9	52.6	52.9	56.0	3.7	3.2
5	WPR(female)	22.0	23.3	28.7	31.4	31.7	35.9	10.3	7.7
6	WPR(male))	71.2	71.0	73.0	73.5	73.8	76.0	1.3	1.4
7	WPR(15-29)	31.4	31.5	34.7	36.1	36.8	40.1	5.0	4.9
8	UR(persons)	6.0	5.8	4.8	4.0	4.1	3.2	-11.8	-12.6
9	UR(female)	5.6	5.1	4.2	3.5	3.3	2.9	-12.3	-11.6
10	UR(male))	6.1	6.0	5.0	4.5	4.4	3.3	-11.6	-12.9
	Current Weekly status (CWS)								
11	LFPR(all)	na	na	51.2	51.8	51.7	54.6		2.2
12	LFPR(female)	na	na	26.3	27.5	27.2	31.6		6.3
13	WPR(all)	44.1	44.3	46.7	47.5	48.3	51.8	3.3	3.5
14	WPR(female)	na	na	24.4	25.7	25.6	30.0		7.1
15	UR (all)	8.9	8.8	8.8	7.5	6.6	5.1	-10.5	-16.6
16	UR(female)	na	8.7	7.3	6.6	5.8	5.1		-11.3
	Source: Periodic Labour force Survey (PLFS) 2017-18 to 2022-23.								

The rate of growth of employment in terms of current weekly status (row 13) which is closer to the concept of employment in a formal economy has grown faster than for usual status (row 4, **Table 5**). Job creation during this period has clearly been faster than the growth of population and the working age population. Much of this job creation has been for female workers, with the female LFPR rising from 23.3% in AY2017-18 to 37% in 2022-23(row 2) and the WPR rising from 22% to 35.9% during the same period (row 5, **Table 5)**.

The ILO model data as contained in World development indicators, does not give us the worker population ratio, only the labour force participation rate, over a longer period. The labour force participation rate increased rapidly after the 1990s reforms, peaking in 2000. During the next decade, referred by some as the "lost decade" in terms of policy reforms, the LFPR was virtually flat. There seems to another spurt in the years following the pandemic, the years which also saw a spurt in reform initiatives (**Error! Reference source not found.**). However, it is t oo early to draw long term conclusions from this spurt.

Figure 10: India's Labour force participation rate



Source: Authors calculation, based on World Development Indicators data on employment & population.

5.3.2 Wage growth

The evolution of real wages between 2017-18 & 2022-23 gives us an indication of labour productivity and along with changes in WPR, about demand-supply balances. During this period jobs have grown by an average 4.4% per year, while weighted average real wage has grown by 0.6% per year, despite the pandemic and other external shocks (**Table 6**).[30]

[30] Job growth is the sum of WPR growth of 3.4% and 1% population growth. Overall wage growth is the Worker weighted sum of wages of the three types of workers.

Table 6: Growth of jobs, Worker population ratio and real wages by type

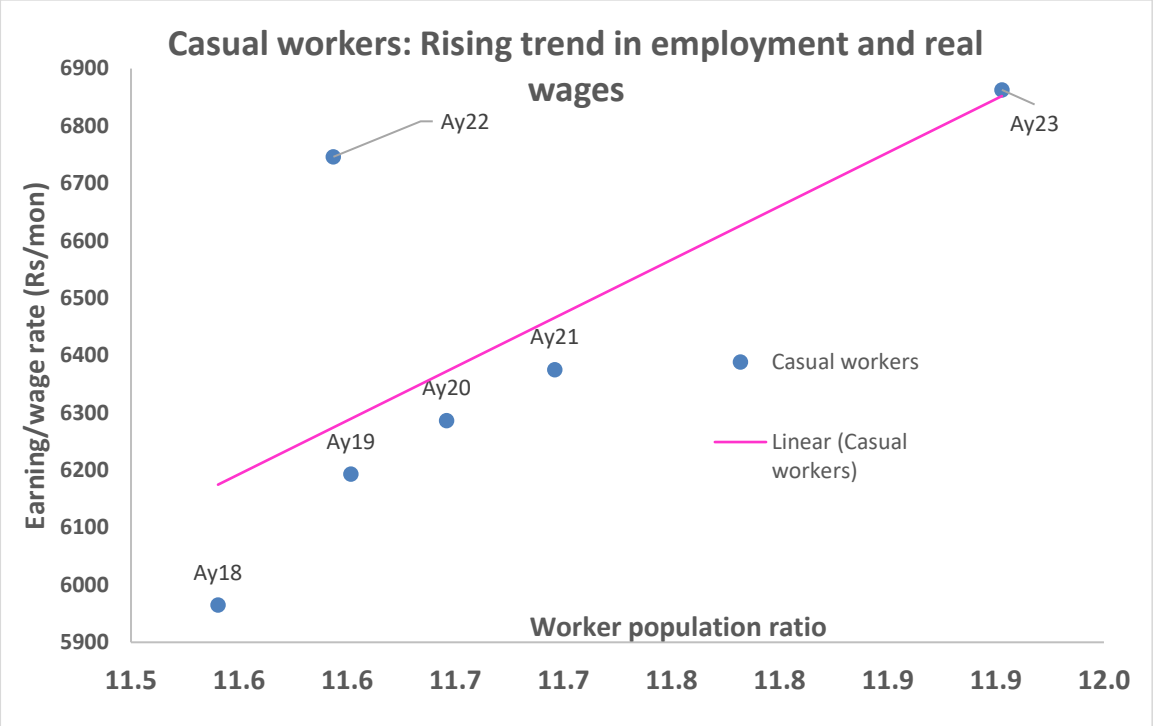
Employment/jobs (WPR) and real wages- ages 15-64, usual status(us)							
	Monthly wages in const 2017-18 prices (CPI deflator)						
Agricultural year (jun-jul)	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	Gr rt (%) Ay23/Ay18
Casual Workers	5964	6192	6286	6375	6745	6862	**2.8**
(gr rt)		3.8	1.5	1.4	5.7	1.7	2.8
Salaried workers	15589	15761	15763	15331	15586	15314	-0.4
(gr rt)		1.1	0.0	-2.8	1.6	-1.8	-0.4
Self employed	10033	10571	9698	9352	9833	10320	**0.6**
(gr rt)		5.2	-8.6	-3.6	5.0	4.8	0.6
Wtd Avg wage	10288	10666	10312	10006	10367	10611	**0.6**
	Ratio of type of worker to population						
Casual Workers	11.5	11.6	11.6	11.7	11.6	11.9	**0.6**
(gr rt)		0.5	0.4	0.4	-0.9	2.6	0.6
Salaried workers	10.6	10.6	11.5	11.3	10.9	11.4	**1.5**
(gr rt)		0.5	7.9	-1.3	-3.7	4.3	1.5
Self employed	24.2	24.3	25.9	27.6	28.4	31.3	**5.3**
(gr rt)		0.3	6.3	6.4	2.9	9.8	5.1
All workers	46.3	46.5	49.0	50.6	50.9	54.6	**3.4**
Source: Authors calc based on nominal wage & worker ratio's from Bhalla et al(2024)							
Real wages calc by author using monthly CPI (2012)-average AY(july-june)							

The fastest growth of real wages is for casual labour (2.8% per year), while job growth is small (0.6% per year), indicating a rise in the productivity of casual labour in the face of rising excess of demand over supply (rows headed casual in column 1, **Table 6**, and **Figure 11**).

Detailed data shows that real wages of casual workers have increased across all education categories, all defined industries and all occupations except clerks and professionals. The ratio of wages of casual workers to that of salaried workers has increased from 38% in 2017-18 to 45% in 2022-23, contradicting the popular assertion that the share of casual workers is increasing largely due to unavailability of wage and salaried jobs.

Job growth has been the fastest for the self-employed, at 5.1% to 5.3% per year, accompanied by a modest increase in real wages at 0.6% per annum (rows with self-employed in column 1, **Table 6**).

Figure 11 Casual Workers Rising demand. Real wages and job productivity



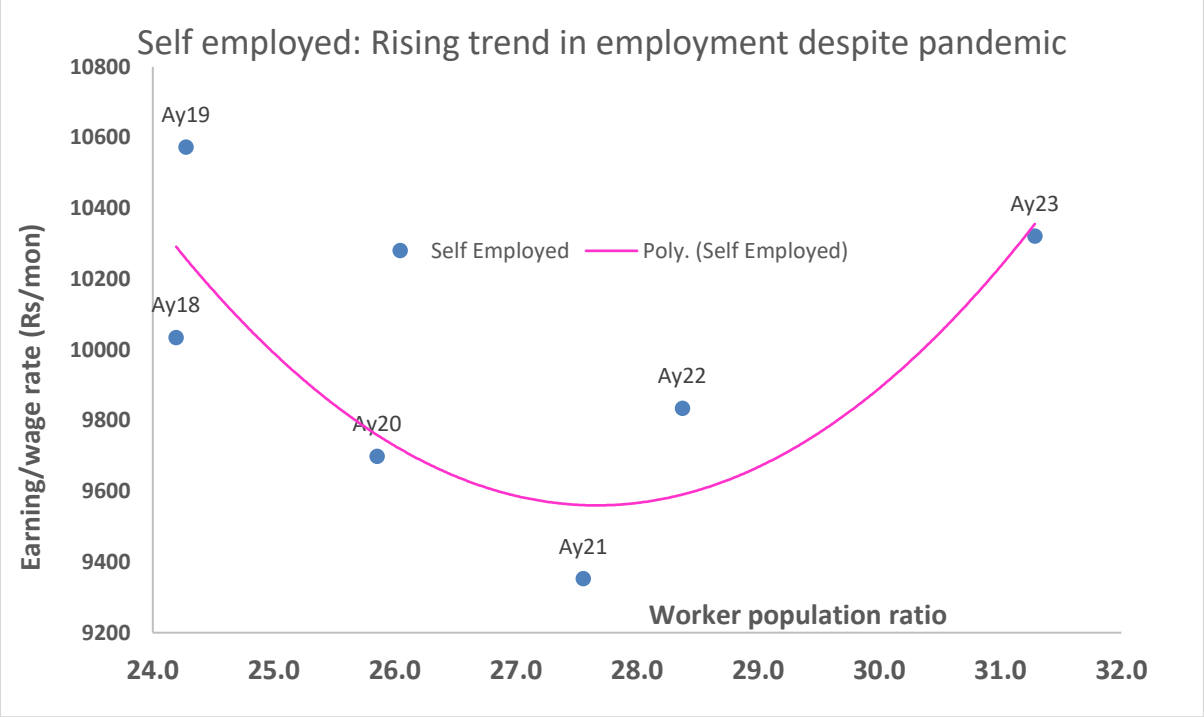
Data: PLFS, unit record data & CPI. Authors calculations based on tables made by Bhalla, Bhasin &Das(2024)

The real earnings of self-employed workers, across industry, education and occupations fell sharply during the pandemic, but are now well on the way to recovery (**Figure 12**).[31] This indicates that during 2017-18 to 2022-23, the supply of workers has kept pace with increasing demand for their services, without diluting worker productivity.

The biggest surprise is that the demand for wage and salaried workers has declined relative to their supply along with their real wages, despite a doubling of formal employment between 2018-19 to 2022-23 (as measured by EPFO). The pattern of decline in real wages for all wage and salaried workers suggests, the two waves of pandemic, global supply disruptions & commodity price volatility in 2022-23 has played a role, but the timing of the impact was likely different in different industries and professions **Figure 13** and **Table 6**).

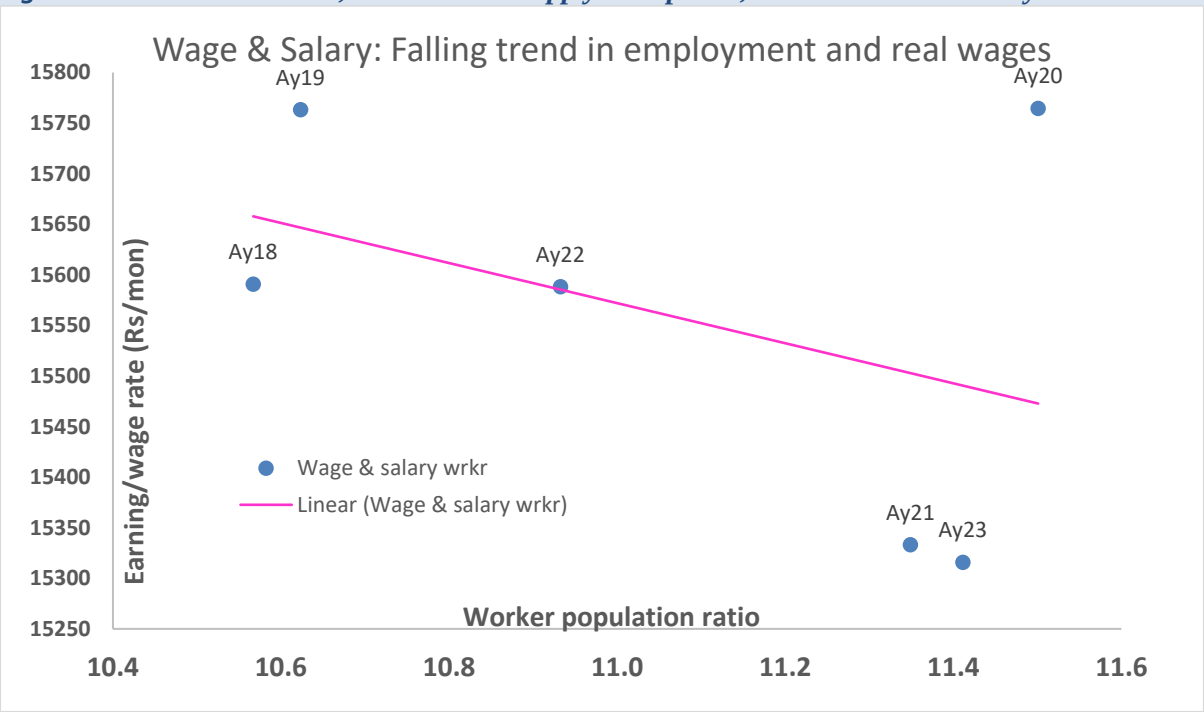
[31] Only exceptions were a few occupations in AY 2020-21, namely crafts, skilled agri workers and "elementary occupation".

Figure 12: Rapid employment growth, but modest recovery of real wages from pandemic shock



Source as in previous figure

Figure 13: Pandemic shocks, international supply disruptions, wars & macro volatility



Source as in previous figure.

As regular workers are likely to be the most skilled on average, this also suggests *a problem with skill acquisition and matching od demand and supply of skills*. Detailed data on real wages by education and occupation seems to confirm this hypothesis. Among salaried workers real

wages have increased only for "post-graduate & above" and "below primary".[32] Similarly, out of 10 occupation categories, real wages of wage & salary workers have increased only for "legislators" and plant & machinery workers, and out of six industry classifications real wages have increased only for agriculture and services-1, during these six years.[33]

Another indicator of weakness in the job skilling & matching system is that professionals (and clerks) are the only occupation in which real wages have declined across every type of worker - self-employed, salaried and casual.[34]

Firm-provided training is an important element of worker productivity and real wage growth of regular salaried employees in developed countries. Ma, Nikab and Vidart (2019) found that, "73% of all reported adult education corresponds to job-related training and that all this training is financed by firms across all countries." Further, "Firm provided training, accounts for almost 43% of cross-county wage growth differences and 10% of cross-country income differences. It is therefore critical to remove all hinderances to firms' apprenticeship and worker training programs, and create a favourable incentive structure for training more workers than they need themselves.[35]

5.3.3 Rural employment & wages

Dividing rural workers into the available categories, we find that, over the period from November 2013 to November 2023, the fastest growth of real wages (2.4% per/year) is of Handicraft workers (**Table 7**). As many Household workers are self-employed this appears to be consistent with the data in **Table 6**. The list of non-agricultural occupations in which real wages are declining (**Table 7**), suggests that either, some of the products they make (bidis, Woven goods, bamboo baskets, Agri implements) or some of their traditional skills (construction services), or both, are becoming relatively obsolete. For instance, if plastic goods entered the rural market, the demand for wooden stools, beds (Charpies), metal buckets & mugs, and other traditional items could be displaced. However, the demand for carpenters in making house doors etc may not be affected yet. Similarly, there may be new electric & plumbing products (electronic switches, plastic pipes) which traditional electricians and

[32] The real wages of illiterate and below primary, salaried workers, has also increased. These are likely to be those working in urban households.

[33] Authors calculations based on summary wage data from Dr. Surjit Singh Bhalla, based on unit level data from different PLFS rounds 2017-18 to 2022-23. "Legislators" is an occupation category in PLFS.

[34] Clerks are being replaced by software; they could be trained in the software tools and internet search engines, to become digital assistants.

[35] Household & small eneterprises have neither the finances nor the skills to train workers. If large companies train more workers than they need, the excess becomes available to the MSMEs and helps improve their productivity & efficiency.

plumbers cannot handle, so their real wages will decline unless they upgrade their skills to handle them. Traditional weavers of baskets & other products may be affected by both product and skill obsolescence.

Table 7: Real Wages of rural non-agricultural workers

Real wages, Rural, self-employed, non-agricultural, male workers				
Gr Rt (compound, annual): Nov'13 to Nov'23		**Obsolesence**		
Occupation	Real Gr Rt	Skills	Product	Competition
Handicraft Workers	2.4	No	No	Quality upgrade
Blacksmith	0.2	Partial	less	Agri implements
Mason	0.0	Partial	less	Type of housing
Carpenter	-0.2	Partial	More	Plastic products
Electrician	-0.5	Yes	No	Quality
Plumbers	-0.8	Yes	No	Quality
Bamboo,Cane basket weavers	-1.8	Yes	Yes	New prds/material
Weavers	-4.1	Yes	Yes	New prds/material
Data: Labor Bureau, Dept of Labor & DOS (CPI). Authors calculations.				

The same labour bureau data for AY18 to AY23 shows that rural women's wages have grown faster than men, except in one occupation. Both the lowest and the highest female/male wage ratio have improved; from 0.49 to 0.84 and from 0.61 to 0.90 respectively. The variance of wages across occupations has declined significantly for men, and marginally for women.

The increase in the labour force participation of women (LFPR) of rural women during AY18 to AY23 (noted by many economists), may be partly responsible for a slower rise in the real wages in unskilled agriculture (0.9% to 1.5% per year in different occupations), and low-skill agriculture (0.4% to 0.8% in different occupations) (**Table 8**).[36]

[36] In several rural occupations, there are too few females, to get a representative sample. We therefore use (prime age) males to derive trends in employment and wages.

Table 8: Growth of real wages of agricultural workers 2013 to 2023

Growth rate (%) of Real wages of Rural, male workers:Nov2013 to Nov2023	
Occupation	Real Gr Rt
General Agricultural Labourers(incl Watering, Irrigation workers)	1.5
Picking Workers(Tea, Cotton, Tobacco, othr commercial crops)	1.2
Sweeping / Cleaning Workers	0.9
Packaging Labourers	0.8
Harvesting/Winnowing/ Threshing workers	0.6
Animal husbandry workers (incl Poultry, dairy & Herdsman)	0.5
Sowing (incl Planting/Transplanting/Weeding) workers	0.4
Source: Authors calculations based on PLFS & CPI rural	

5.3.4 Youth employment & Job search

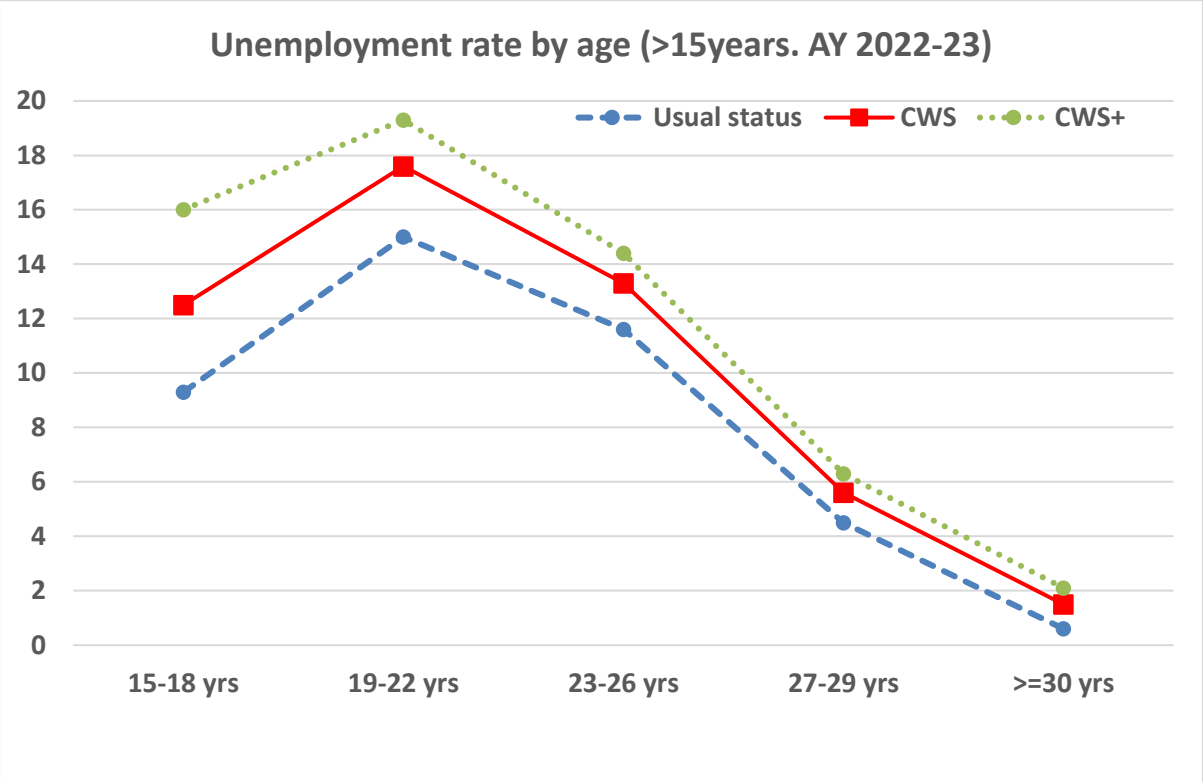
Youth unemployment is another area about which there is a lot of misunderstanding. The concept of ***search unemployment*** is critical to understanding the higher unemployment rate among youth, educated youth who have finished their general education (higher secondary school or college degree). Indian markets for skilled jobs, are imperfect and incomplete, due to severe information asymmetries. Students who have passed out of college or even higher secondary, do not know the skill requirements of the jobs they are seeking and assume, mistakenly that they meet these requirements. Potential employers do not know the quality of learning backing the degrees/credentials that they have and their ability to acquire the job skills actually needed in the jobs they are trying to fill.[37] Some job seekers gradually learn the actual requirements of the job they seek and adjust their expectation to their capabilities and job skills. Therefore, the unemployment rate is very high after graduation and declines gradually to the general unemployment level. Students would generally conclude their schooling or basic college between the ages of 17 and 21 so the unemployment rate is highest, at 17.6% (CWS)in the age group 19-22. It then declines to 13.3 % in the 23-26 age group, and then more rapidly to 5.6% in the age group 27-29 (Figure 14). The unemployment rate compares to the total unemployment rate of 4.2% in the same year 2022-23.

As college enrolment rises, youth leave the work force and are therefore no longer unemployed. This reduces unemployment rate in the college age group. As these youth graduate, they join the work force with higher credentials and heightened expectations, whether ot not they possess any job skills.[38]

[37] Like those who keep taking coaching lessons for years, despite repeated failure in competitive exams.

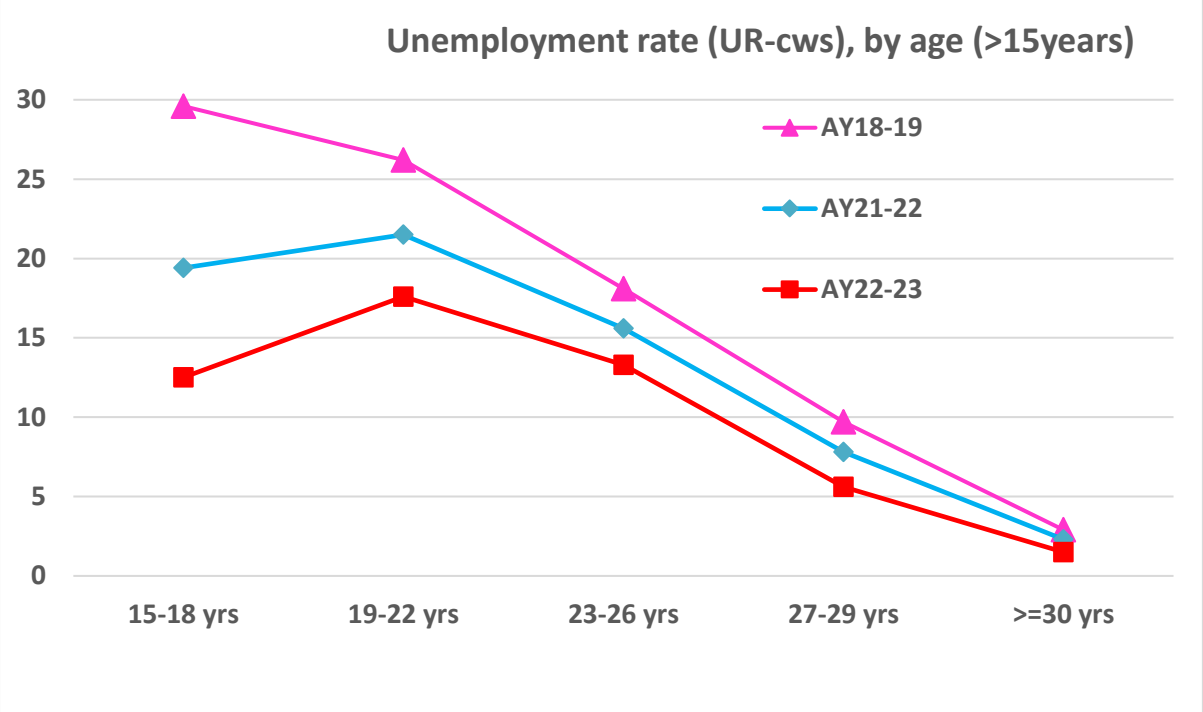
[38] For instance, jobs in Government and Departmental public undertakings like railways, pay higher than market rates, with greater job security despite lower average productivity. There is therefore excess demand for jobs in Govt., compared to jobs with similar job skill requirements in the private sector. Getting a non-IAS

Figure 14: Search unemployment – Youth unemployment rate by age groups



Source as in previous figure.

Figure 15: Search employment peak shifts as the % of college educated increases



Source as in previous figure.

job in government or PSEs/PSUs is like a lottery in which all those meeting the minimum credentialism requirements want to participate. The cost is paid in terms of search unemployment.

Thus, search unemployment increases with the rising % of college educated youth. The unemployment rate therefore increases for the post-BA age groups. This sequence of changes is evident from the first two age groups depicted in **Figure 15**, for the three non-pandemic years AY18-19, AY21-22 & AY22-23.

One of the many challenges of skill development is to improve the flow of information between all stake holders (students, employers, skill providers and skill exchanges/skill matchers).

5.3.5 Availability of educated labour force

52.6 per cent of working age population with basic education is currently in the labour force. The number is 45.2% for intermediate education and 63.5% for advanced education (Table 9). This means that the labour force can expand rapidly to meet increased demand for male and female labour with intermediate qualifications and females with either basic education or advanced education. As shown earlier (Table 4), the supply of new graduates was also high.

Table 9: Potential supply of educated labour for rapid expansion of economy

Educational status of labour force (% of population)					
	India		Predicted value of Indicator		
	Gap	Actual	2022	2031-32	2047-48
			India Now	India UMIC	India HIC
Labor force with basic education (%)					
Total	0.9	52.6	51.7	49.7	45.7
Male	13.7	75.8	62.1	60.2	56.2
Female	-15.4	24.8	40.2	38.0	33.4
Labor force with Intermediate education (%)					
Total	-15.2	45.2	60.4	60.9	62.8
Male	-4.3	64.6	68.9	70.0	72.3
Female	-31.1	18.7	49.7	51.3	54.4
Labor force with advance education (%)					
Total	-9.9	63.5	73.3	74.7	77.53
Male	4.6	84.5	79.9	80.8	82.5
Female	-32.6	35.4	68.0	69.9	73.9
Labour Force,					
Total	-0.03	0.39	0.42	0.44	0.49
Source: World Development Indicators			Note: Gap(2022) = Actual - Predicted		
Prediction is based on cross country regression with PcGdp PPP(2017 pr)					

5.4 Digital Skilling (E-Guru)

There are broadly two types of skills. Those that require working on physical materials, and those that require work mostly mental work or intangibles like design. The former requires training in an Industrial training facility where the materials, tools, equipment and machinery

that is to be used for training is available. To some extent simulators can be used to improve the quality of training, reduce material requirements, and scale up the training, by incurring higher capital cost.

The latter require books, pen and paper and computers, and can be carried out in any coaching centre or secondary school or inter college, whether run by govt, NGOS or private sector. In this case a digital or e-trainer can be used to enhance the quality of the training, scale it up easily by adding less well-trained trainers, and even provide the training directly to the student sitting at home. The demand for training in these skills is relatively strong because the society is biased towards white collar jobs. Consequently, parents are willing to pay for the fees needed to hire competent teachers & basic computers & programs. The main challenge is the lack of information about the immense range of skills and jobs which can be generated through a market system for certification and standardisation, training and placement, in sectors like education (including sports, arts & crafts), health (including preventive, nutrition, mental, physical & mental therapy). NGOs of various hues can play a key role in creating and running such markets till profitability is demonstrated and attractive for the private sector.

The challenge is far greater with respect to blue collar jobs in manufacturing, construction, installation, assembly, repair & maintenance and logistics! The Indian middle class, even at the lowest end seems uninterested in such jobs which require physical work with the hands and arms. There is already a gap between demand and supply in some of the occupations within these sectors, and the gap will increase if the pace of manufacturing and construction accelerates as expected. This requires bringing skilling institutions geographically closer to the potential sources (poorer rural areas) and users of skills (industrial units in small towns and along highways) and as well create the information networks connecting companies and create the information platforms, which bring these two together with skill trainers (e-gurus) and govt agencies who can help change the image of blue-collar work, by awarding excellence in physical skills.

The quality of skills available in and to, the informal sector, also needs to be upgraded if the productivity, real wages and incomes are to increase in the self-employment segment of the labour force. The creation of *Digital trainers and E-Gurus* could help expand access to poor and less educated children across the country including remote villages. These could also direct training of workers on simulators for wedding, lathe work. milling and drilling

5.5 Knowledge Stack

Table 4 showed that the one area in which India is doing well relative to its per capita income, is higher education (Bachelor's degree). The performance is even better with respect to male graduates, whose participation in the labour market is currently much higher than for women. To facilitate the creation of a knowledge economy in the information age, the Government will create a multi-dimensional knowledge exchange, with several sub-stacks such as for R&D, education, and skilling. The knowledge stack will have a digital library, a library of patents and a library of indigenous knowledge.

The R&D sub-stack will have a provision for listing and accessing all published Indian research and for digital publication of reviewed and unreviewed Indian research articles. This system will also bring together all the higher education and research resources of the government(s). It will also have a knowledge exchange with provision for both free exchange among academia, think tanks and researchers and for marketing of priced knowledge services.

The second dimension will be a public education sub-stack, which will bring together the tele-education, e-learning, and e-skilling efforts of central and State governments.[39] At the base of this stack will be a central government system for the education of educators and training the trainers. The next layer will be State Govt layers for schooling and skilling, which connect to and provides access to every State Government Primary school, Secondary school, college, and training centre in the State. The top layer will contain all the NGOs, private companies, educators, and trainers providing goods and services for e-learning.

6. Governance & Public Welfare

We envision an India in 2050 in which the memories of the license-quota-permit raj of the 1960s and 1970s and the sanctimonious attitude of the economic development bureaucracy, have been wiped clean. We envision an India in which every bureaucrat is judged by its contribution to sustained increase in productive employments and every action that slows economic growth is recorded.

A socialist bureaucracy, which was once notorious among the large countries, will hopefully have replaced Singapore as a model of uncorruptible, efficient and helpful bureaucracy. The criminal penalties in 26,400 economic laws would be reduced to less than a tenth and all

[39] ISROs experience in tele-education can be used to build a comprehensive education stack.

economic laws rationalised, reduced in number and integrated into 1/5th to 1/10th of current ones, on the pattern of the four Labour codes.

The tax bureaucracy, which was once considered the worst among the bad will run the simplest, most rational system in the world, in which few need help from their CA or lawyer, to file tax returns. The Income tax Act will have been reduced from 23 chapters and 298 sections, to a Direct Tax Code with few tens of pages, which will be studied and emulated across the World. The GST will be so simple efficient, that it will be studied in management courses in US ivy league colleges. The customs tariff will be a uniform tariff of 5% among the lowest in the World. Even agriculture will have become so efficient, that it will not need special protection in the form of QRs and higher tariff rates.

India will be among the top 10 in terms of Ease of Regulatory compliance, Ease of doing business and ease of living.

6.1 Government Stack

A comprehensive digitization of all rules & regulations, forms compliance procedures will greatly facilitate this process. This will integrate compliance and eliminate duplicate filing of the same information to different levels of government and different departments of government and different regulators. Random post-filing audit of regulations. Incentive compatible, integrated tax-welfare system (NIT). Digitization of laws, judicial services, judgements, arrest, prosecution and conviction data bases, prison population is an important element of institutional reform. The digitization of governance will have to be complemented by modern management, processes re-engineering, development of technical capabilities & acquisition of new equipment,[40] covering; (a) Laws, Courts, Judiciary, (b) Policing, Investigation, Prosecution. (c) Prisons.

There are multiple, diverse, uncoordinated efforts at digitisation of Govt- public interaction at Union and State level, with each effort having to start from scratch and progress through learning by doing. These can be accelerated by reducing the cost and effort needed, by the provision of an Application Programming Interface. The "Universal Governance Interface (GPI)," would act as the foundation, for the interaction between government departments and the public, and also among different levels & departments of Government. This would be a

[40] E.g., DNA labs, finger printing, recording of statements.

quantum leap in ease of living and ease of doing business, comparable to the UPI in the financial sector.

6.2 Poverty and Distribution

Absolute poverty ($1.9/day/person) has been virtually eliminated in India. Poverty rate as defined in Lower middle-income countries ($3.2), will be brought down from 21 % in 2022-23 to 8% (14.4% – 6%) in 2031 (Table 10). It will be virtually eliminated by 2035, through a net income transfer system integrated with personal income taxes. 100% coverage of Aadhar number will ensure that neither a single person (man, women, or child) is left behind, nor a single income earner fails to pay his/her due share of taxes.

Table 10: **India's Poverty rate (HCR), based on Consumption**

Poverty in India: Head Count ratio (HCR)						
				BBV (**2019-20**)		
	2011-12	**2022-23**	**Change**	Avg	GDP	SDP
Absolute ($1.9/day)	12.5%	2.0%	-10.5%	1.8%	1.4%	2.2%
Low-Middle Inc ($3.2)						
Total	53.6%	21.0%	-32.6%	20.9%	18.5%	23.3%
Rural		25.0%				
Urban		12.0%				
Gini Co-efficient						
Total						31.4
Rural	28.7	27.0	-1.7			
Urban	36.7	31.9	-4.8			
Note: International poverty lines as defined in 2011-12 prices & exch						
Calculations by Surjit S Bhalla (Feb 2024) and BBV (2022)						
Data source: NSS, HCES 2011-12 and 2022-23						

Poverty as defined in upper middle-income countries will be eliminated in India, by 2050, through a combination of higher per capita GDP and a more efficient tax-transfer system. This has three implications: (1) That the anti-poverty programs have worked, and it is time to shift the focus of Welfare polices from basic needs to empowerment of the lower middle class (both actual & potential). (2) States need to focus much more on urbanisation, and key elements of the urban economy, such as availability of non-slum based, rental housing, public transport and worker housing in industrial estates/factories. (3) The quality of schooling and job skilling needs to be greatly improved to facilitate upward mobility of workers. (4) We need to incentivise the provision of information and knowledge to micro (self-employed) and small entrepreneurs, to upgrade their management skills & technology.

The traditional method of measuring the effect of welfare policies on consumption/income distribution is to either use a summary measure like Gini coefficient, or to look at the cumulative distribution of consumption/income. Several analysts have shown that the Gini measure of consumption distribution has improved between 2011-12 and 2022-23, for both rural and urban areas (Table 11).[41] As the latter measure has been neglected, in this paper we examine the cumulative distribution of consumption for these two years. The cumulative distribution for Urban consumption for 2022-23 consumption distribution stochastically dominates that for 2011-12.[42] The same is true for the distribution for rural consumption except at the 20% to 30% decile of consumers (Table 11**).** Most likely reason for this is, the poor-quality education in State's rural schools (primary and secondary), coupled the paucity of opportunities for acquiring job skills. There is great scope for expanding E-education and e-skilling to reduce the rural-Urban quality gap.

The data also shows that the ratio of consumption of the top 5% to bottom 5% of consumers has declined from 8.6 to 7.3 in rural areas and from 14.7 to 10 in urban areas Between 2011-12 and 2022-23. Measures which could improve this further are, (1) Reduced protection of tradable goods produced by selected capital-intensive industries, through high tariffs, (2) Better design of auctions for leasing natural resources (minerals, oil & gas, spectrum), keeping in mind that the reserve price for many resources may be zero, and that additional levies, fees & charges may make the auction price negative.(3) Better design of subsidy auction for public goods infrastructure coupled with introduction of benchmark competition to measure performance. (4) Leveling the playing field for SMEs and Startups vis-à-vis Corporations by simplifying taxation & regulation. [43]

[41] Authors calculations, based on the decile distribution given in HCES, shows that the rural Gini declined by 5% points and the Urban Gini by 9% points.

[42] There is statistical dominance if the cumulative consumption distribution for 2022-23 is better than the cumulative consumption distribution for 2011-12 for each cumulative share of population.

[43] Educational mobility in India was low during 1940-1985 with average intergenerational corelation in educational attainment of 0.52, suggesting significant persistence. Intergenerational mobility has however increased at the lower end of the father's educational distribution but has decreased at the top end of the distribution. Education relative mobility has increased for girls but is tangent for boys. There is a significant trend convergence in education levels, occupation distribution, wages and consumption levels between SC/ST towards non-SC/ST between 1983 to 2005. Intergenerational income persistence rural India is lower compared to other developing countries (1994-2012). The between cast co-efficient also indicate that India is slowly progressing towards cross-caste equality. Genicot, Ray & Concha-Arrigada (2024), "Upward mobility in developing countries,"

Table 11: Cumulative Consumption Distribution

Cumulative consumption distribution				
Share of	Share of Consumption -cumulative			
Consumers	Rural'11-12	Rural'22-23	Urban'11-12	Urban'22-23
0.00	0.00	0.0	0.00	0.0
0.05	0.02	0.02	0.02	0.02
0.10	0.05	0.04	0.04	0.04
0.20	0.13	0.10	0.09	0.09
0.30	0.17	0.17	0.13	0.15
0.40	0.21	0.24	0.17	0.213
0.50	0.32	0.32	0.26	0.290
0.60	0.37	0.41	0.31	0.378
0.70	0.44	0.52	0.37	0.479
0.80	0.59	0.63	0.52	0.597
0.90	0.68	0.78	0.62	0.745
0.95	0.80	0.86	0.75	0.840
1.00	1.00	1.00	1.00	1.00
Source:Authors calc based on decile distribution in HCES(2024)				

6.3 Welfare Stack

India's welfare system reflects the complexity of the constitutionally defined division of subjects and powers between the Union and State Governments and the interests of different ministries and departments charged with promoting social welfare. There are 250 to 350 different State & Central Govt programs at the district level, designed to help the poor and needy in different ways for different problems, yet many do not get the benefit of even one program while many others get away with multiple undeserved benefits. A *Welfare Stack* would put all these programs on a digital platform where everyone can see what these programs are, and for who! An Aadhar ID linked, virtual Integrated Smart Card (VISC), layered on top of the base, would show the eligibility of each person for all the programs in the Stack.[44]

The next step would the creation of a *Direct cash transfer* system (*DCT*), which can deliver cash in the hands (mobile wallet) of any citizen hurt by an epidemic, natural or manmade disaster as soon as those affected by the disaster have been identified.

The final phase of simplification would be an incentive compatible, *Net income transfer* system (*NIT*) integrated with the personal income tax system in which adults with an income below a certain threshold, receive a payment based on how far they are below this threshold. Such a

[44] Including free schooling and health services provided in State govt primary, secondary & tertiary health centers and primary and secondary schools. To ensure the security of the Aadhar number and the uniqueness of the VISC/Welfare Identification number of the person, it will be linked to the Aadhar number in the data base.

negative income tax could start at an income of 1 lakh with 10% and increase to 20% below Rs 75,000 and 30% below 50,000.[45] The Aadhar provides a unique identifier to bring all adult citizens into this integrated NIT system, though a PAN/WIN (welfare identification number) could be used in public domain to protect safety & security of Aadhar.

6.4 Public Health

The framers of the constitution used the principle of subsidiarity to create the State, Concurrent and Union lists of the constitution, and rightly put, "*Public health and sanitation; hospitals and dispensaries*," in the State list, leading to the creation of State run Primary health centres (PHCs), Secondary health centres(SHCs), and Tertiary health institutions There is however a peculiar disconnect between the academics & health experts and the State Govts. In the 75 years of independent India the former have seldom held the latter accountable for health outcomes in the State![46] The result is a neglect of public health and a state of peoples health which is inferior to what it should be for countries at our level of per capita GDP.

Numerous research studies have shown that the big gap in Child malnutrition (stunting, under-weight) between India and other lower middle -income countries (LMICs) is due to poor sewage and sanitation systems, such as in slums and small towns. Most of these studies have used open defecation as a measure of access to and quality of sanitation/sewerage. In our cross-State analysis based on data from NFHS 4 and 5, we use a number of other measures of access to, and quality of, the sanitation system such as unimproved sanitation facility, use of shared and unshared facilities, which are, or not, connected to a piped sewer line or septic tank. The results confirm that open defecation is a significant factor in explaining Cross- State variation in child (under 5 year) Stunting (height for age), Under-weight (weight for age) and Wasting (weight for height), and that the quality of the sanitation system (unimproved sanitation facility and shared facility maintained by public bodies old) also matters (Table 12). Further, Per capita income (PCNSD) is not significant, for child malnutrition when we use first differencing to control for unobserved variables.

[45] Like the income tax, the income transfer would be individual, not household/family based. Eventually there could be a bonus payment for up to two minor children, added to the mothers' net income transfer.

[46] The same applies to Education and other social services entrusted to the States (like relief for disabled & unemployed)

Table 12 Sewage & sanitation as determinants of Stunting, Under-weight and Wasting in India

Regression results for stunted, underweight & Wasted						
	Dependent variable			Dependent variable: 1st differe		
Independent variables	**Stunted (ht/age)**	**Underwt (wt/age)**	**Wasted (wt/ht)**	**Stunted (ht/age)**	**Underwt (wt/age)**	**Wasted (wt/ht)**
(S.E. in brackets)						
Open Defecation+unimproved sanitation		0.56	0.307			
SE		(.090)***	(.064)***			
Open Defecation	0.24			0.12	0.18	0.11
SE	(.090)**			(.035)***	(0.029)***	(.036)***
Shared facility(Flush toilet to sewer system/septic tank)				-0.96	-1.14	-0.96
				(.29)***	(.25)***	(.30)***
Per Capita net domestic product(PCNSDP)	-0.0000303		0.000023			
SE	(.000016)*	ns	(.000011)*			
Constant	32.19	17.71	9.77			
SE	(2.65)***	(1.71)***	(2.077)***			
R squared	0.404	0.601	0.474	0.448	0.669	0.420
Adjusted R squared	0.356	0.586	0.432	0.406	0.643	0.375
No. of observations:	28	28	28	28	28	28
Source: NFHS 4(2015-16) & NFHS 5(2019-21).						
Note: * =p < 0.10; ** = p < 0.05; ***= p <0.01. PCNSD is not significant in the difference equations						

We need a quantum leap in urban and semi-urban *sewage collection*, processing and recycling systems, to eliminate this gap and reach Upper Middle Income country standards in drinking water, sanitation & sewage systems (column headed 2031-32 & UMIC, Table 13Table 13).

There are three key public goods needed to make Bharat look & feel like an Upper middle income (UMIC) or developed country (HIC): A national water grid, a national solid waste grid and a national sewage grid. The National Water grid should ensure enough water for all consumers, everywhere in the country at all times. The national solid waste should be designed for universal collection and recycling of solid waste. The national sewage grid must ensure sewage systems in every city and town in the country, collection of sewage (including from septic tanks) and its processing and safe disposal.

Table 13: Public Health Basics – Drinking water, sanitation & Sewage

	Table: Access to Public Goods & services (% of population)					
		India		Predicted value of Indicator		
		Gap	Actual	2022	2031-32	2047-48
				India: $7096	UMIC: $11500	HIC: $30500
	Least Basic Drinking Water (%)					
1	Total	6.9	93.3	86.4	94.1	
2	Rural	12.9	91.9	79.0	87.9	
	Safely managed drinking water (%)					
3	Rural	24.1	66.0	41.9	53.9	78.1
	Least Basic Sanitation Services (%)					
4	Total	6.9	78.4	71.5	84.3	
5	Rural	10.9	74.9	63.8	76.5	
	Safely managed Sanitation Services (%)					
6	Total	6.2	52.1	45.9	55.5	74.9
7	Urban	-3.9	42.7	46.6	55.4	73.5
8	Rural	23.9	57.4	33.5	42.9	70.7
	Open Defecation (% of pop.)					
9	Total	3.7	11.1	7.4	3.1	
10	Urban	-1.9	0.6	2.5	1.3	
11	Rural	4.7	17.0	12.3	6.3	
	Hand washing facilities (%)					
12	Total	13.6	76.3	62.6	75.8	
13	Rural	13.4	70.0	56.6	69.1	94.5
	Data: World Development Indicators (WDI), 2022					
	Predicted value is estimated from a regression,					
	with Gap = Actual-predicted					

Life expectancy at birth is a summary measure of health outcomes. Life expectancy for males is commensurate with our per capita GDP, but female life expectancy is lower than predicted by the cross-country regression. This is likely due to high female mortality rates (Table 14). This is in turn partly due to women's health emergencies not being taken as seriously as those affecting males. The quality of health care provided to women can be upgraded by use of Expert systems by educated family members and informal health providers. This is particularly important for rural areas. We need to correct these gaps in life expectancy and mortality, and reach (or exceed) the levels indicated under column headed UMIC by 2031-32 and those under column headed HIC by 2047-48

Table 14: Health outcomes – life expectancy and mortality

	Life expectancy & mortality in comparitive perspective					
		India		Predicted value of Indicator		
		Gap	Actual	2021	2031-32	2047-48
				India: $6677	UMIC: $11500	HIC: $30500
	Life Expectancy at birth (yrs)					
1	Total	-1.0	67.2	68.2	71.2	76.5
2	Male	0.1	65.8	65.6	68.6	73.8
3	Female	-1.9	68.9	70.8	73.9	79.4
	Mortality (Nos per 1000)					
4	Infant	6.8	25.5	18.7	12.2	5.6
5	Male	6.6	254	247	211	147
6	Female	19.0	186	167	136	79
	Undernourishment (% of pop.)					
7	Total	7.3	16.6	9.3	6.4	3.3
	Data: World Development Indicators (WDI), 2021					
	Cross country Regression of each indicator on PCGDPppp(2017$)					
	Predicted value is from regtression: Gap = actual -predicted					

6.5 Digital Doctor (E-Vaid)

Telemedicine will play a central role in providing quality health services to India's huge population. This will include, (a) Direct to Patient diagnosis & medicine delivery, (b) Knowledge resources for public & private doctors/clinics/hospitals, (c) Direct to patient (DTP) diagnostic & prescription services and delivery of medicines. (d) Hybrid Primary health centres (pathology, X-Ray, ultrasound), Secondary Health Centres (CT, minor surgery), Tertiary Health Centres (MRI, major surgery, rare disease).

There is wide disparity in the quality of advice provided by private health providers, with rural health providers much worse on average, including the giving of health prescription which make the disease worse instead of improving it. Though the average quality of advise provided by the public health system is somewhat better, particularly for severe diseases, there is also a wide variation in quality. Both types of health providers could benefit greatly from the availability of a multilingual digital doctor that can help all health providers from the level of chemist to the GP, to improve the quality of diagnosis and treatment that they provide. The data bases for such expert diagnosis & treatment already exist in the advanced countries and to a lesser extent in India. The Union and State govts should join together to create an NGO with the mandate to create and maintain such an expert AI doctor for the 1.4 billion people of India. This could transform the health of the average Indian within 5 to 10 years.

India will pioneer the development of a **Health Stack and a Public Health Stack**. A health stack is a unique innovation for public private cooperation, in which government funds the design and development of a public good infrastructure for digital health, on which the whole range of health, medicine and medical equipment can over lay their products and services.

The Pandemic has also alerted us to the need for a *Public health Stack*, which will mirror the health stack or be a specialized sub-set of it, focusing on Public health issues. The Epidemics Act of 1987 also needs review and overhaul to deal with future epidemics. The disaster management act is more suited to disasters which cause physical damage to humans and property.

6.6 Community & Social Stack

Social Media is playing an increasing role in shaping society in terms of both short-term socio-political discourse and expression of conflict and in terms of long term mental and social development. India democratic society must not only regulate this medium but also provide the infrastructure for a healthy positively directed alternative to a commercial, profit driven media. We envision an Indian developed, multicultural, multilingual, multireligious, gender neutral and child safe Social Stack, based on the best of Indian community and family values. A social media or community media stack, which uses Aadhar ID based system for secure online interaction as well as Hybrid social spaces where social groups can meet offline.[47] Private sector can use the SM stack to build layers of social media and physical spaces for different age groups (minors, youths, adults, aged) and interests (intellectual, emotional, social, spiritual/moral, physical, mental).

7. Digital Economy: Expert System AI

India is on the verge of a Digital revolution. This revolution is transforming the nature of consumption, production, work and social relations. From our perspective the revolution can be used to eliminate the tyranny of geography (remote & hilly areas), gender disparity (skills, work differentials), inequality in quasi-public goods (rural-urban education-health quality) and information asymmetry (formal-informal firms, govt – citizen).

We envisage India is one of the foremost digital economies in the World by 2050. India's large population, provide an opportunity to pioneer the development of *hybrid online-offline*

[47] Non-resident foreigners, who are ineligible for Aadhar could be issued a unique ID number (UIDg) based on a recognized passport or other recognized international document.

(Phygital) systems for education, health, skill development & job matching, government services, finance, and business services. Expert systems already exist for transforming the quality of education and health in rural areas. Combined with specialised AI, specialised data bases, they can make urban quality services available to rural areas, and international quality services available to the smallest towns. Social entrepreneurs will play a key role in delivering quality services to the rural areas, and scaling up successful social projects, with the support of State Governments and digital public infrastructure (DPI).

Regulatory systems & regulators for Digital economy: Data Privacy, data security, safety from (sexual) predators, hate speech/incitement to violence/murder/mas murder, information warfare (countries, non-state ideologues), global mafias/drug cartels. The economics of digital economy has features, not seen in Goods and services, or even in the financial economy, such as economies of scope, network externalities and psychological control & information warfare. Regulatory rules must ensure against these dangers and the development of sectoral oligopolies and service monopolies.

Public goods infrastructure for digital economy: Bharat Net (fibre optic system connecting every village of India) will play a critical role in equality of opportunity and inclusive growth. Private mobile footprint will soon cover 99% of land and exclusive economic zone and provide digital data services to mobile workers & consumers outside their habitation and fixed workplaces. The government will develop the soft infra based on open architecture (like India stack, Fin Stack, UPI, Health Stack, Knowledge stack), to provide a level playing field to millions of Indian tech entrepreneurs.

There must be a Public information centre in every village in this country, connected through a fibre optic backbone reaching every district in the country, so that every citizen has web-based access to National and international information bases, data, and knowledge bases. These centres will provide universal digital access to government services and health & education services on a fair and equitable basis. They will also provide connectivity to business and individuals on a commercial basis.

7.1 Digital regulation

The economics of digital regulations has revealed four important elements relevant for regulation of the digital economy. (1) Economies and Scale and scope are much deeper and broader than in the bricks and mortar economy. (2) Network externalities are unique to telecommunication systems and the digital economy. (3) Data is a unique natural resource, (4)

Algorithms can give the illusion of being neutral and more objective than human beings, but can be as much if not more biased, while being undetectable. These four elements raise the possibility of multi-product, multi-service monopolies, stretching over multiple countries. Independent professional regulation is critical to ensuring competitive markets, without stifling innovation.

7.2 Skills exchange

Informal labour markets work through personal contacts and connections. A modern economy requires a better matching of job requirements with education and skills of potential labour force. Private intermediaries are good at matching upper-level jobs to skilled personnel. There are a range of jobs where a digital employment exchange is a necessary condition for equality of opportunity, particularly for tribal, Dalits and other social groups, who are not part of legacy networks.

Such groups are particularly handicapped if they are subject to oppressive social traditions in villages and rural areas. Social constraints have worked even more strongly against female employment as rural women have withdrawn from labour force as family income increases. Even educated and trained urban women have low labour force participation rates compared to urban males. Propagation & proliferation of the "work from home" digital economy can help them get around discriminatory social norms, practices & biases facilitating their entry into the labour force. It will also improve the incentive of discriminated groups to acquire job skills, digitally. Training/skilling will be key to Increasing long term labour force participation rates (LFPR) of rural groups. A digital employment exchange will help gain access. Further reform of labour laws, rules, and procedures to facilitate work from home will also be necessary.

The Union govt has created an E-Shram portal for informal workers and an Skill India portal for skilling and matching of supply and demand for skills. It is in the process of integrating these functions at different levels. There are also numerous private efforts for skilling and job placement, of differing quality. There is a need for a universal interface for skill generation and skill matching to user demand, on which the private sector can compete and innovate while maintaining so minimum quality standards.

7.3 UFI, Fin-stack and Finternet

We envision an India as a leading provider of FinTech, including Mobile wallets, mobile accounts, deposit & loans, Insurance & pensions, Financial & wealth management services, Investment advisory. Regulations must balance the need to stimulate innovation and protecting

the interests of less informed savers. Publicly driven innovations like *Universal Financial Interface* (UFI) and *Financial stack* and *Finternet*, will accelerate innovation by promoting competition. The last envisions the creation of a digital public ledger for all tradable assets, starting with all those which already have some govt or other registration system (like land or property) but are not listed on any financial exchange.

7.2.3 Digital Market Interface or Market stack

The central govt has created a marketplace for purchase of goods and services by Central and State Govts and their subsidiary organization and Public Sector Enterprises. The ONDC has been created in parallel. These could be integrated by creating a Universal Market Interface (UMI) or Market stack for e-commerce. The EGOM could then be an upper level on top of the market stack, built on the foundation of a UMI. Such a platform can be viewed as public goods infrastructure (open access, neutral), on which MSMEs, farmers and service providers from the remotest corners of the country can market their products competitively. Geographically branded products will be supplied to nation & world.

Another sub-set of the digital marketplace would be a marketplace for social services, including online management & business services (Front, Middle and Back office), Professional services (fintech, architecture, data analytics), Social services (health/medical, education/skilling, welfare) and technical services.

8. Green Economy

India has a holistic approach to Carbon emission driven Climate change. This issue and its potential solutions are characterised by enormous risks and large uncertainty. Given the limitation of resources of a lower middle-income country, the best way to reduce risk is to distribute these resources in a wide variety of possible carbon mitigating solutions. These range from renewable energy to replace carbon intensive oil, energy efficient design of housing machines and urban areas and life style changes promoting healthier, water & energy efficient foods like millets viz rice & sugarcane.

We envision a green economy in 2050, in which economic development during the next thirty years, creates energy efficient, carbon neutral and low environmental polluting designs for everything. We also envision the Developed countries training, financing a generation of Indian youth to create environmentally efficient designs and to implement through thousands of start-

ups. These start-ups will not only implement these designs in India, but also propagate them to the rest of the world.

The "throw away" consumer economy that developed with mass consumption will gradually move back to one in which consumer product design is more modular. Products will have sub-systems which can be replaced when they become technologically obsolete and those which will continue to be used because they are very carbon intensive or energy intensive to produce & replace. The repair and maintenance services which play an especially important role in poor countries but have virtually dis-appeared from the rich countries, will make a comeback. India will become a leader in modular green product design, and they will attain economies of scale and scope, in India's vast rural market.

The primary incentive for promoting a low carbon, less polluting economy will be a new Carbon Tax, separate from the three core taxes (income tax, GST and customs tariffs) which will replace the excises on petrol, diesel and other polluting substance.[48] Conceptually this will provide the funding for promoting de-carbonization, pollution reduction and energy efficiency programs, as well as rural digital connectivity, which will help substitute physical movement (transport) with digital interaction. An independent professional environmental protection agency will be set up to calculate the carbon content and polluting load of different goods, based on which the tax will be imposed.

Food and water are an important element of India's green economy. This requires a move from excessive consumption of impure water intensive crops like sugar and polished rice & wheat to less water intensive & healthier cereals like millets. Water conservation, saving & recycling are also important elements of a holistic view of ecology, environment and climate change.

7.1 Transport

There has been increased focus on Mass transit systems and Electric Vehicles (EVs) during the last 10 years. Substitution of physical transport by online transaction, service delivery; The shift of entertainment from physical theatres to online & social media, and work from home, will reduce the energy used in transport. Similarly offline shopping to online ordering will reduce transport use through optimised delivery systems. So will online delivery of government, education, health & other services. Innovation in production, storage and use of

[48] Once the carbon tax is imposed, normal GST will include petrol and diesel at the single standard GST rate applicable to 75-85% of goods and services.

hydrogen will bring down the cost of using it in industry & transport in which grid electricity cannot be used.

7.2 Energy

The capital cost of renewable energy (Solar, Wind, sea wave) is now about half that of fossil fuel plants, which in turn is about half of nuclear plants, The variable cost of renewables is of course a fraction of fossil fuels and nuclear, but it requires large storage, to even out the daily and seasonal fluctuations in availability of sunshine, wind & waves, so the delivered cost is higher, but still cheaper than fossil fuel plants. Further, decentralized production and use of solar energy in villages and remote hamlets, will reduce electricity transmission and distribution losses. Solar industry, including repair and maintenance services will become an important industry in the sunny, water stressed rural areas of India, having poor land quality. The solar revolution however awaits a dramatic reduction in storage technology, which will cost effectively even out the large fluctuations in production, allowing efficient matching to demand peaks and elimination of more flexible but higher carbon fuels.

7.3 Urbanization

Urban administration is limited to statutory towns, which constituted 84.5% of urban space in 2011 census. Census towns constitute another 14.4% of Urban space. Outgrowth or regional arteries of urbanisation are estimated to constitute 1.1% giving a total urbanisation of about 31.1% in 2011. Current estimates put this at one-third to 36%. Urbanisation is likely to increase progressively over the next 10 to 20 years.

Urban land-use policy has to be supportive of the growth of economic activity, with design of work, residence, and social activity to minimise transport and energy consumption; Due consideration has to be given to Urban gardens & greenery to minimise carbon load. “Natural Cities” have been suggested to accommodate structural migration from rural areas to urban agglomerations. Semi-urban areas & small towns located on, or near rivers, could be transformed into Natural cities of 1.5 to 2 million population. Urban design based on local geography, weather patterns and locally available traditional housing materials is a climate imperative.

7.4 Housing

Design of mass housing, offices and factories and the construction industry has developed and propagated from an era in which there was little consideration for local climate or geography. As India is virtually at the start of the journey for mass housing and commerce, it

can pioneer design based on local materials and climate/weather conditions, married to modern technology such as Solar roof tops, smart sensors & energy controls.

7.5 Circular Economy: Re-cycling

Life style for environment (LIFE) is an important element of India's holistic approach to Green economy. Recycling of Water, sewage, physical waste; national grids for each. Cleaning of all rivers and water way (including those on which "Natural cities" can be built), to make them suitable for drawing drinking water. Chemical units generating polluting liquid waste to be in estates, where norms can be strictly enforced, and common water treatment facilities set up for efficient processing. Waste collection, processing, and recycling will become a significant industry, with e-markets for different types of waste. Consumer durables design will return to an era when it was repairable and re-usable.

7.6 Environmental Regulation

Environmental regulation has been heavily politicized and tied up in legal wrangling. A professional *Environmental Protection Agency* needs to be set up which collects data, tests hypothesis, and provides scientific analysis of benefits and costs of different regulatory choices. The mandate of this agency must be carefully defined. This will help ensure that administrative and judicial decisions are based on professional advice rather than speculation and motivated public campaigns.

7.7 Green Stack

There are many diverse, but interacting elements of the Green economy. To ensure co-ordination and identification of gaps, India will build a Green Stack, on which all element of the green economy will be featured. This includes markets for green designs, green products, and green services. This would include an insurance market for climate related events, disaster monitoring and management systems, open access Government and non-profit systems for disaster relief, and disaster relief organisations to facilitate recovery, Alternatively, it could be a sub-stack within the knowledge stack.

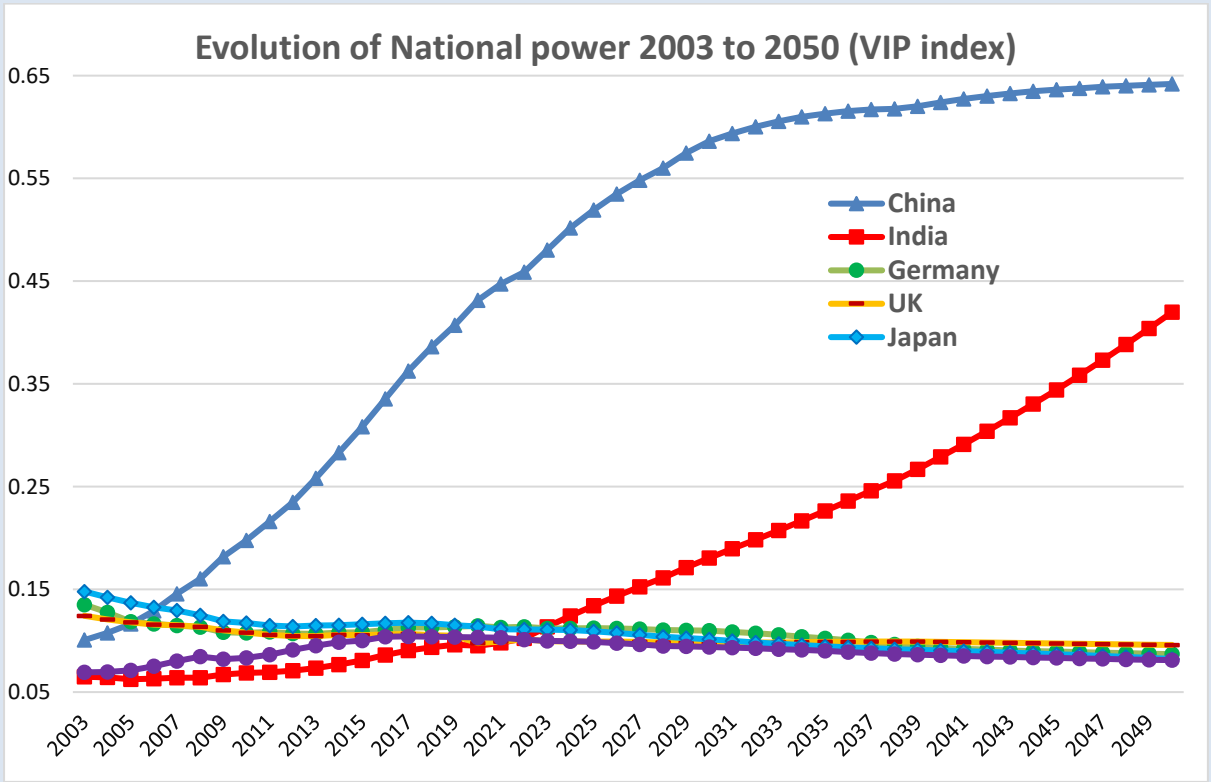
9. India as a Civilizational Power

In economics there is the concept of "Duopoly with competitive fringe", in which the two firms in the duopoly jointly set prices and competitive fringe are pure price takers, with no market power. We envisage a World in 2050 that can be described in 2035, as "*Bipolar World with Multipolar Rim*" and in 2050, as "*Tripolar World with Multipolar Rim*." This is based on

the author's index of National power, VIP, which is an exponentially weighted index of economic power (VIPe) and Military power (VIPm).[49] The projected evolution of economic power (VIPe) was shown in **Figure 6** .

In contrast to economic competition, there are four separate dimensions of inter-country competition: Geoeconomics, Technology, Military and Geopolitics. We envisage the World in 2035 will be a geopolitical version of this concept, with USA & China constituting the bipolarity which dominates other competitors in all four domains, and the "multipolar rim" consisting of 5-6 countries, having a high rank and influence in one or more domains. For instance, Japan, Germany, India, UK, France will be among the 6 largest economies; India, UK, France, and Russia are nuclear powers. Russia's economy & general technological base is much weaker than that of Japan, Germany, UK, and France, but it has a large legacy/reservoir of defence technology. An evolution of this index for major powers is shown in Figure 16.

Figure 16: National power as measured by VIP index



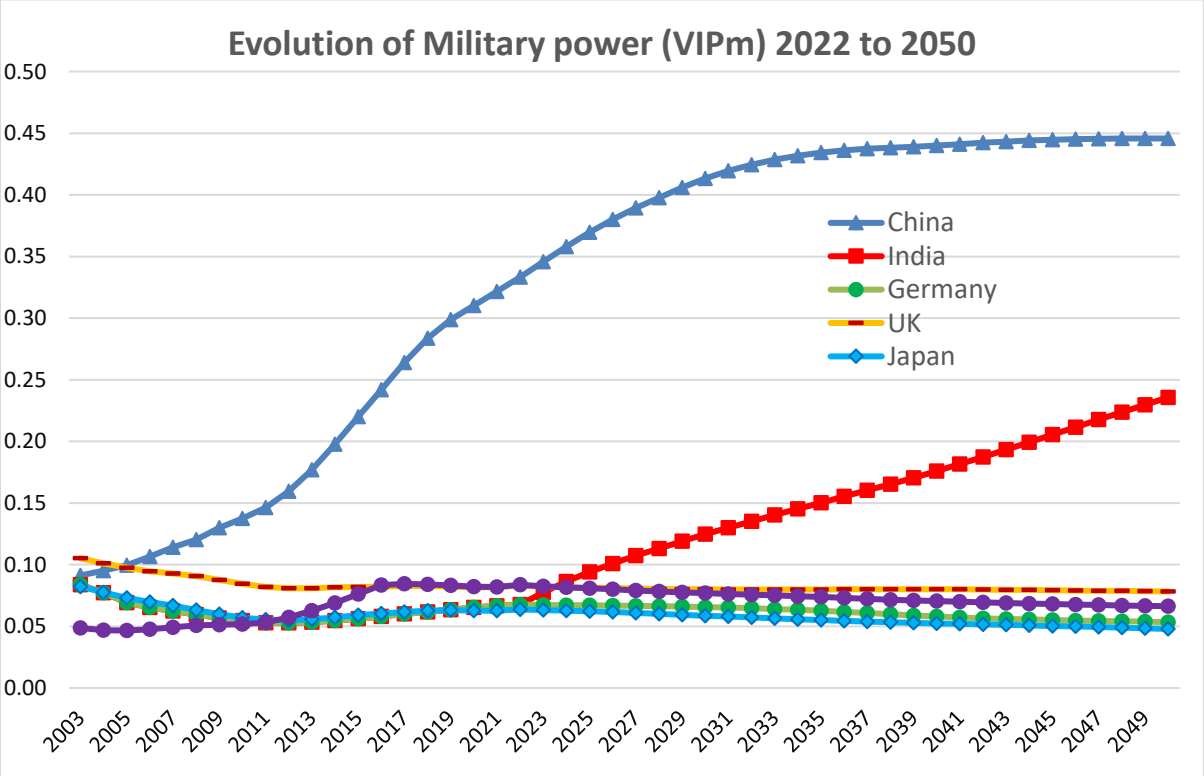
Source: Authors calculation based on WDI and SIPRI data.

[49] VIP = (VIPe^0.5) * (VIPm^0.5). VIPe = [Y/Yus)^0.5]*[(y/yus)^0.5, Y = GDP PPP,; y = PcGdpPPP = GDPppp/population. VIPm has a similar structure to VIPe but is based on budgeted expenditure on defense as given in SIPRI. VIPm is based on a measure of the capital assets and non-capital assets of the Military, excluding nuclear assets.

8.1 Defence & Deterrence

India's technological base and defence technology base is envisioned to rise rapidly over the next 15 years, to establish multilevel deterrence against aggression and foreign terrorism. The levels include border encroachment/acquisition and terrorist infiltration(L1), limited war in border region (L2), Deterrence of Restricted (military bases in border States) war (L3), Deterrence of Conventional war (L4), and Nuclear deterrence (L5). We envision a defence capital budget which will rise to 1.5% to 2% of GDP to make this financially feasible, a Defence R&D commission which will develop strategic technology (AI) and new weapons systems and a reformed higher defence management structure which will mould and organise human resources and weapons into cost-effective deterrence at each level. Remaining obstacles to private production, marketing and export of dual use products and defence systems will also need to be eliminated. The projected evolution of military power, as measured by the index VIPm, is shown in Figure 17.[50]

Figure 17: Military Power as measured by VIPm



Source: Authors calculation based on WDI and SIPRI data.

[50] VIPm is based on a measure of the capital assets and non-capital assets of the Military, excluding nuclear assets. Ideally the capital expenditure would be converted into defense assets and used separately from the defense revenue expenditures. As these are not available separately from SIPRI, the totals are used with a higher depreciation to create a virtual defense asset series, using a higher depreciation rate than would be applicable to Capital expenditures.

8.2 Bipolar World with Multipolar Rim

A "Bipolar World" with a Multipolar Rim will emerge by 2035. It will resemble the Bipolar post-war World to some degree, but most closely with respect to technology because of "technological decoupling.". The multipolar rim will include Japan, UK, France, Russia, Germany, and India. The EU can also become an important member of the competitive Rim, because of geoeconomics strength and authority over economic, trade and technology policies of member States. It must, however, resolve the contradiction arising from the independent geo-strategic and geo-political role of France, Germany, and other large members of EU. Other large economies like Republic of Korea, Canada, Australia, and Taiwan will also play a role in technology and investment.

8.3 Tripolar World with Multipolar Rim

We envisage the emergence of a "Tripolar World with Multipolar Rim", by 2050. India is projected to catch-up with China, by closing the per capita GDP gap that opened during the 30-year period, 1992-2021(figure 3 & 4). Economic growth will generate the revenues needed to close the Strategic technology gap. One reason for the huge gap is the "open arms, closed eyes policy," adopted by the developed countries towards the Peoples Republic of China, during 1980-2010. These countries can now play an important role in helping India close the technology gap, through equally generous partnerships.

Considerable progress will be made in developing an Indian private military industrial complex by 2035. Cooperation with free market economies with a large private defence sector like France, Israel, UK, and USA will play a key role. Development and production of "dual use technologies", needed for the civilian and defence sectors, need to be jointly planned and coordinated to maximize Atman-Nirbhar. By 2050 India will have full-fledged private military industrial system which partners with the private military industrial US companies, on a near equal footing. India's defence public-sector will continue to partner with country like Russia with much of defence production in its Public sector.

The efficiency and comprehensiveness of technological and digital firewalls and extent of economic decoupling, between, (a) The Peoples Republic of China & its allies & partners, and (b) The USA & its allies and partners, will determine whether USA or China is more powerful (economy, military, technological) in 2050. China has grown much faster than any expert predicted, because none understood the nature and import of the asymmetric, economic, trade, technology, and investment policies it adopted. These non-transparent policies allowed PRC to extract rents from rest of the world and thus contributed about 1/3rd of the growth during 1980-

2010. These rents can be eliminated by technological decoupling and the creation of viable competition for PRC's export monopolies through supply chain diversification. India can catch up faster, if the labour-intensive supply chains and human skill intensive value chains, are incentivized to move to India by the USA & its developed allies.

8.4 Diplomacy

India's National interest is being clearly defined and its national security and economic growth goals more clearly integrated into Indian Diplomacy. This will continue to improve and be better translated into foreign policy and actions. Every country has multiple goals, some of which translate into actions over time and geography that appear inconsistent or even contradictory. Values are important for India, but its preferable to pursue them quietly and persistently outside the media glare, then to hypocritically criticize enemies and adversaries, while tacitly condoning more serious violations of values by allies. National interest must take precedence, but philosophical values should not be abandoned or forgotten.

The role of the QUAD in Indian Geopolitics and Geo-economics is envisioned to rise during this decade, plateau in next decade, and decline in the third. With Africa and Middle East's share of world population rising, the importance of Indian Ocean will increase rapidly during the next decade. India's historical ties and legacy must be enhanced and developed to promote peaceful development of this expanded IOR region.

India cannot match PRC's financial advantage in geo-economics and geo-politics. We must use one critical advantage which we have. The Chinese communist party has wiped out Islam from PRC and committed genocide against the Uyghur. In contrast, India is among the handful of countries in which the percent of Muslims in total population has risen decade after decade for 70 years. This argument can and must be used when we go head-to-head with China in the 50 Muslim countries (including Indonesia, Malaysia, Bangladesh, Pakistan, Afghanistan, Nigeria). The narrative must also be addressed to Muslim populations in Christian countries.[51]

8.5 Civilisational State

The question is often asked, will India become like China? Seldom is the question asked, whether India will become like USA![52] The answer to both questions is neither. India that is

[51] The pendulum of religious division in India has moved from the far left to the right, but we envision it settling back to the center in a decade.

[52] If Western analyst had read an analyzed the statements of the Chinese Communist Party's leaders and understood its history, unfiltered by vested interests benefiting from Western ignorance, it would not be surprised. The same applies to India; Read and understand what rulers have stated for 75 years, instead of listening to vested interests who stand to gain from a biased approach.

Bharat, is a civilisational State which will neither be like USA the inheritor of European colonial traditions, nor like Communist China the inheritor of Han imperial traditions. A wealth of new archaeological evidence from the Indo-Gangetic plains, and modern genetic analysis of the genetic markers of different civilisations of the Eurasian continent, tells us why! When the Egyptian civilisation was building great monuments, based on funds & labour usually achieved through conquest, Bhartiya civilisation was focussed on building cities for its enormous population, developing craft manufacturing and trading both internally and with its North-Western and Western Neighbours. An estimated third of the Ancient World population was in India, a third in China, and the rest scattered over the rest of the World (Mesopotamia, Egypt, Persia, Turkey, East & Central Asia, Italy, Greece)

In an Era in which other civilisations saw glory in the conquest of neighbouring territories & enslavement of "other" peoples, Bharat's rulers were spreading Vedic culture, spiritual ideas and civilisation across the Indian sub-continent (from Himalayas in the North to Sri Lanka in the South, and from the Baluchistan desert in the West to Myanmar's hills in the East of Bharat.[53] An estimated third of the Ancient World population was in India, a third in China, and the rest scattered over the rest of the World (Mesopotamia, Egypt, Persia, Turkey, East & Central Asia, Italy, Greece)

India that is Bharat is built on a *Secular spiritual- social contract*, in which all the tribes of that time brought their Gods to the sacrificial fire, and agreed to accept the Gods of every other tribe, with each tribe free to worship its own god (or no God)! This "Hindu (/Indic) secularism" in terms of spiritual-religious beliefs, and peaceful co-existence with outside civilisation, is the foundation of the Indian Civilisational State.

In the economic sphere, India does not seek a monopoly or duopoly over manufactured goods production or manufactured exports. All it wants is to narrow the large gap between its fourth rank in production of manufactured goods, and its 15th rank in export of manufactured goods.

[53] Most internal wars between Rajas, Maharajas & emperors, were among those who accepted and promoted their favorite elements of Vedic spiritualist & principles, and all followed the rules of War prescribed by scholars and Gurus!

10. Policy Vision

After the 1990s reforms, there was a visible hiatus in the pace of economic reforms during 2004-2013.[54] The last ten years have seen a spurt of economic reforms designed to promote sustained, fast inclusive growth. Some of these reforms remain incomplete, others need to be refined based on outcomes, and others need to be thought through to address new challenges. This note highlights some of the policy and institutional reforms required in the next five years.

Four transformative reforms have been initiated but left incomplete. These are, (1) the four labour codes to unify and replace numerous labour laws, (2) the reform of agricultural laws, particularly those relating to inter-state and international trade in agricultural goods, (3) The strategic industrial policy for Privatization of Public sector enterprises, Public sector banks and financial institutions, and (4) Reform of Land laws to make acquisition for infrastructure development faster & fairer, through land pooling arrangements, and make it possible to change land use to promote structural change & productive growth. Once these are completed, the 2010 reforms will arguably rival the 1990s reforms, in scope and ambition.

Three new transformative policy reforms that will simplify and automate governance systems, and three uses of *AI expert systems* to dramatically & speedily improve the quality of education, skilling & job skill matching and health & wellness: (1) A dramatic simplification and integration of the GST, Income tax and Import-Export duties, to make payment, collection, monitoring of tax payments, and detection of evasion and corruption by a completely unbiased, expert AI system ***E-Kautilya***. (2) A Government Public interface (GPI) which integrates all intra-government (ministries/departments of Union & State govts) and government - public interactions, and allows a digital AI expert, ***E-Chanakya***, to simplify compliance with all economic laws, rules and regulations. (3) An AI judge named E-Manu, which dramatically reduces the cost and time for resolving litigation, (4) A digital AI expert system, ***E-Acharya***, for school education, which can help teachers to improve the quality of education and student with a wide range of abilities to improve their learning (5) A digital doctor, ***E-Vaid*** for diagnosis, prescription of medicines and refence for surgery or higher level evaluation, which will help the entire range of health providers from the compounder to the General practitioner in rural areas to the educated patient, to avoid health harming advice, and for India to dramatically improve the quality of health outcomes. (6) The eco-system for creation of job

[54] Despite the slow-down in the pace of reforms, economic growth was quite high during 2000s, because of the lagged effect of 1990s reforms. The effect of the reform holiday and loose fiscal monetary policy was felt2010-2014.

skills and the matching of demand & supply of job skills, is highly fragmented and underdeveloped in India. A number of successful efforts have been made by govt to improve job skilling. But a massive thrust, at multiple levels, is needed to create a Hybrid physical-digital system is needed to integrate this three-cornered market. The digital element of this will be an expert system AI***, E-Guru***.

Accelerating economic growth and sustaining it for three decades is the key to achieving the vision presented above. Faster growth is the source of higher revenues, which will fund the development of hard and soft infrastructure by the Government and provide the resources to create a Welfare system that takes care of the less advantaged. A competitive market economy in which monopoly infrastructure segments, and services characterised by asymmetric information or moral hazard, are rationally regulated, is a necessary condition for sustained fast growth. Government provision of public goods and an environment for competitive entrepreneurship and innovation will help sustain growth.

10.1 Controls, Regulations & Regulators

During the first 30 years of independence India developed a jungle of controls, restrictions, regulations, and procedure, which came to be known as the licence, permit quota Raj. There has been considerable de-control and liberalization since the 1980s, but its residue still exists in every law, rule, regulation, and procedure, relating to every subject and policy domain

As per the company named "Team lease Reg Tech," 1536 acts and rules, 69,233 compliances and 6618 annual filings are applicable to the average company. Of these, Labour accounts for 30.1% of the applicable laws and rules, 47% of the compliances and 68% of the provisions that carry clauses for imprisonment.

There are 54 Central acts, 945 compliances and 254 filings/intimations related to taxation and finance.[55] The Indian tax bureaucracy is notorious among free market, open democracies with the worst reputation among potential FDI investors. It fares very badly relative to our competitor countries. Simplification laws and rate structure will make it much easier to digitize compliance and monitoring systems and run them smoothly and efficiently to the benefit of both taxpayers and govt's tax revenue collection.

[55] There are also 62 State acts, 2339 compliances and 736 filings/intimations, which must be addressed.

The control mentality is deeply embedded in the public mind, and it will require Herculean dedication and effort to root it out. This must be complemented by economically rational regulations and well qualified, independent, professional regulators.

A modernised Indian economy requires 21st century regulations and regulatory systems, run by technically qualified professional regulators.[56] These relate to public goods infrastructure, financial markets (SEBI) and fiduciary financial institutions (RBI), social services like Education and Health (FDA) characterised by asymmetric information & moral hazard, and specific subjects affecting public safety (pollution-EPA, fire hazards, mines) & security. [57] Government must keep deepening and broadening the recent reforms in Education, Medical education and Science, to develop better regulators for these complex sectors.

Infrastructure unbundling is required to separate competitive parts like electricity production or running train service, and those like electricity distribution & transmission, docks, runways & rail lines & signalling systems, which need regulation. Production and intra-city electricity distribution is still monopolised by State electricity boards and must be made competitive. So, must passenger and cargo train services and cargo handling, fuel supply and other services at ports, airports & railway stations. Within the non-competitive parts, areas like intra-city electricity & piped gas distributions, must be subject to benchmark competition, and inter-city transmission lines (electricity, pipelines, rail lines, fibre-optic cables), must be run on public carrier principle with regulated open access. Turnaround time for cargo at ports, airports, and stations of the dedicated freight corridors is reduced to that in competitor countries.

Financial markets, both domestic and international, need regulation to rationally balance the benefits of innovation and the risks of macro instability & crisis. Much of the interest differential between India and global financial markets, is due to the relative lack of competition, and higher fiscal deficits. Fiduciary financial institutions need to be regulated to protect mass of investors/depositors without destroying financial incentives & efficiency.

The internet and web-based services, such as e-commerce and social media, are new areas whose economics and social impact is still not fully understood. There is an opportunity for India to pioneer rational, socially beneficial, regulations based on emerging knowledge.

---

[56] Not bureaucrats and politicians who are clueless about academic economics, market reality, entrepreneurial risk taking and complexity of managerial decision making. Regulations need to be commented and criticized by such professionals as well as consumers/users/buyers before they are promulgated.

[57] As proposed in earlier section, we must set up technically proficient, Food and Drugs Administration (FDA), an Environmental Protection agency (EPA) and Center for Disease Control (CDC), modeled on US and/or EU institutions. For good school regulators we could look to Scandinavia and other European countries.

10.1.1 Ease of Regulatory Compliance

Reform of the labour code must be taken to its logical conclusion by notifying the four parliament approved codes. Consideration also needs to be given to raising the threshold level in the Industrial Relations code from 300 workers to 1000 workers. There is an unintended anomaly in the Social code which provides a disincentive for employing labour in labour intensive, small-medium enterprises (SMEs). Social security contribution (ESI, PF etc) by employers, for employees with salary above Rs 22,000 a month pay 9% of salary, as matching contribution for the employees. On the other hand if the employee's salary is lower than Rs 22,000 a month, the employer has to pay up to 45% of salary as social security contribution. As a higher share of SME employees are likely to fall into the latter category, the disincentive for hiring regular workers is much higher.

Eliminating controls and improving Ease of Regulatory Compliance (EoRC) remains an important goal. This requires reducing and integrating as many rules and regulations as possible, and simplifying compliance procedures, through digital filing, private certification, and random audit system.[58] This process must also proceed progressively from Central regulations to Union Territories (UT) regulations with many elements of State regulations, to State regulations.[59]

There are 23,655 central compliances and 1,893 filings/intimations on subjects other than labour, taxation, and finance, which need to be dramatically slashed. This should be followed by making a model regulation to replace 35,289 State compliances and 687 intimations. The Central government can test and demonstrate the model State rules by applying them in Union territories.

The Jan Vikas Bill has eliminated 40 criminal penalties related to economic offences. 26, 400 still remain. Going one by one through each bill and removing criminal penalties could take half a century. The elimination has to be based on some commonly accepted philosophical, social and juridical principles. A survey of the literature can be used to select these principles and, then be applied to the remaining laws.

[58] Details of legal changes at https://prsindia.org/billtrack/overview-of-labour-law-reforms . Team lease study estimates that there were 937 compliances and 135 filings and intimations under the central labor laws. These should be reduced by 90%.

[59] As per Team lease study, States have 423 labor-related Acts, 31,605 compliances and 2,913 related filings. Most of these could be collapsed into the four central labor codes and their compliances.

10.1.2 Government Public Interface (GPI)

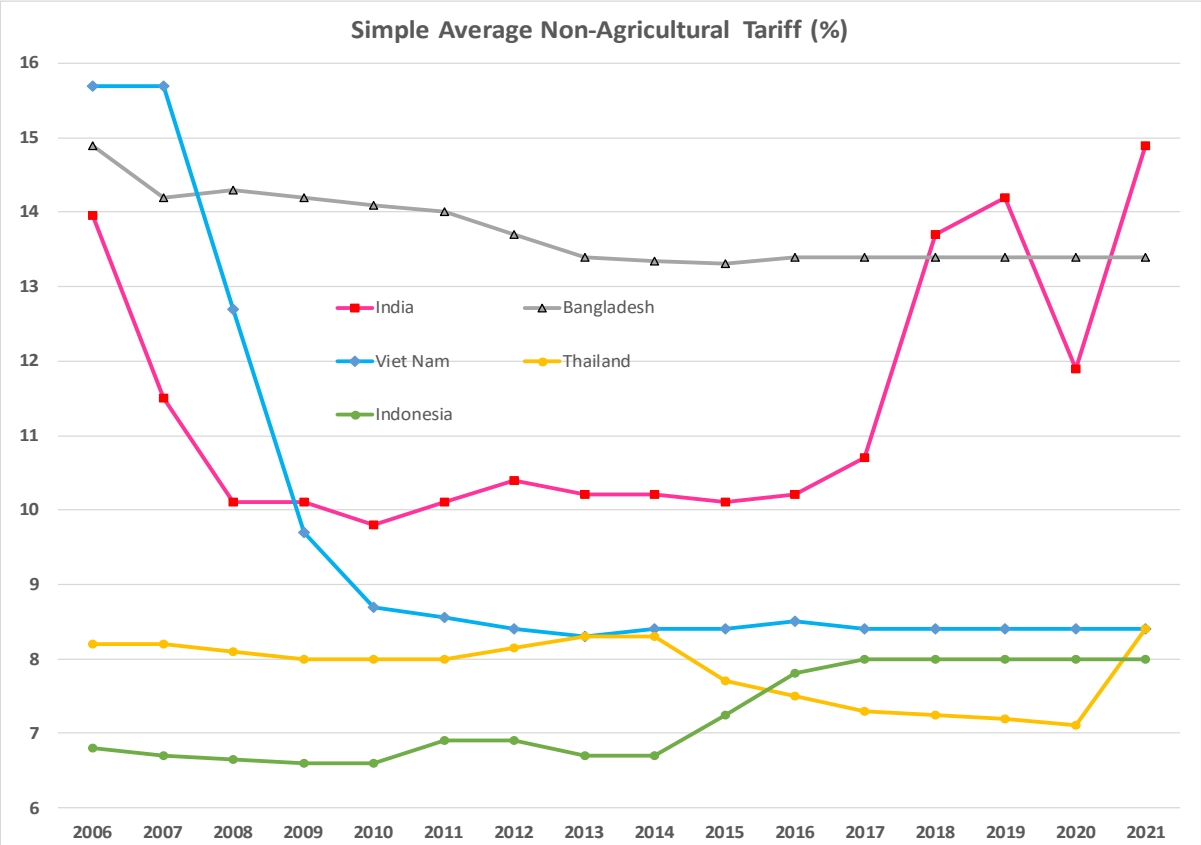
There are multiple, diverse, uncoordinated efforts at digitisation of Govt- public interaction at Union and State level, with each effort having to start from scratch and progress through learning by doing. These can be accelerated by reducing the cost and effort needed, by the provision of an Application Programming Interface. This Universal Governance Interface (GPI), would form the foundation of a system, for interaction between government with public and for Govt ministries & departments also with each other. This would be a quantum leap in ease of living and ease of doing business, comparable to the UPI in the financial sector.

10.2 Digital Taxman: E-Kautilya

Corporate taxes have been reformed and plans for ease of tax filing and compliance have been initiated but much remains to be done. The Income tax Act (1961) contains 23 chapters, 298 sections and fourteen schedules in 90 pages. Further complexity arises from numerous sub-sections & sub-sub sections accumulated over 60 years of clarifications and amendments of the Act. There are 129 income tax rules, with several sub-rules and three appendices, contained in 47 pages. The complexity embedded in the Direct tax Acts, gives rise to massive litigation (1.37 lakh cases under litigation in March 2017), with 85% by the direct taxes department, and repeated unsuccessful appeals, having a success rate of 30%. A new Direct tax code, incorporating economic logic, global best practice and simplicity of language has been devised. It consists of 16 chapters, 285 sections and eighteen schedules contained in 254 pages (including 16-page table of contents). It is essential for reducing the time and financial costs of compliance for MSMEs and dramatically reducing the litigation choking Indian courts.

Reform Customs duty structure to rectify inverted duty structure in manufacturing and reduce average tariff rates to that of potential competitors Thailand, Vietnam, Malaysia (Figure 18) and specific duties (Table 15) FTA's with potential competitors must pay careful attention to inversions created by reduced (or zero) tariffs. The issue does not arise in FTAs with developed countries. A comprehensive reform of the customs duty structure, with specific duties eliminated and average rate reduced to ASEAN levels, will not only support SME exports, but also draw global attention, as a major reform of the Govt.

Figure 18: India's Tariffs relative to ASEAN countries



Source: Author's calculations based on WTO data.

Table 15: Table: Specific duties in India

Specific Tariff rates in manufacturing (% of tariff lines)						
	% of specific rates			Rank		
Country Name	**2003**	**2011**	**2020**	**2003**	**2011**	**2020**
India	**2.3**	**2.3**	**3.9**	**4**	**3**	**1**
Uzbekistan			**1.2**			**2**
Timor-Leste			**1.2**			**3**
United States	**1.1**	**0.8**	**1.1**	**7**	**9**	**4**
Nauru			**1.0**			**5**
Average	**0.2**	**0.3**	**0.2**			
Avg-primary	1.2	1.4	5.2			
Average-all	0.5	0.6	1.6			
Note: rank 1 = Worst ie highest nos of specific duties						

The Goods and services tax was a landmark constitutional change. But too much of the legacy laws, rules, and procedures that it was supposed to replace crept into the new law, rules, and rates. Massive simplification of the rules and procedures can be achieved if three-fourths (3/4th) of goods and services are subject to a uniform 15%, rate, one-tenth to one-eighth (10-15%) are exempt (0%) food, medicines & medical services and education services, to ensure equity.[60] Revenue neutrality requires that cars, tobacco & products and luxury hotels, be subject to a higher rate of 25%.[61] If Cess is extended it must be restricted to a few product categories like tobacco & products, betel nut & luxury cars, otherwise they are undistinguishable from multiple GST rates. Eliminate cess on all goods & services except Automobiles, tobacco & pan masala. Impose uniform 15% GST on all intermediate products and raw materials and consumer goods & services produced largely by MSMEs. Have a second rate of 30% on goods & services with high income elasticity and produced largely by corporate sector. Exemption should be restricted to basic food & beverages, medical services & drugs and Education services. The result of the proposed changes are summarised in Table 16. Bring energy (electricity, coal Natural gas) and petroleum products into the GST. Impose cess on petrol to attain revenue neutrality.

Table 16: Implication of Proposed GST Reform

	Number of items by category			Change	
Category	Current	Proposal 1	Proposal 2	Proposal 1	Proposal 2
Consumer G&S	193	177	82	-16	-111
Govt G&S	17	17	17		
Mixed G&S	36	31	16	-5	-20
Intermediate	130	123	118	-7	-12
Capital gds	4	4	2		-2
Total	380	352	235	-28	-145

Source: Virmani and Bhasin (2020)

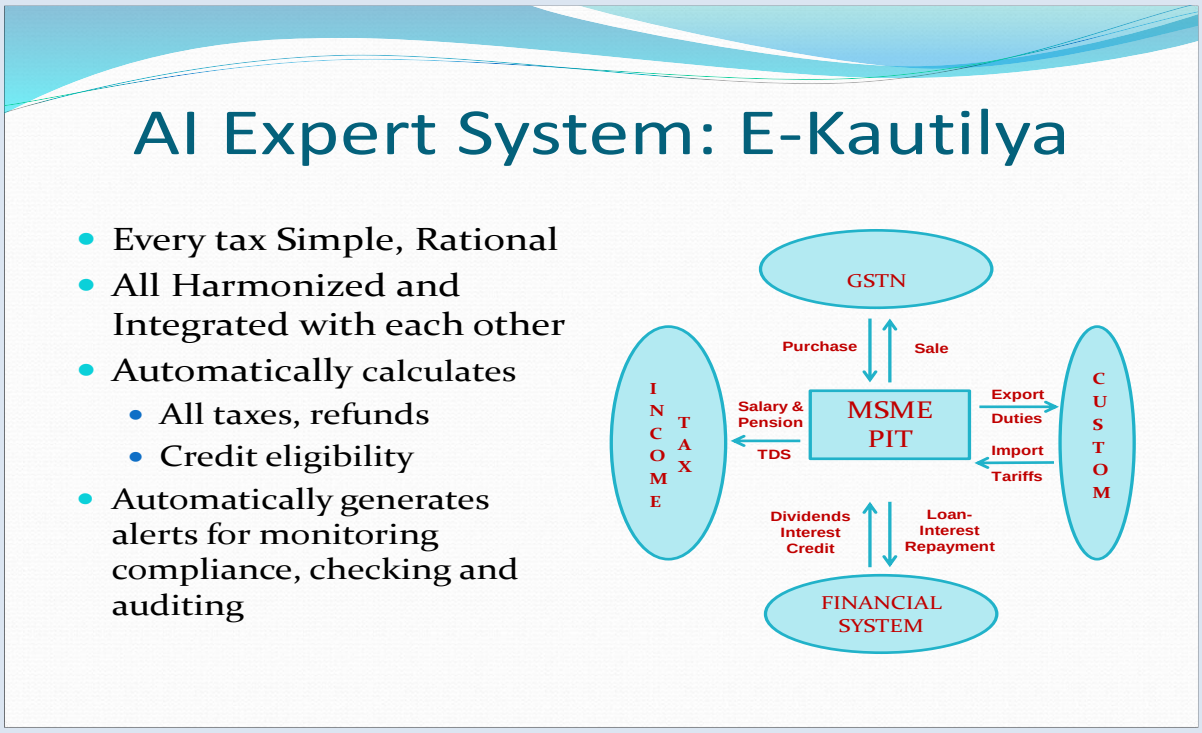
Automatic Seeding of Income tax, GST and Customs tariffs for MSMEs can and must be accomplished in the next 3 to 5 years. This requires simplification, standardization and

[60] Only exports must be zero rated, otherwise the GST system rapidly increases in complexity. The uniform rate structure will also remove the discrimination against man made and artificial fibers, fabrics and cloth which has stopped India from becoming a major exporter of garments made from no-cotton and mixed fabrics.

[61] With this rate structure, 99% of MSMEs can use an excel spread sheet to store daily/weekly/ monthly data & file returns; Total value of inputs bought from each supplier and total value of output sold to each buyer would have to be recorded separately for 15% and 25% GST. Monitoring becomes equally easy as a single sheet can represent (GSTN) rows of sellers and columns of buyers, with each cell representing total value of items bought during month/quarter/year (at 15%), with another sheet for those who sell and buy items at 25%.

integration of tax returns for the three taxes, so AI can automatically cross check and create returns for all three taxes (Figure 19: An Integrated digital Tax system). An *expert AI* digital tax person (***E-Kautilya***) would be created to monitor the Kautilyan tax system and investigate tax evasion. It would red -flag discrepancies and outliers for further investigation by appropriate authorities.

Figure 19: An Integrated digital Tax system



Source: Author

Tax reform, despite being revenue neutral in first year, will improve voluntary compliance, increase revenue buoyancy, and generate much higher revenues from the 2nd or 3rd year on.

Digital automation of tax payment for small business must be complemented with a professional "Tax Audit Unit" for large organizations with complex operations with numerous issues of definition & interpretation, so that differences can be sorted out face to face, ad hoc interventions by enforcement authorities are eliminated.

Reform of the personal income tax and the related issue of Direct Cash Transfers (DCT) prepares the ground for a dramatic reform of the Welfare system, in the form of Net Income Transfers (NIT). The latter is based on the concept of Negative Income Tax, first outlined by Milton Friedman in the late 1950s. The proposed NIT system would cover every person with income below the level of income tax payee, including retirees and the aged.

10.3 Capital Markets

Capital costs are too high in India, relative to its competitor countries and to global financial markets. The competitor countries of Asia have been famous for low corporate tax rates and fiscal surplus. We have reduced corporate tax rates to competitive levels and must eliminate fiscal deficits by 2035.

The announced policy of privatization of (all but four) Public sector banks and several Govt General Insurance companies, and reduction of govt equity holding in LIC needs implementation over next five years. For the four large Public sector banks remaining under Govt control, the Bank Nationalization Act needs to be replaced by the Companies Act, to improve their management & regulation. These policies will increase competition and help reduce interest differential.

Phased introduction of more risk management products and decontrol of investment in them by banks, will improve depth. For instance, restrictions on speculative trading in Foreign exchange derivative markets should be eased to help create a robust market. Bond markets, commodity markets, foreign exchange markets and markets for risk management products are currently either very short term or lack depth. These need to be opened to foreign investment & for a certain amount of speculative activity, essential for creating markets.

Dollar denominated bond markets need to be created to compete with ECB. With the inclusion of Indian Bonds in the international indices, there is an opportunity to expand the corporate bond market. This requires the creation of a sovereign yield curve off which corporate bonds could be prices. One way to do this is through GOI guaranteed Infrastructure bonds or Green bonds.

These measures will reduce interest differential and pave the way for complete capital account convertibility by 2035.

10.3.1 FDI Restrictions

There is a popular mis-perception that FDI policy is very restrictive. This is simply untrue and has been so for decades. India has less restrictions than ASEAN countries, with the exception of Vietnam, and even the latter had more restrictions than India in 2010 (Table 17). Mexico has somewhat less restrictions than India, but the gap has narrowed over the last ten years. The approach to *Investment treaties*, however, needs to be re-examined.

Table 17: FDI restriction index – 2020 & 2010

OECD FDI restrictions index				
Country	**2020**	**rank**	**2010**	**rank**
Viet Nam	0.130	40	0.300	52
Mexico	0.188	47	0.211	47
India	**0.207**	48	**0.285**	**49**
Saudi Arabia	0.211	49	0.393	54
China (PRC)	0.214	50	0.436	56
Malaysia	0.257	52	0.290	50
Thailand	0.268	54	0.296	51
Indonesia	0.347	55	0.319	53
Philippines	0.374	56	0.417	55
Source: OECD				
Note: Rank is for countries which had data for both years				

10.3.2 Banking & Credit

During the pandemic, many unconventional measures had to be taken restrictions imposed, to manage the crisis with minimum collateral damage. These included restrictions on bank lending rates and procedures, These should be phased out and the earlier trend of progressive liberalisation of banking resumed. Reduction of statutory liquidity ratio (SLR), CRR and other additional requirements must also be reduced as we introduce more competition through privatisation of Public sector banks.

10.4 Supply Chain Revolution

India needs a Global Supply chain policy to meet the challenges and opportunities thrown up by post-financial crises (2008) de-globalization and post-Pandemic (COVID) opportunities: All established exporters must be seamlessly linked digitally to GST, customs, designated bank, and RBI, so that foreign exchange payments/receipts, exports and import, export linked credit, GST set-off/refund, import tariff set-off are recorded instantaneously and available/visible to all. This can ensure complete zero rating of exports & 8-hour GST offset, and full credit provision for export production at international interest rates.

The import tariffs critical to both MNC supply chains and domestic MSMEs are those on raw materials, components, intermediate goods, and sub-systems. Given the interlinkages between different sectors of the economy,[62] it is extremely difficult to ensure that no industry/sub-sector is dis-protected (faces negative effective protection). A single uniform ad-velorem tariff rate n all minerals, oils, manufactured goods can ensure that not a single industry is dis-protected. [63] Global experience and the experience of our Asian competitors suggests that a 10% uniform ad-valorem rate, will lead to rationalization and increased competitiveness. The rate can be gradually reduced to 5%.[64]

Around 10% of manufactured goods can have higher rates for a limited duration, to promote import substitution of goods monopolised by China. The extra protection must be linked to attainment of minimum efficient scale under the production linked incentive (PLI) scheme, so that such plants get a window of three years to iron out glitches in their new plants and improve their procurement & marketing systems, to match higher production.

Ad hoc changes in agricultural import-export controls, quantity restrictions (QRs), import tariffs and export duties, increase the risk of developing production for export markets and import substitution of niche products. We need a transparent, virtually automatic system of import tariffs and export duties, linked to the difference between international and domestic prices. Controls and QRs must be replaced by such a system to reduce policy and regulatory risk for farmers and Agri-entrepreneurs and promote export of agriculture and allied products.

10.4.1 Manufacturing Supply Chains

International and Domestic conditions are ripe for a surge in investment and growth in the manufacturing sector. Domestic policy and infrastructure are vastly improved and comparable to our LMIC competitors. Global desire for de risking among High income Developed countries (HIDCs) is increasing. The headquarters of 90-95% of Multinational enterprises (MNEs) are in these countries, and these MNEs lead and drive the supply chains, through FDI, skilling and internal trade channels. 2/3rd of Merchandise trade occurs through them. The shift

[62] An Input-output table (IO) is commonly used to show the interlinkages between different industries & sub-sectors and to calculate "effective protection" of each industry given the structure of import tariffs across these industries.

[63] Textile sector has dozens of specific rates which are of source of complexity and corruption, and which provide a disincentive to honest, genuine exporters of textiles. Raw cotton, silk and other plant materials used in industry should also have the same rate, but this may need to be phased in slowly as they currently have much higher rates.

[64] This will make our rates closer to those prevailing in ASEAN countries. There are two problems with this system; (a) The inverted duty structure created by the IT1 agreement remains unaddressed. (b) FTAs with Middle income countries have created inverted duties and dis-protection in some items like wood pulp passed fibers.

of supply chains to India and manufacturing growth can be accelerated by laying out the red carpet for these MNEs and co-operating with their home countries in developing a joint approach to dealing with Chinese manufacturing monopolies.

A High-level committee is required, to Develop a Trade policy, to reduce dependence on imports of manufactured goods from PRC. Strategy for de-risking manufacturing sector through multilateral manufacturing trade agreement with USA & EU, building on India-EU FTA! As US internal politics, currently dis-favours new FTAs, we will have to find an alternative mechanism focusing strictly on manufacturing supply chains. The manufacturing part of the USMCA FTA, particularly its cumulative origin rule, can serve as a model. It can also form the core of a USA-India-EU agreement for de-risking supply chains by moving them to trusted economic partners.

The existing tariff policy has a provision for imposing taxes up to 200% on imports from Pakistan. A similar provision could be introduced for imports from China (in next budget). An import tariff of 50% should be imposed on all manufactured imports from China, with exception for intermediate goods which do not have any alternative available source. To deter tariff evasion, by rerouting through other countries, a surcharge of 100% should be levied on value added in China, on imports from China's partners. Selective, time bound exemptions could be given to Indian or foreign firms, as part of a phased manufacturing program, to import-substitute goods imported from China.

We should immediately enter into discussions with USA & EU to jointly introduce a 50-60% tariff on manufactured goods imports from China, while simultaneously eliminating tariffs on the same goods from each other, based on cumulative Value added in USA, EU, India (& maximum 10% VA in China or by Chinese firms in other countries).

We should aim to attract at least one *Anchor MNC/MNE* to each large State in India, within the next five years (i.e. minimum 13 MNEs/MNCs). As an overwhelming % of MNEs are headquartered in USA an EU+, we will have to make a special effort in these economies. Both the Union Govt and States should set up a Supply Chain Department in the Ministry of Industry and Commerce. The primary goal of this department will be to attract Anchor investors from High Income Developed Countries, and ensure that they start production within one year of decision. This Department must therefore have the authority to buy and transfer land, provide telecom, road, electricity, water & sewage connectivity and facilitate skilling of labour needed

for the project. Its second goal would be to facilitate the shift of the anchor investors suppliers within the next 3 years.[65]

Large States in the heartland, which are far from the coast, such as UP, Bihar and MP, may require a special dispensation to attract MNCs/MNEs. Special manufacturing zones (SMZs) could be set up in these States, with 100% online digital administration of all economic laws, rules, regulations, procedures. Private companies would be certified to undertake periodic auditing of the registered companies in these zones. There would be no interference of the State or GOI bureaucracy with the manufacturing companies for a decade to let them focus on building up their workers skills, developing supply chains and becoming competitive with firms in more favourable locations.

Along with this, the PLI policy should be focused on attracting strategic supply chains from PRC (China) to India, particularly those related to Défense, dual use items, telecom, ADP & electronics & IoT, which can be used to undermine the sovereignty & security of India and its Western partners. Review and refinement of PLI is a continuous process.

10.4.2 SME & Start-ups

Tax reform, skilling and information-knowledge platforms are necessary to ensure that SMEs are equipped to participate in supply chains, produce export quality products in a timely manner and focus on creating jobs. Start-ups can be viewed as a modern version of SMEs. They are going to be critical in driving innovation and generating high quality jobs in the 21st century. Unfortunately, bureaucratic systems still view them with suspicion. Start ups must be provided a level playing field.

Tax bias against start-ups must be removed. Completely eliminate the taxation of unrealized capital gains, which was introduced around 2011.Financial and other regulations need to be purged of anti-start-up biases. For instance, some financial regulators impose additional requirements on management and ownership structure of start-ups, which are not applicable to companies. These must be dropped.

Deep tech start-ups go through three stages: (i) From Idea to "Proof of concept," (ii) From proof of concept to prototype, and (iii) From prototype to marketable product. Each stage differs with respect to risk & funding requirements. Financial & managerial support needs to be understood & addressed separately.

[65] Performance would be judged by the degree of import substitution of imports from China, additional exports and jobs created.

10.5 Education & Skilling

Primary education is the base of the education pyramid. A person who cannot read, write and understand others, cannot function in a modern economy. Inclusive growth is difficult, if not impossible, without literacy. 100% functional literacy (FLN) must be the goal of every Indian State, in the next five years. The States who are not performing at the level expected given their per capita NSDP, based on a log linear regression of attainment indicator on PCNSDP, are shown in Table 18**.** These States need to make a special effort to improve their primary education system, including by adopting the Diksha program whole heartedly.[66]

Table 18:States with gap in education performance relative to their per capita NSDP

Gap in primary, secondary & College completion rates (%)							
Gap: Actual-Expected	PC NSDP	Primary		Upper Secondary		Bachelors	
State	2020-21	Male	Female	Male	Female	Male	Female
Bihar	26820	-2.8	-4.2	-1.6	-2.8	-1.6	-2.7
Jharkhand	51464	-2.8	-6.6	-1.3	-2.0	-1.8	-2.6
Madhya Pradesh	56320	2.1	-1.8	-3.6	-4.1	-2.2	-2.8
Meghalaya	60522	-10.8	1.6	-8.2	-0.4	-6.7	-1.6
Assam	61304	-4.0	1.0	-7.8	-3.6	-5.1	-3.6
West Bengal	63562	-4.9	-0.6	-4.5	-0.5	-2.7	-2.3
Rajasthan	73140	1.2	-8.0	1.3	-3.4	0.6	-2.5
Chhattisgarh	73259	0.9	-2.8	-2.6	-1.4	-1.7	-1.4
Odisha	73357	-2.2	-4.8	-6.5	-4.3	-6.0	-5.4
Tripura	79123	-0.8	3.2	-10.6	-9.2	-7.8	-8.3
Andhra Pradesh	105880	-7.9	-9.4	-1.9	-2.6	-3.6	-5.7
Arunachal Pradesh	106002	-8.6	-7.4	-4.3	-1.9	-3.7	-4.0
Telangana	140703	-9.5	-15.2	2.0	-1.5	-0.9	-4.8
Karnataka	149030	-5.5	-7.5	0.2	0.8	-3.2	-5.5
Haryana	155756	1.0	-4.3	3.3	-0.6	0.6	-2.4
Gujarat	156285	-2.6	-8.5	-7.7	-9.9	-7.6	-9.6
Sikkim	237212	-6.2	-3.3	-11.2	-6.2	-8.5	-7.8

Sources: NFHS 5 (2019-21. Authors calculations

The Union Govt can help by transforming the excellent Diksha program into an *Expert AI digital teacher*, *E-Acharya*, which can teach the teachers and the students, from pre-primary to the Higher secondary school level. This will require a true partnership between Central and State Governments, NPOs and private sector. The States will have to ensure that Diksha and E-Kautilya is customised to the State language & environment, and there is 100% digital connectivity with every primary and secondary school in the State.

[66] Interestingly, Uttar Pradesh (UP), with a per capita NSDP of Rs. 39,735 i.e. between that of Bihar and Jharkhand, is performing better than expected from its per capita NSDP, in all three levels of education shown.

Despite efforts during the last two decades, there is a wide gap between the credentials and skills acquired by youth and the job skills sought by employers. There also information gaps and missing markets. We need a comprehensive policy for development and regulation of the Skilling Industry. The objective of this policy should be to facilitate information flows between all stake holders, reduce fragmentation by promoting integration of different segments of the industry, and create markets where they don't exist or are rudimentary. A high-level steering group should be set up to develop such a policy in consultation with all stake holders, such as Industry, Skill generators, NGOs and Govt organisations, involved in the industry.

Private companies, SMEs, NGOs and Govt are going to play a critical role in different parts of the skilling and employment industry. Companies should be allowed and encouraged to use their CSR funds to promote skill development related to their industry, along with their peers. A *Skilling Industry Council* should be set up, with the participation all stake holders, to meet the diverse requirements of "Skilling for India, Skilling for the World." Students of Training and skilling institutes should be eligible for loans from Public Sector Banks, and foreign applicants to these institutes should be eligible for a student or *trainee visa*. The logic of charging 18% GST on job skilling and training is questionable, as long as there are lower brackets for basic needs.

There are numerous ministries, departments and agencies involved in skilling and employment. There is a need for an integrated review of their strengths & achievements, and weakness & short comings. The review can also play a critical role in areas of skilling that are falling between the cracks. As NITI is well placed to take a neutral view, a Steering Group should be set up under the member concerned with skilling and employment.

Pending a review, the integrated E-SHRAM – Skill India Platforms, should be put on Cloud with Modular structure in two broad dimensions (i) National & State, (ii) Modules for Employment (seekers & providers of jobs, intermediaries), skilling (suppliers & users of skills, standards & certification), and all related markets. All modules should be connected and seamlessly integrated for the user. Connectivity should also be provided with Private Sector intermediaries, and with NGOs in Health, Education & Other social sectors. The ultimate goal should be create an *AI powered expert system, E-Guru* to provide appropriate job skills to every person according to his/her capabilities and limitations.

There is increasing likelihood of Obsolescence of products used earlier (e.g., Bidis) and obsolescence of rural occupational skills (e.g., carpenter, electrician, plumber). A mission

could be launched for re- skilling of obsolescent rural workers. The Vishwakarma scheme could introduce a component to train, spouse or daughter of craftsman, in basic management/ marketing/procurement, for Household enterprises.

10.6 Urban Development

Urbanization and Urban development will be one of the drivers of growth in the next few decades. The Sewage and drainage systems of all cities and towns will need to be modernised and a system of underground conduits built in cities, to carry utilities such as electricity, piped gas, and fibre optics cables. Mass transit systems will have to be built in cities and large towns. Despite the Nagarpalika Act, the planning, development and running of cities is highly fragmented among State government agencies and multiple city administration Modernization and development of cities and towns requires a single political-administrative authority, with all elements of town planning & policy, and town specific taxation (e.g., land & real estate) & expenditure under this authority. The Nagar-Palika and Panchayati Raj Acts must be amended to ensure this.

Among the policy measures which need to be taken/propagated are, Land Pooling for Urban infrastructure; which is both speedy and fair to those whose land is acquired, Land Use laws, rules & procedure which permit more densification, while strictly ensuring availability of needed infrastructure, both underground (sewage, drainage, conduits for wires, pipes) and overground (parking, last mile connectivity for metros, bus stations). Abolition of rent control laws and facilitate construction of rental accommodation and renting out of such accommodation for diverse groups and duration. The model Rent Control Act (2021) provides a template which can be modified by States to local conditions. Setting up of an online portal for registering all available rental apartments & matching demand with supply (e-market). The PPP framework for infrastructure, whose shortcomings and failures have already been reviewed by a finance ministry committee, which also suggested solutions, needs to be revamped.

Modern cities mass transport requires digital information systems and software-based planning systems. Small private players and bureaucratic govt organizations do not have the capability or the capital to do this. States must allow a few organized private companies to run the bus systems in the cities and large towns. This can be done through a State wide auction of bus routes, organised by groups of towns, with the companies bidding on the either the roll out of the modern bus system across cities, or the subsidy they would provide to disadvantaged users.

A system of last mile connectivity from metro/bus stations should also be devised by cooperation of Govt, Pvt sector & NGOs

Convert all Urban Slums into rental apartment complexes. Existing policies have failed because State Govts are always trying to extract the maximum revenues out of the conversion. They should reorient their focus to the property taxes these complexes would generate after they are built. There should be sufficient incentive for private developers and for those in illegal occupation of slum land, to agree/allow this conversion & rebuilding to occur expeditiously. The Odisha Liveable habitat Mission or *Jaga Mission (2018)* and the preceding slum dwellers land rights legislation, could serve as model for other States and cities. This should be viewed as an opportunity to develop high class urban infrastructure.[67]

Cloud based Modular system in three dimensions; (a) Regional, City/Town, (b) Traditional Planning (Transport, Utilities) and Economic activity. (c) Platforms for, (i) Demand-Supply of planning services, (ii) Creation of planning skills and matching demand- supply of skills, (iii) Information – Knowledge Platform for critical elements of Urbanization (e.g. finance, admin), (iv) Demand & supply of Urban Public & quasi-public goods (Sewage & water treatment plants, solid waste collection, disposal & recycling services).

Besides modernization of existing sewage systems in towns and cities, the mission could cover entire cycle, including sewage treatment and recycling. It is important to ensure that sewage collected from septic tanks is not dumped in open fields, water drains or water bodies, as this just transfers the problem from one place to another, without solving it. Similarly open sewage drains which flood and overflow in monsoons or heavy rainfall can negate the benefits of eliminating open defecation and 95% toilet availability in the same place.

The planning, digging, and laying of new sewer lines, should simultaneously accommodate, updating of rain water drains, road design for drainage from road surfaces, and construction of modern, underground conduits for utilities (water pipes, electricity wires, telecom/fibre-optic cables) to preserve good road surfaces.

10.7 Land & Real Estate

Efficient land and real estate markets require accurate records of land ownership. The lack of such records limits the contribution that real estate can play in raising personal income and

[67] Road & footpaths with underground conduits for utility wires, cables & pipes, integrated with separate storm water drains, sewage pipes & public toilets, green spaces for children's play & recreational areas for all, and community centers.

GDP growth. The digital India Land Records modernization program can play an important role in modernization of the industry, along with Cadastral surveys. Urban land-use planning must be modernised to provide greater flexibility in land use change, institutional structures for participation of all stake holders and speedier procedures for change in land use. Rules, procedures and systems for renting, leasing, sale and purchase of land and real estate must be made smoother and corruption free. India's Ease of Doing indicators have improved in every sub-category except those related to real estate regulations, procedures, and speed of litigation, largely because it is a State subject. Central government can take the initiative in creating and implementing model legislation & systems and implementing them in Union territories and Special export zones under its control.

10.8 Agriculture & Rural

Agriculture remains the most unreformed sector. This is not for want of knowledge. The correct policy solutions have been known for decades. GOI for the first time took the initiative to reform Rural land and agricultural trade laws that have thwarted diversification, productivity and profitable growth. These efforts should not be abandoned.

Non-agricultural employment also needs greater attention, particularly the skills dimension and keeping in mind the burgeoning development within 10 km of every highway & fast growing "census towns" classified as rural areas. Among the needed reforms are, (a) Abolish Essential Commodities Act (ECA) or reintroduce ECA (Amendment Act), (b) Abolish .Agricultural Produce Marketing Act (APMC) or re-introduce Farmer Produce, Trade and Commerce (Promotion & Facility) Act. Consider reintroducing a suitably modified, "Farmers (Empowerment & Protection) Agreement of Price Assurance and Farm Services Act." (d) De-control futures, options and warehouse receipts, on all agricultural commodities

Subsidies for Pesticides, Fertiliser, Water & electricity and on water intensive crops, are resulting in contamination of drinking water supply, land and air, and depletion of underground water in several areas of the country. There is need for a comprehensive review of the literature to estimate and evaluate the negative effects (externality/ collateral damage) of these subsidies. A working group could be set up for this purpose. The same group could also evaluate the gains from clubbing all the subsidy and giving it back to the farmers, in the form a Direct cash transfer.

Internet Data Connectivity, must be provided to all Primary Schools, Primary Health Centers, State Govt Offices (24x7). This should ideally be through fibre optic cables which can be

accessed 24x7. It should also be provided to all villages & Habitations (100%), either through Fibre optic or Satellite data connection. The reserve price for spectrum auction should be zero for all rural area, as supply of spectrum is greater than the demand for spectrum. Geographically restricted licenses can be given to local start-up entrepreneurs to promote social innovation. The Universal connectivity fund, should ensure last mile connectivity to every village

Cloud based Modular platform for agriculture, associated skills, related services and non-farm job skilling. It would be cloud based with two dimensions; (a) National, State; (b) Platforms for, (i) Demand-Supply of Inputs & Outputs, (ii) Creation of skills and matching demand- supply of skills, (iii) Information – Knowledge Platform: R&D, extension, (iv) Agro-processing, including skills & related services

Groundwater resources are low and depleting fast in North-West India (Gujrat, Rajasthan, Haryana, Punjab).[68] Many areas of the Deccan plateau between the Western and eastern ghats are water stressed. Water use by industry, commerce and water intensive crops like sugar, rice and wheat must be charged to reflect its scarcity value in water stressed regions of the country. The funds generated can be used for water harvesting, restoration of water bodies, and recharge of ground water.

10.9 Transport & Energy

Considerable progress has been made in providing higher quality infrastructure to producers, users and the general public. The World Bank ranking of India's Overall LPI rank and the rank in sub indicators shows this, with India ranked higher than Philippines, Vietnam, Indonesia and Mexico in 2023. Some weakness remains in Customs and Infrastructure, though the improvement in Port turnaround times is incredible (Table 19)

The new challenge is to raise it to the average quality and access levels prevalent in Upper middle-income countries within a decade. This requires policy reforms to improve the viability of infrastructures and the profitability of potentially competitive parts of (unbundled) infrastructure services, and professional, well qualified regulators to regulate the monopoly-duopoly parts of infrastructure.

[68] Map https://www.wri.org/insights/nasa-satellite-data-help-show-where-groundwater-and-where-it-isnt , "Long-term groundwater variation in North-West India from satellite gravity measurement," Cheng, Li, Zhang & Ni, May 2014, https://www.sciencedirect.com/science/article/pii/S0921818114000526 .

Table 19: Logistics Performance and Ports and Shipping

World Bank Logistcs performance index							
2023	Malaysia	Thailand	India	Philippines	Vietnam	Indonesia	Mexico
LPI Rank	26	34	38	43	43	61	66
LPI Score	3.6	3.5	3.4	3.3	3.3	3.0	2.9
Customs Rank	31	31	47	59	43	59	84
Customs Score	3.3	3.3	3.0	2.8	3.1	2.8	2.5
Infrastructure Rank	30	25	47	47	47	59	63
Infrastructure Score	3.6	3.7	3.2	3.2	3.2	2.9	2.8
International shipments Rank	8	22	22	47	38	57	75
International shipments Score	3.7	3.5	3.5	3.1	3.3	3.0	2.8
Logistics competence Rank	28	38	38	46	53	65	61
Logistics competence Score	3.7	3.5	3.5	3.3	3.2	2.9	3.0
Tracking & tracing Rank	30	46	35	21	59	59	46
Tracking & tracing Score	3.7	3.5	3.6	3.9	3.3	3.3	3.5
Timeliness Rank	29	34	41	49	41	65	62
Timeliness Score	3.7	3.6	3.4	3.3	3.4	3.0	3.1
Supply chain Indicators: Ports & shipping							
Rank	42	31	36	59	25	88	37
Turnaround time at port (days) Median	1.0	0.8	0.9	1.0	0.8	1.1	0.9
Turnaround time at port (days) Mean	1.2	1.0	1.1	1.3	0.9	1.8	1.1
Turnaround time at port (days) IQR (P75 - P25)	0.7	0.8	0.7	0.8	0.5	0.9	0.6
Turnaround time weighted by ship's TEU, Median	1.0	1.1	1.0	1.1	0.9	1.1	1.0
Turnaround time weighted by ship's TEU, Mean	1.4	1.4	1.1	1.3	1.0	1.5	1.3

Source: World Bank, Logistic Performance Index

Socialist pricing of passenger vs freight trains raises freight costs for industry above cost of supply, to subsidize consumers. Reduces competitiveness by raising logistics costs. It promotes a shift of transport to more carbon producing transport. We need to move to cost based pricing.

India has one of the highest electricity prices among the emerging market economies/ Middle Income countries, for purchase of electricity by manufacturing industry (Table 20).

Table 20: Comparative Electricity price

Electricity Prices for business		
Country	**Price**	EMDC
	USD/KWh	Rank
Indonesia	0.069	20
Vietnam	0.072	23
China	0.088	32
Malaysia	0.121	47
Thailand	0.124	50
India	0.129	53
Mexico	0.227	82
Source: globalpetroprices.com		88
Note: Data is for sept 2023		Total

This is a dis-incentive for the growth of Value added & employment. **States have to s**hift from socialist pricing of consumers & industry, to market pricing. Consumer subsidies must come directly from budget. This will eliminate an important source of competitive disadvantage for Indian industry viz our competitors (Vietnam, Thailand, Indonesia). It will incentivise private sector to efficiently integrate peak day-time solar generation with peak evening demand; The modality will be a combination of, a shift in effective demand by goods producers, and the use of storage technology to shift supply.

10.10 Criminal Justice System

An efficient market economy is built on the rule of law. Citizens require an environment secure and safe from criminals to innovate and take entrepreneurial risk. The abysmal conviction rate for heinous crimes (murder, rape & kidnapping) can only be improved substantially by comprehensive, end to end reform of the criminal justice system. This requires reform of laws, rules and procedures, police & prosecution reform, judicial reform, reform of courts and prison management systems and of the political system to minimise the possibility of criminals becoming legislators or ministers.

AI is already bringing about a revolution in the legal profession. We need to use AI expert system, ***E-Manu*** that helps identify and remove anomalies in Union and State laws and rules, identifies and removes contradictions in court judgements at municipal, high court & Supreme court levels, and speeds up judgements by codifying all past judgements and identifying key pieces of evidence needed to resolve cases!

11. Summary and Conclusion

This paper outlines a vision of a developed free market economy, an open, plural democracy, in which every citizen is assured of equality of opportunity and provided the support to develop her full potential to the benefit all. The paper analyses the demographic, digital and greening trends in the global economy and society to trace a path for India's comparative advantage, over the next 30 years. It then sketches out an economic vision in terms of average income of the citizens and puts in the perspective of the World economy. The geopolitical & strategic implications of this growth are addressed towards the end of the paper.

Structural transformation of the economy entails a reduction of the labour force engaged in agriculture from half to 15-20% of total labour force. The rest will be employed more productively in rural services and industry located in currently rural areas. With less underemployment and greater labour productivity in Agriculture will improve, leading to increased demand for rural services & industrial products. Its important to ensure that a substantial share of this increased demand is met by service providers and production located in rural geographies. Physical & digital connectivity, availability quality education and skills, and the freedom to use land for non-agricultural purpose, will play a critical role in this transformation.

We envision a key role for the digital eco-system in upgrading human resources, structural change, and the transformation of the Indian economy from a lower middle income one to a high income one. The digital economy will have two elements, one a digital of architecture of a dozen stacks and sub-stacks and second a modular, multi-layered system of telemedicine, and e-learning, tele-education & e-skilling' The stacks include a knowledge stack with four sub-stacks focused on education, rural & agricultural information, R&D and marketing of high-tech skills, a Health stack with a sub-stack focused on Public health, a Welfare Stack, and a Social media stack, along with the broader and deeper fin-stacks and e-market stacks. The stacks are designed to promote competition in the digital economy, by providing a level platform, with transparent, fair and credible rules to new entrepreneurs & MSMEs. The stacks will be accessible to every resident of India through a national fibre optic cable network which reaches every block, tehsil & taluk.

The second element consists of suite of AI enabled expert systems that improve the quality of education, skilling, health and government services. Among these will a digital teacher (E-Acharya), a digital trainer (E-Guru), a digital doctor (E-Vaid), a digital taxman (E-Kautilya) a

a digital bureaucrat (E-Chanakya) and a digital judge (E-Manu). The telemedicine, e-education, e-skilling and governance systems, are envisioned as hybrid ones that leverage the scalability of web delivery with personal human touch critical for motivation and social learning. They will also combine government and private service providers to complement the strengths and supplement the weakness of each. The architecture is envisioned to empower citizens, promote structural transformation of the labour force, and drive inclusive growth.

The green economy's role is envisioned to grow over time in urbanization, housing, and transport and to contribute to greening of growth. A green sub-stack will be built to support the propagation of green designs, services, goods, and systems.

Polices and programs causally related to these issues such as welfare reform, are also discussed. These include the creation of a macroeconomic, and sectoral environment in which private initiative can thrive and take the entire economy and society forward. The last chapter brings together the policy and institutional reforms essential for accelerating growth and sustaining fast growth for three decades.

The India-China per capita gap (ratio) has bottomed out and started closing. With India's population growth rate and per capita GDP growth rate now above China's, the GDP and economic power ratios will start closing at an increasing rate. If the free open market democracies, reject the asymmetric economic, trade, technology and FDI policies of the Peoples Republic of China and diversify their Supply chains out of the PRC and into India and other free open market democracies, they can collectively reduce the risk of disruption and exploitation. This will allow India to reform faster, and to transform its economy more comprehensively, to create a better, more equal economy and society for its 1.64 billion citizens by 2050. It will also be in a better position to provide more support and help to the low income and lower middle-income countries.

The World is moving toward High-tech decoupling between the USA and its allies (Group USA) and China and its allies (Group China). This will be accompanied by partial economic decoupling, resulting from de-monopolisation of manufactured exports and an effort to de-risk supply chains of each group in the other. This effort is greatly complicated by the fact that China's ASEAN neighbours, who are neither allies of USA nor of China, are economically dependent on international trade, FDI and economic interaction with China, and for security on the USA. India, on the other hand has a huge trade gap with China and must reduce its import dependence on China in the Medium long term. In the short-medium term (5 years) it

can gain by partnering with Group-USA to help it de-risk its supply chains, by creating a welcoming environment for its MNEs to diversify their supply chains to India. This will increase the economic, technological and strategic security of USA, its allies (EU, UK, Japan) and of India.

India that is Bharat, is a civilisational State which will neither be like USA the inheritor of European colonial traditions, nor like Communist China the inheritor of Han imperial traditions. When the Egyptian civilisation was building great monuments, based on funds & labour usually achieved through conquest, Bhartiya civilisation was focussed on building cities for its enormous population (1/3rd of World), developing craft manufacturing and trading both internally and with its North-Western and Western Neighbours. In an Era in which other civilisations saw glory in the conquest of neighbouring empires & enslavement of "other" peoples, Bharat's rulers were spreading Vedic culture, spiritual ideas and civilisation across the Indian sub-continent (from Himalayas in the North to Sri Lanka in the South, and from the Baluchistan desert in the West to Myanmar's hills in the East of Bharat.

India/Bharat is built on a *Secular spiritual- social contract*, in which all the tribes of that time (3500 BCE) brought their Gods to the sacrificial fire, and agreed to accept the Gods of every other tribe, with each tribe free to worship its own god (or no God)! This "Hindu or Indic Secularism" in terms of spiritual-religious beliefs, and peaceful co-existence with outside civilisation, is the foundation of the Indian Civilisational State. This is still the basic philosophical approach of India's political, economic and military leadership.

12. References

Agenor, P. and O. Canuto, “Access to Infrastructure and Women’s Time Allocation: Evidence and a Framework for Policy Analysis”, Fondation Pour Les Etudes et Recherches Sur Le Developpement Internationale, Working Paper 45, 2013.

Bhalla, Surjit S., “The New Wealth of Nations”, 2017

Bhalla, Surjit S, Tirtha Das, Karan Bhasin, Abhinav Motheram, Employment in India, World Bank, 2023.

Das, Sonali, Sonali Jain-Chandra, Kalpana Kochhar and Naresh Kumar, “Women Workers in India: Why So Few Amoong So Many?”, IMF Working Paper No-15/55, 2015.

Gannicot, Garance, Debraj Ray & Caro;ina Concha-Arriagada, Upward Mobility in Developing Countries, NBER, April 2024.

Goyal, Ashima (editor), “A complete Handbook of the Indian economy in the 21st century, Oxford University Press, October 2019.

Reddy, Y V, “Advice and Dissent: My Life in Public Service.”

Virmani, Arvind, “India Vision 2050,” Policy paper No. PP No.-01/2021, EGROW Foundation, May 2021.

Virmani, Arvind, "Fall and Rise of India", Working paper No. Ws Wp 1/2013, October 2013. IndiaEcHistory13Nov01.docx

Virmani, Arvind, From Uni-polar To Tri-polar World: The Multi-polar Transition Paradox**,** Academic Foundation, Delhi, 2009. https://egrowfoundation.org/research/india-vision-2050/ .

Virmani, Arvind, Propelling India from Socialist Stagnation to Global Power: Growth Process, Vol. I (Policy Reform, Vol. II), Academic Foundation, New Delhi, 2006.

Virmani, Arvind, "Global Power From The 18th To 21st Century: Power Potential (VIP^2), Strategic Assets & Actual Power (VIP)," Working Paper No. 175, ICRIER, November 2005.http://icrier.org/pdf/WP175VIPP8.pdf, http://icrier.org/?s=working+papers .

Virmani, Arvind, "A Tripolar Century: USA, China and India," Working Paper No. 160, ICRIER, March 2005. http://icrier.org/pdf/wp160.pdf , http://icrier.org/?s=working+papers .

About the Author

Dr Arvind Virmani is a Member of NITI Aayog. He specialises in policy & institutional reforms for sustained, fast, inclusive economic growth.

He is a macro economist who has bridged the gap between academics, think tanks and policy makers, through research-based policy advice and policy-oriented research. He played a prominent, professional and advisory role in the economic reforms of the 1990s and 2000s, such as Tax, Tariff, Foreign Exchange, Financial Sector & Expenditure Policy reforms.

He was the founder Chairman of the non-profit, "Foundation for Economic Growth and Welfare" (EGROW) and President of the Forum for Strategic Initiatives (FSI, Delhi) and has earlier served as Executive Director, IMF, Chief Economic Advisor, Ministry of Finance and Principal Advisor, Planning Commission.

He was Director & Chief Executive of ICRIER and has published over 60 Journal Articles, Books & Chapters, and more than 100 Working and Policy Papers in Macroeconomics, Growth, Tax & Tariff Reform, Foreign Exchange, International Relations and National Security Strategy.

He was a member of the TRAI, a mentor (Public Policy & Economics) to FICCI, and Member of Technical Advisory Committee on Monetary Policy, RBI.

His experience in Finance Sector includes: Chairman, Board of Trustees of SBI Mutual Fund, Director LIC, Member of SEBI Appellate Tribunal and Depositories Act, Member Board of Trustee at UTI and Director in PNB, Allahabad Bank and EXIM Bank.

His Think Tank experience includes: Member, Board of Governors in CPR & RIS, Non-resident Sr. Fellow in Brooking Institution, USA, Affiliate Professor & Distinguished Sr. Fellow in George Mason University, USA.

Recent Policy Papers of EGROW Foundation

1. Arvind Virmani, Policy for Post-Lockdown Indian Economy, September 2020 https://egrowfoundation.org/site/assets/files/1406/policy_paper_no_04_2020_sep.pdf

2. Arvind Virmani, Lockdown Economics: Fiscal Policy during Pandemic Crises, May 2020. https://egrowfoundation.org/site/assets/files/1349/policy_paper_no_03_2020_b.pdf

3. Arvind Virmani, Macroeconomics of Crises, March 2020 https://egrowfoundation.org/research/macroeconomics-of-crisis/

4. Arvind Virmani, Growth Slowdown, Reforms and Recovery, January 2020 https://egrowfoundation.org/research/growth-slowdown-reforms-and-recovery/

5. Charan Singh, How to Revive our Economy: Some Suggestions, August 2019 https://egrowfoundation.org/research/how-to-revive-our-economy-some-suggestions/

Recent Working Papers of EGROW Foundation

1. Subhash Chandra Pandey, Future for Indian Banking from Public Policy Perspective, November 2020. https://egrowfoundation.org/site/assets/files/1444/egrow_wp_no_06_20_-_edited_s_c_pandey_25_nov.pdf

2. Arvind Virmani, Effectiveness of Containment Policies: Coronavirus Cases and death Rates, July 2020. https://egrowfoundation.org/site/assets/files/1371/egrow_wp_no_05_12_july.pdf

3. Arvind Virmani and Karan Bhasin, Goods and Services Tax: Structural Reform, June 2020. https://egrowfoundation.org/site/assets/files/1360/egrow_wp_no_04_2020.pdf

4. Arvind Virmani and Surjit Bhalla, COVID 19: Arrival and Departure, May 2020. https://egrowfoundation.org/site/assets/files/1334/egrow_wp_no_03_2020_2.pdf