Comparative analysis of India and China's human development progress (1991-2023) - insights and policy comparison

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Abstract

The study provides a comprehensive comparative analysis of human Development in China and India, two nations that have followed different development trajectories since 1990, using Human Development Index (HDI) data from the United Nations Development Programme (UNDP) to examine the evolution of HDI in the two countries, based on the HDI framework that combines indicators of health (life expectancy), education (mean and expected years of schooling), and standard of living (gross national income per capita, adjusted for purchasing power parity).

The results show that China as a Communist- led one party state has reached near Very high Human Development level, ranking 78th in the world out of 193 countries with HDI score of 0.797 in 2023, with its successful HDI achieved by Centralized planning through Five-Year plans at provincial and prefecture levels, investment in health infrastructure and education, Systematic tracking of HDI through government plan documents, Regional development strategies for addressing geographical disparities, and Govt lead universal health coverage mechanisms.

On the other hand, India (130th and 0.684 HDI) has seen consistent growth due to post-liberalization economic reforms, social welfare program expansion, and grassroots delivery of healthcare and education services, although it continues to struggle with Income Inequality, regional disparities, and access to quality public services.

Keywords: Human Development Index, Policy comparison, Education and Health, Economic development, China, India

1. Introduction

Significance of human development as a research theme

In recent times, the concept of progress in development economics has fully come full circle – passing from measuring the increase in the volume of goods and services to measuring an increase in their quality.

Evaluation of man's welfare. We are witnessing a growing unease with current measures of welfare, like Gross Domestic Product (GDP), as appropriate, as they fail to encompass the intricacies of welfare. The term 'human development', which has been codified in the United Nations Development Programme (UNDP) has presented a multidimensional approach in its report on Human Development Index (HDI) to understand the overall quality of life for people based on three indicators namely health, education and income (UNDP, 2023) [59]. The HDI has been used since 1990 as an important indicator of development other than economic indicators (UNDP).

Importance of studying human development:

Capacity to communicate policies which increase capabilities and freedoms of people as per the thoughts of Amartya Sen (Sen, 1999). As economies change, it's essential to become familiar with how the economic transformations affect the social, political and demographical contexts of human well-being. This study therefore seeks to fill the gap of comparative research study on human development performance in different countries with different developmental characteristics.

What is the relevance of comparing China and India? Why do we need to compare China and India?

In China-India comparison the HDI is of particular relevance to examine the various pathways of development between two large countries. The population size in both countries is roughly the same and they are both emerging economies, however, the achieved HDI was not the same, nor has the path of development in the two nation-states been the same. India has been consistently lagging behind China, which has registered higher results on the HDI scale, showing better performance in life expectancy, education and income categories while India is facing challenges of low literacy rate, high infant mortality and high prevalence of poverty. This comparison sheds light on the ways in which policy governance approaches, investment in human capital and choices directly affect quality of life indicators. These knowledge differences are needed to gain deep insights into the effectiveness of different development strategies, how different economic growth options contribute to human welfare and who will be better off if the various resources are distributed equitably. Furthermore, the similarity is significant for international policy discourse, given that both countries account for large shares of the world's population, and their development models can impact the international debate on sustainable development in emerging economies. In addition, it is important to look at India's statistics to determine

what the progress on the HDI metrics means for educational reform, healthcare infrastructure, and poverty reduction programs. Comparisons serve as a means of understanding the lessons that can be learned from good practice or possible pitfalls in pursuing human development in different socioeconomic contexts.

Research Objectives and structure of Paper

The main aim of this paper is to do a thorough comparison between the development index of India and China for 33 years from 1990 to 2023. In using data which are comparable across the world, this study will seek to:

- Analyze and compare the development of life expectancy, education and income in both countries.
- Review the policy measures and institutional arrangements which have underpinned these developmental outcomes.
- Offer guidelines for improving human development, based on learning from one another's experiences.

The paper consists of one part, which is organized in the following way:

The conceptual framework of human development and the HDI is presented in Section 2, which follows this introduction. The methodological approach to the project is presented in Section 3 as well as the data sources for the project. The section 4 Key milestones influencing current HDI Trends in India and the China focuses on this. Section 5 provides a detailed comparative analysis of performance and components of HDI. Analysis of policy in India and China and India's forward path (Section 6). The last but not the least are the conclusion section.

2. Conceptual and Theoretical Framework

Define Human Development and Human Development Index (HDI)

The concept of human development has come as a paradigm shift from the traditional model of development is economic growth. According to Sen (1999), human development it is about increasing people's options as well as improving their freedom to choose their lives. This idea has been elaborated in terms of Human Development in the operational plan for the United Nations Development Programme (UNDP). Index (HDI) in 1990. The HDI is designed to capture the achievements in key dimensions of the human condition, going beyond income measures, to paint a broader picture of human wellbeing (UNDP, 2023) [59]. The HDI is a composite index designed to measure the average attainment of a population in three fundamental dimensions of: human, economic and social development.

UN Development Programme (UNDP), human development: health, education and standard of living. It provides a common denominator across countries for measuring development outcomes. The incorporation of the social and economic indicators makes the HDI a valuable measurement to obtain insights into the effectiveness of the conversion of economic wealth into comprehensive human welfare. (Klugman, Rodríguez, & Choi, 2011).

Human Dimensions-Health, Education, Standards of Living

HDI is based on three equally-weighted components:

- **Health dimension:** Health is measured by life expectancy at birth; proxy for overall health and longevity of the population. It shows the influence of the health care system, nutrition, and public sanitation and the quality of safe water.

These include opportunities to connect with friends, family, and others for support, access to health services, as well as social stability (UNDP, 2023) [59].

System and educational involvement are included in the education dimension. Two sub-indicators make up the education dimension, which is calculated as the geometric mean: expected years of schooling for children entering the education system, and rate of schooling.

Surveys of adults aged 25 and over, for their education in terms of system and mean years. These measures offer information about current educational access and on historical educational attainment. (UNDP, 2023).

Standard of living dimension: Gross National Income (GNI) per capita (adjusted to Purchasing Power Equality (PPP)). It reflects a country's material wealth and economic status.

The PPP adjustment takes into account the differences in the cost of living in the countries (UNDP, 2023), whereas the productivity adjustment reflects differences in productivity across the countries.

Each HDI score is between 0 and 1, where higher scores reflect a higher human development performance. The Normalization of the data within pre-established boundaries of desired values is involved in methodology allowing for comparison of different sets of data.

Over a period of time and countries

Relationships between emerging and developed economies, based on their HDI – There is significant difference between developed and emerging economies depending on the Human Development Index (HDI). Nations that have developed are consistently in very high human development category – scores higher than 0.80 – such as countries in east Asia including Japan, north America, North Atlantic countries such as the United States and Germany, and most countries in western Europe. They have well-established institutional structures, strong healthcare system, high-quality education system and high per capita income due to decadal economic development. The emerging economies including India, Brazil, Vietnam and Indonesia on average have medium levels of human development (0.60-0.75), meaning they continue to experience development difficulties, but are also benefitting from strong economic growth.

Life Expectancy and Health

The major difference between these two groups is life expectancy, in developed economy the lifespan is more than 80 years and in emerging economy it is between 65 and 75 years; although emerging nations have successfully lowered infectious diseases and infant mortality due to targeted public health programs and sanitation, the life expectancy in

developed economy is very high due to the technology, preventive healthcare programs, healthcare spending per capita etc.

Education and Skills Development

Another major difference lies with education – developed economies have almost 100 per cent youth involvement in primary and secondary school, and in some cases, almost 60-70 per cent of young people are already in tertiary education or pending a new cohort, good quality education structures are increasingly available in emerging economies and some countries like China and Vietnam have opened new avenues for education of exceptional quality and extension, but it is still an area that has been assigned to equation-building in other countries.

Income Inequality and Per Capita Wealth

There are in fact quite large differences along the income dimension—the living conditions and consumption of goods and services available to people with per capita income in the range of $40,000 to more than $90,000 in the developed economies are quite different from those enjoyed by the people with per capita income in the range of $5,000 to $15,000 in the emerging economies, where income distribution tends to be high, and where large groups may have become relatively prosperous thanks to the growth of a few sectors of the economy, while other groups continue to be at the bottom of the income bracket.

3. Data Sources and Methodology

The analysis presented in this study relies on secondary data Derived from easily accessible, world-recognized, and world-standardized data sets. The main source on human development indicators comes from the United Nations Development Programme (UNDP) which releases the Human Development Reports annually and the individual country's HDI value.

The Human Development Index (HDI) is a three-dimensional model which has been developed and refined by the UNDP. It has the following components:

- Health is indicated by life expectancy at birth, which represents the overall health and life span of a population.
- Expected years of schooling for adults who are expected to graduate from school.

The number of years expected to be in school, as proxied in its geometric mean by the values for (a) years of schooling expected by children of school entry age, and (b) years of schooling expected by adults who have an expected graduation date from the school.

The average number of years in school completed by adults 25 years old and older is computed.

The standard of living indicator is Gross National Income (GNI) per capita (PPP adjusted and constant 2011 international dollars).

The below indicators are normalised into a value ranging from 0 to 1, with the normalisation using fixed goalposts, thus resulting in an HDI value.

The formula for each component, it is:

Health index

Health Index = (Life Expectancy - 20) / (85 - 20)

Education index

$$\text{Education Index} = \sqrt{\left(\frac{\text{Mean Years of Schooling}}{15}\right) \times \left(\frac{\text{Expected Years of Schooling}}{18}\right)}$$

Income index

$$\text{Income Index} = \frac{\ln(\text{GNI per capita}) - \ln(100)}{\ln(75{,}000) - \ln(100)}$$

Human Development Index (HDI)

$\text{HDI} = (\text{Health Index} \times \text{Education Index} \times \text{Income Index})^{1/3}$

Limitations of HDI data methodologies

As HDI simplifies human development and well-being down to three factors however, there are limitations to what it can capture. These are some of the criticisms of the index.

Correlated factors

Some critics believe that the HDI gives equal weights to some factors (e.g., the height of the table) which, they say, should not get the same weight if the measurements are not equally meaningful. Countries could, for instance, have the same HDI with different life expectancy and GNI per capita. It would mean that there would be an economic value to a person's lives. The HDI also correlates factors which are more common in developed countries. A higher level of education, for instance would be associated with greater GNI per capita. It can be misleading to include two highly correlated values instead of just one, as critics say.

Missing factors

The HDI only includes three measures of human well-being. It does not consider indicators of development and wellbeing that are different, like gender, ethnic differences, security, poverty or inequality.

For instance, a nation may have a high HDI as it may be the nation with a high per capita GNI. That's a high GNI it may have risen at the expenses of some ethnics or genders. But on the other hand, a high GNI may be a result of a small number of very rich people, who may turn a blind eye to the fact that the bulk of its people are still impoverished.

Numerical limitations

The values of the factors that make up the HDI are bound between 0 and 1. This would imply that, for those countries already with higher GNIs, there may be little scope for them to raise their GNI scores even if they could increase and improve it further. This same parameter relates to the logic in the life expectancy score.

It should, however, be noted that the HDI is limited and some historians have proposed that it is a worse measure of foreign

policy success than looking at income alone, but is useful since it is complementary to other economic or social indicators, and can help to expand the definition of development, including making comparisons among developing and emerging economies.

4. Key milestones influencing current HDI trends in both countries

The following key milestones and criteria have directly contributed to the current HDI trajectories of the China and India.

Criteria	China	India
Population & Demographics	Population: ~1.4 billion (slightly declining) Median Age: ~38 years Urbanization: ~65% Dominant Ethnic Group: Han Chinese (~92%)	Population: ~1.4+ billion (rapidly growing) Median Age: ~27 years (younger demographic) Urbanization: ~35% Highly diverse: 2000+ ethnic groups, multiple religions
Government & Political System	One-party communist state Centralized authority under CCP State control of major industries Limited political freedoms and civil liberties	Democratic federal republic Multi -party parliamentary system Private enterprise dominance Greater freedom of speech, press, and religion
Economic Structure	GDP: ~$17.8 trillion (world's 2nd largest) Manufacturing powerhouse Large export-dependent economy Growing tech and innovation sector	GDP: ~$3.9 trillion (world's 5th largest) Services sector dominant (55% of GDP) Rapidly growing manufacturing Strong IT and software services industry
Language & Cultural Diversity	Official Language: Mandarin Chinese Minority languages: Cantonese, Tibetan, Uyghur Relatively homogeneous culture Cultural emphasis on family and hierarchy	No single official language at national level 22 official languages recognized English widely used for business and education Very diverse cultural practices, religions, and traditions
Education & Literacy	Literacy Rate: ~97% Compulsory education: 9 years Strong focus on STEM education Highly competitive educational system	Literacy Rate: ~74% (varies significantly by region) Compulsory education: 8 years Increasing focus on STEM and vocational training Challenges with quality and dropout rates
Healthcare System	Universal health insurance coverage expanding Mix of public and private healthcare Significant investment in healthcare infrastructure Challenges: Aging population, regional disparities	Growing public healthcare system Large private healthcare sector Increasing health insurance programs Challenges: Access gaps, affordability issues
Infrastructure & Development	Advanced transportation networks (high-speed rail, metro systems) Modern urban infrastructure Significant Belt and Road Initiative investment Developed manufacturing infrastructure	Developing transportation networks Rapid urbanization and infrastructure projects Growing tech hubs and smart cities Challenges with rural infrastructure
Natural Resources & Environment	Rich in coal, oil, rare earth minerals Facing severe pollution and environmental challenges Increasing renewable energy investment Water scarcity in northern regions	Diverse mineral resources (coal, iron, diamonds) Facing pollution, water, and waste challenges Growing renewable energy sector Monsoonal climate affects agriculture

***Sources*:** Authors own estimation from references [51-58]

5. Comparative analysis of human development

The Human Development Index (HDI) is a way of measuring and comparing human development across countries, which is a composite measure of life expectancy, education and Gross National Income (GNI) per capita. Compare the HDI of the UAE and India as reported in the 2023/24 Human Development Report, highlighting the overall HDI and the sub-indicators.

Table 1: Trends in Human Development Indicators in China and India

Year	China				India			
	LYS	EYS	MYS	PCY ($) based on PPP	LYS	EYS	MYS	PCY ($) based on PPP
1991	68.61	8.59	4.33	1772.22	59.03	8.21	2.88	2143.71
1995	70.36	8.72	5.13	2724.41	60.63	8.26	3.29	2511.58
2000	72.28	9.90	6.12	3945.03	62.74	8.32	4.14	3069.54
2005	74.08	11.54	6.59	6122.46	64.93	10.02	4.52	3859.17
2010	75.66	13.04	7.06	10222.51	67.16	11.10	5.06	5022.13
2015	76.97	13.97	7.53	14505.20	69.32	12.26	5.69	6443.56
2020	78.01	15.21	7.95	18683.02	70.15	12.12	6.49	7331.95
2023	77.95	15.47	8.03	22029.22	72.00	12.95	6.88	9046.75

Sources: Estimation from UNDP data

Table 2: Comparative analysis of HDI and its indicators

Year	China				India			
	Health index	Education index	Income index	HDI	Health index	Education index	Income index	HDI
1991	0.747	0.383	0.434	0.499	0.600	0.324	0.463	0.448
1995	0.774	0.413	0.499	0.542	0.625	0.339	0.486	0.469
2000	0.804	0.479	0.555	0.598	0.657	0.369	0.517	0.500
2005	0.832	0.540	0.621	0.653	0.691	0.429	0.551	0.547
2010	0.856	0.597	0.698	0.709	0.725	0.477	0.591	0.589
2015	0.876	0.639	0.751	0.749	0.758	0.530	0.629	0.632
2020	0.892	0.687	0.790	0.785	0.771	0.553	0.648	0.651
2023	0.891	0.697	0.814	0.797	0.800	0.589	0.680	0.684

Sources: Estimation from UNDP data

Overall HDI Comparison

During the year 1991, China had an initial advantage of 0.051 points with an HDI of 0.499, while India's was 0.448. India's HDI value for 2023 was 0.684 compared with 0.797 in China, which has improved significantly over the past 30 years, and China has kept and increased its lead, trailing by 0.113 point.

As the two countries embarked from a similar economic base in the early 1990s, it is especially disturbing that they have both been developing economies facing similar problems from that point on. These differential rates translate into China making strides towards "rapid human development" and India stuck in the "moderate human development" group, as would be classified by development economists. Although India's absolute numbers are growing increasingly large and its economy is as large as China's in recent years, the HDI index numbers indicate important differences in the effectiveness of the members of the World Economic Competition in bringing about improvements in citizens' lives.

Income Index

The Economic dimension of human development is measured by the Income Index, which is based on Gross National Income per capita (adjusted for Purchasing Power Parity (PPP)). Because of this, it has been possibly the most stark contrast in income data between the two countries throughout the entire HDI framework that is observed in creating this graph. In 1991, China's per capita income (PPP) was marginally lower at $1,772.22 compared to India's $2,143.71, a difference of only $371.49. This moderate disparity is significant as it illustrates that both countries started the process of liberalization with similar per capita incomes. As 2023 came around, however, everything had changed that image. China's per capita income (PPP) had reached $22,029.22, while India's was $9,046.75, creating a gap of $12,982.47.

Income growth in India has been less volatile, but less spectacular, implying an economic model with underlying structural drivers of income growth, but greater constraints on the ability to turn income growth into per capita gains.

The superior position of China's income index indicates greater individual purchasing power and improved government revenue for public spending, in addition to a more robust ability for household expenditure on healthcare and education.

Health Index

The Health Index is calculated from life expectancy at birth (LYS), and thus reflects the health state and longevity of populations, and the efficacy of health systems, nutritional status and overall wellbeing. The health aspect of the HDI represents one of the most important and interesting disparities between China and India with domestically significant implications for human development and improvement in quality of life. In 1991, the life expectancy of China was 68.61 years and the Health Index was 0.747 while in India, life expectancy was 59.03 years and Health Index was 0.600. In this time difference of 9.58 years in life expectancy, China had an advantage of 0.147 points on the Health Index, which represents that China's population health was much better at the start of the study period.

In 2023, the average life expectancy in China is 77.95 years and was Health Index (HI) 0.891, therefore, in India, average life expectancy is 72.00 years and was HI 0.800. But India's improvement has been faster, adding 12.97 years, increasing the Health Index score only 0.091 points, bringing the gap down to 5.95 years.India's improvement has been quicker as it added 12.97 years, and increased its Health Index score by only 0.091 points, which narrowed the gap to 5.95 years.

The investments made in the health system in India, such as scaling up rural health services, vaccination coverage and disease eradicating initiatives, are yielding tangible outcomes.

Education Index

The Education Index draws from both the EYS index and the MYS index which reflects the duration of the education that will be received by the average person of school age in a specific country, and the average years of schooling received by adults in that country, respectively. These combined metrics give an idea not only of current educational attainment levels, but also of the human capital "reservoir" of the population. Perhaps the most interesting convergence between China and India can be seen in the dimension of education, although China's take is that of a country with a long-term advantage.

The Education Index for China in 1991 was 0.383 with Expected Years of Schooling (EYS) of 8.59 years and Mean Years of Schooling (MYS) of 4.33 years, while that for India was 0.324 with EYS of 8.21 years and MYS of 2.88 years. China's EYS rose to 15.47 years in 2023 from 8.59 years in 2010 and India's was increased to 12.95 years in 2023 from 8.21 years in 2010.

These fundamental gains are reflected in the better performance in the Education Index over time. This gave China

an index value that is 0.697 and India's has increased to 0.589 from 0.324. This is an increase of 0.314 points representing a 82% rise for the former and 0.265 points representing 82% rise for the latter.

The significance of these trends in terms of their implications for both countries and development paths in large emerging economies is great. Its model – with the state responsible for infrastructure investment, educating people, and driving fast economic growth – has brought about rapid transformation on all areas, and China has become a prime example of how well this has been done. There is hope in India's model, which is less old in introducing targeted human development programmes, taking steps to produce improvements, including better education, where gaps have narrowed most and gains are more evident. From a policy and development economist's perspective, these trends imply that human development can be significantly improved with both the universal access strategy – as India has been pushing recently – and the quality-oriented strategy – as China has been doing so far.

6. Policy analysis: India & China

The road taken by India and the road taken by China are different ways to development in Asia, the most populous region of the world. Reduction, China was transitioning to a state-dominating policies that gained a fast industrialization and poverty reduction.

In the Indian federal and democratic system, pluralism is the primary focus of the system. This study is a discussion on the following 12 key policy areas—ranging from infrastructure to innovation—where India can learn and adopt from the successes of the Chinese policies, while retaining elements of its institutional strengths that are distinct from those found in China's communist government.

Policy areas	China's approach	India's current status	Key lessons for India	Challenges and Adaptations needed
Special Economic Zones (SEZs)	Established SEZs (Shenzhen, 1980) with ultra-low taxes, streamlined regulations, and dedicated infrastructure. FDI surged from near-zero to $140B+ annually.	India has 400+ notified SEZs but most underperform due to land acquisition issues, policy uncertainty, and inadequate infrastructure links.	Designate 5–10 world-class SEZs with guaranteed policy stability, single-window clearance, and top-tier logistics. Commit for 30-year horizons.	India's federal structure means land and labour laws require state buying. Democratic processes slow land acquisition unlike China's state-directed model.
Infrastructure investment	Invested 8–9% of GDP in infrastructure annually for two decades. Built 45,000 km of high-speed rail, 135,000 km of expressways, and 250+ airports.	India spends ~5.5% of GDP. Has 4,000 km of expressways; first high-speed rail corridor still under construction. Freight corridors are delayed.	Sustain infrastructure spending above 7% of GDP for 15+ years. Prioritise multimodal freight corridors linking ports, industrial clusters, and hinterlands.	India's fiscal constraints and coalition politics make sustained capital commitments harder. Land acquisition remains a bottleneck for linear projects.
Manufacturing & supply chains	Became 'World's Factory' by offering cheap land, low taxes, massive scale, and deep supplier ecosystems. Dominates electronics, pharma APIs, and machinery.	Manufacturing is 17% of GDP vs China's 27%. PLI schemes launched 2020–22 is early-stage and cover 14 sectors. Supply chains remain shallow.	Build complete supply ecosystems, not just assembly. Anchor large firms that attract hundreds of suppliers. Focus on electronics, EV, chemicals, and textiles.	India lacks the intermediate goods industry depth China built over 30 years. Workers need upskilling. Input costs (land, power, logistics) remain high.
Poverty alleviation & rural development	Lifted 800 million people out of poverty in 40 years via targeted village-level programmes, rural industrialisation, and land reform. Declared zero extreme poverty in 2021.	~230 million still in extreme poverty (World Bank). MGNREGA provides rural work guarantees but productivity gains are limited. Urban–rural gap is wide.	Combine income-transfer programmes with village-level enterprise clusters, rural-urban migration facilitation, and digital financial inclusion.	India's diversity (caste, language, religion) requires culturally sensitive delivery. Authoritarian top-down implementation cannot be replicated directly.
Education & human capital	Raised tertiary enrolment from 3% (1990) to 60%+ (2023). STEM graduates exceed 3 million per year. Massive vocational training system serving 20M+ annually.	GER in higher education is 27%. Quality is uneven; ~50% of graduates are considered 'not employable' by industry. Vocational training at scale is nascent.	Reform curriculum to align with industry; fund 20–30 world-class universities; scale up ITI/polytechnic quality, not just quantity.	Private sector dominance in higher education creates quality gaps. India must avoid replicating China's rote-learning critique while building scale.
Digital infrastructure & fintech	Built a cashless payments ecosystem (Alipay, WeChat Pay) serving 1B+ users. Digital ID, e-commerce, and super-apps cover rural areas. 5G deployed at record pace.	UPI is a global benchmark (12B+ monthly transactions). However, rural digital adoption lags, 5G rollout is early-stage, and AI/cloud infrastructure is thin.	Leverage UPI's success to build an open digital public infrastructure stack — health, agriculture, logistics, ONDC — and link it with AI-powered services.	Privacy laws, data sovereignty debates, and private sector incentives need alignment. India must avoid state surveillance overreach visible in China's model.
Bureaucratic reform & ease of doing business	Centralised execution with clear accountability reduced project timelines dramatically. Single-window systems for business registration cut time to <1 day in major cities.	India climbed to 63rd in World Bank's EoDB (2020) from 142nd (2014). Still faces multi-department approvals, inspector raj, and compliance burden.	Digitise all regulatory interfaces, assign time-bound single-point accountability, and adopt 'deemed approved' rules for low-risk applications.	India's separation of powers, judicial review, and federal structure make sweeping executive action harder. Reform must be democratically negotiated.

Export diversification & trade diplomacy	Diversified exports from low-cost goods to machinery, EVs, and semiconductors. Dominates 200+ product categories globally. Active in bilateral FTAs covering 28 partners.	India's exports are ~$450B vs China's $3.3T. Software and pharma are strong but merchandise exports are concentrated and lack brand identity globally.	Negotiate FTAs with the EU, UK, and GCC aggressively. Brand 'Made in India' products with quality standards. Target China-exit supply chains in electronics.	India's historically defensive trade posture and domestic political economy (farm lobbies, MSMEs) make FTA negotiations slow and difficult.
Urbanisation & smart cities	Urbanisation rose from 18% (1978) to 66% (2023). Planned cities with integrated metro networks, utility grids, and industrial zones reduced urban sprawl.	Urbanisation at 36%, projected 50% by 2047. Smart Cities Mission covered 100 cities but with modest outcomes. Urban infrastructure lags migration rates.	Plan satellite cities around large metros with pre-built infrastructure. Reform urban local bodies' finances. Build integrated transit-oriented developments.	India's cities are democratically governed with limited financial autonomy. Migration patterns are harder to direct; informal settlements are already entrenched.
Research, innovation & IP	R&D spending rose to 2.5% of GDP. Files more patents than any country (1.6M in 2023). Has built world-class labs in AI, quantum computing, and biotech.	R&D is ~0.65% of GDP — among the lowest for a major economy. Private sector R&D is weak. Brain drain continues through diaspora linkages are strong.	Set a national target of 2% R&D/GDP by 2030. Create tax incentives for corporate R&D. Link IITs/IISc to industry. Attract diaspora scientists back.	India lacks China's centralised industrial policy muscle. Must build innovation incentives market-side rather than through state-mandated programmes.
Land & agricultural reform	Household responsibility system (1978) unlocked rural productivity. Later, land-use rights allowed consolidation for industrial use. Agricultural output tripled.	APMC reforms remain incomplete after political reversal (2021). Land leasing markets are restricted. Fragmented land holdings suppress agricultural productivity.	Enable voluntary land leasing with legal protections for farmers. Expand contract farming. Build agri -logistics (cold chains, mandis) to reduce wastage.	India's farm reforms carry high political risk. The 2021 reversal shows the limits of top-down reform. Inclusive deliberation is essential for durable change.

Sources: Authors own estimation from references [5-50]

India's path forward

What India can learn from China's model

A significant part of the 40-year journey of China's transition from a low-income agrarian economy to the world's second largest economy provides some important lessons for India, but not in achieving the same steps en masse. Looking at the information in the 12 policy areas, it is undeniable that the advantages China has lies in execution at scale and commitment to long-term policy. For 20+ years China had invested 8-10% of GDP annually in SEZs infrastructure and built integrated industrial ecosystems and it deployed targeted poverty alleviation, resulting in 800 million people being lifted out of poverty.

This long term structured method can and should be learnt by India. The evidence indicates that there are five strategic priorities:

First is the investment in infrastructure above 7% of GDP, in tandem with the completion of multimodal freight corridors. India's investment rate is 5.5%, which is lower than the rest of the world.

Second, create world-class SEZs having 30-year policy guarantees and single window clearance. There are more than 400 underperforming SEZs that are not wealthy enough or committed enough to being Shenzhen like.

Third, exploit the success of UPI to create a more comprehensive digital public infrastructures stack that adds more elements beyond financial transactions like health, agriculture and logistics. The governance edge that India has here is real, and needs to be taken advantage of.

Fourth, promote reform of land and agricultural markets, esp. the promotion of self-managed frameworks for voluntary lease, and agri-logistics not top-down mandates; India's democratic process needs inclusive deliberation better reflected in the aborted farm laws (2021).

Fifth, make STEM education and R&D spend 2% of GDP by 2030, bring in foreign scientists, and develop a strong indigenous innovation capability.

The key takeaway: Challenges are indeed strengths with proper adaptation. India can also achieve success by means of market-based incentives to the appropriate players, transparent laws, and inclusive discussion, where China has achieved success with state direction. The idea is not to be the "next China," but a part of this is definitely about creating a "path differently India" that reflects the concrete methods adopted by the Chinese and recognized as strengths in their country, while also affirming India's institutional advantages.

Welfare and poverty elimination: challenges of India's forward path

Nevertheless, India has massive policy challenges lying in the structural and political aspect in bringing about the comprehensive policy reform on the basis of the lessons learnt from China:

- **Institutional fragmentation:** India is a federation country so the agriculture, infrastructure, land and educational policy are shared responsibility among the states. The central government of China carried out high-speed rail and SEZs with little interference from bureaucrats. However, India has to negotiate with 28 state governments, which ensures they are democratic but also acts as a hindrance to reforming.
- **Land acquisition bottlenecks:** China's land was state-owned which helped it acquire land quickly and easily for infrastructure and industrial zones. Project time frames are years longer due to India's private land ownership, court-ordered environmental clearance and rehabilitation of the evacuees. The matter of land reforms in agriculture – the

controversial 2020/21 laws aiming to liberalise these sales – were reversed after only eighteen months under political pressure – an example of the ways in which top-down reform has its boundaries.

- **The conflict between democratic politics and economic urgency:** Coalition government in India gives short cycles (5-year maximum) as compared to the cycles of 10 years in China. Political consensus over two or more election cycles for an increase of 7% of infrastructure spending, or a doubling of R&D investment will be required, a feat that will be hard to pull off in the face of fiscal pressures and competing priorities.
- **Quality of implementation:** India has excellent policy but poor grounds level implementation. In terms of productivity, MGNREGA offers guarantees of jobs to farmers in the rural areas (desirable in theory!) but that is not realized. Likewise, PLI schemes in manufacturing have the potential to deliver positive results, but need to be supported by ICHR at the state level; and the performance in these areas is quite variable.

  Addressing poverty in India is complicated by caste, religious, and regional divisions by inequality and social resistance. In China, achieving the goal was made easier by the unified cultural environment, in India more decentralised, culturally-sensitive approaches to delivery would be more expensive and slower.
- **Skills gap:** In China, there are over 200 million people with some skills in Manufacturing. India has 700 million youth of which only ~50% are employable. The time to fill this gap 100 per cent with ITI and vocational trainings would be 10–15 years.
- **Technical difficulties:** due to high savings rate of China (35%+ GDP) and state-owned companies in providing capital for the infrastructure. The fiscal deficit of the Indian government (6% of GDP) and also decreasing domestic saving further restrict public investment. The private sector needs to be involved but delays are created from project appraiser processes.

The solutions to these challenges are not overly difficult and require realistic timelines and alternative implementation methodologies that are suited to Indian democratic, federal and pluralistic context.

7. Conclusion

This is a detailed comparative study of the human development path of India and China over the past 30 years—where they have made enormous strides and where they have seen ongoing differences. Almost all the indicators have been remarkably similar in both countries in 1991, and by this year have nearly equal per capita incomes, but by 2023, they have taken entirely different development paths, resulting in markedly different human development gains. Although both countries have registered significant human development gains, India's development has been slower than China's with India's human development index increasing from 0.448 to 0.684 and China's from 0.499 to 0.797 and China has maintained and even improved its position in many dimensions.

Analysis of the three components of the HDI shows the complexity of development journeys. The disparity is particularly stark in terms of income – by 2023 China's per capita income PPP was $22,029.22, while India's was $9,046.75, reflecting better performance of economic growth converting into individual income and income for government provision of public goods and services. The health dimension as expressed in life expectancy,

Nevertheless, large progress gaps persist and have been observed, with China achieving a life expectancy of 77.95 years as opposed to India's 72.00 years, indicative of the difficulties faced in providing healthcare and investing in public health. The education element looks most promising of the areas of commonality: The percentage gains in schooling were comparable, and India holds out potential in this area by extending access and investment in education.

The comparison shows the development economist and the policy maker that many ways are on offer to human development. The path Indian success can take is to adapt its strategy instead of copying China's important features. India can take its own way to sustainable development by its democratic institutions, its constitutional safeguards, its demographic dividends, which can be combined with very innovative markets, and the timely investments of the government in infrastructure, education and research and development. Improving health and earnings gains in India requires putting improvements in education into practice. Finally, the China-India example shows that basic commitment to an ongoing, multi-sectoral investment in health, education and economic opportunity is essential, whether or not the governance system is based on development or a totalitarian regime. The lessons learned from both countries are important for the international development community, as they reveal the many ways to realize human development in an inclusive and sustainable manner.

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