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We extend our deepest gratitude to authors who have contributed to the journal of economics & commerce since 2010. Your enduring trust in our publication in the cornerstone of our success, and it is a privilege to share your work with the global community

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EDITORIAL NOTES

We are feeling great satisfaction that the Journal of Economic & Commerce ***(JEC)*** has successfully completed the fourteenth years of publication and entering in the 17th year. Earlyear we successfully indexed our journal in QLI Database of INSTITUTE FOR STUDIES IN INDUSTRIAL DEVELOPMENT as well as in the UGC list (2018). We are also proud of our Editorial Board for the *Journal of Economics & Commerce* **(*JEC*), *Which*** includes academicians in the fields of Economics and Commerce, who have marks of records of accomplishment in their respective disciplines and also share a burden of referee as per required from time to time. Ever since its inaugural publication in 2010, ***JEC*** has emerged as one of the most respected publications, encompassing both Economics and Commerce. We intend to build on this tradition with our present issue.

Over the years, ***JEC*** has endowed with a platform for the progression of knowledge and the quest of academic excellence. Many prominent scholars from different part of India have published inspiring high quality articles analogous to those in leading journals in the field. Even as maintaining its focus on contemporary developments in the broad areas of Economics and Commerce, the journal is now also pledged to the spreading out of research frontiers further.

Within this orientation the present issue of the journal provides a set of eighteen articles which includes some special articles case studies on burning issues of economics, commerce and institutional area. In addition to this we have also kept our commitment towards promotion of new contributors and young researchers in the present issue.

The Editors welcome submissions of the research papers on vital issues concerning our economy and commerce, **with a token of note that these will strictly be referred before acceptance.**

DAV PG College
Varansi
31th, January, 2026

Anup Kumar Mishra
Editor

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WHY NATIONS FAIL AND THE VISION OF VIKSIT BHARAT @ 2047

Prof. I D Gupta*

ABSTRACT

The present Prime Minister of India has taken Sankalp of Vikasit Bharat by 2047, that is, the Centenary year of India's Independence. Mahatma Gandhi saw a dream of India which he presented in book 'India of My Dreams' and Javahar Lal Nehru saw a dream of industrially developed India. Nehru, our first Prime Minister, wanted to make it industrialized to remove poverty from the land and establish economic and social justice by suitable reforms. This is the mandate of the Constitution of India. Modi wants India should be technologically advanced, economically strong, and socially inclusive. The paper has 4 parts. First, it introduces the theme; then it discusses various theories of development and less development. It begins with 2024's Nobel award in Economics to the three economists AJR, who worked on Why Nations Fail and demarcated the role of Institutions in success and failures of the nations. Then it mentions Ragner Nurkse's concept of "Vicious Circle of Poverty, Myrdal's theory of Cumulative Causation, Harvey Leibenstein's theory of, Critical Minimum Effort, Nelson's model of Low Level Equilibrium Trap, Lewis model of Dual economy, the Balanced Growth and Unbalanced Growth strategies, and the Big Push theory of Hirschman. The theories formulate the strategy to break the "Vicious Circle' with a Big Push of investment and concerted effort. In Part three, paper very briefly looks into India's development story from 1947 to 2024, the present day and counts on achievements and the challenges. It attempted to find out the reasons why the "State Failed" to deliver, and how and why "Socialism" Failed in India.

The challenges before country are formidable, like huge Unemployment, high price rise of Food articles and inability of the RBI to contain core inflation, high corruption level in the pillars of democracy_ Legislature, Executive, and the Judiciary. Today the society is sick, political system is sick, and judiciary is also infected. Paper highlights criminalization of politics in recent two three decades. As Nobel Winners AJR have highlighted good Institutions make the nation developed and the bad Institutions with extractive practice fail the Nation. In the fourth part, the paper brings out suggestions. It highlights the role of quality teachers and educational institutions in producing, individuals of high integrity, honesty, and caliber. For, it is individuals who make the nation developed and strong. Besides, it emphasizes strict adherence to the "Rule of Law" and suggests making laws to debar criminal elements in coming into politics.

Declaration: This is to declare that the paper is being submitted to the Indian Journal of Economics, for exclusive consideration by the Journal.

It will not be sent to any other Journal for publication.

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Keywords: *Vikasit Bharat, Socialism, Growth*

In the year 2024 three economists, Daron Acemoglu, Simon Johnson and James A Robinson were awarded the coveted Nobel Prize in Economics for their work "Why Nations Fail". They postulated upon democracy as the basic political system which promotes fast growth. They asserted successful nations establish institutions that secure property rights, fair laws with equal access and opportunities, and robust state institutions. These institutions support the disadvantaged, safeguard the less powerful and regulate large corporations effectively. In view of the above postulations, our attempt in the present paper is to look into India's dream of a developed nation and the success and failures with which the country is struggling and in which direction it is going now to realize the dream of a Vikasit Bharat by 2047, the one hundredth year of our Independence.

On 15th August 1947, at the stroke of the midnight hour, Pandit Javahar Lal Nehru, Independent India's first Prime Minister, gave his famous "Tryst with Destiny" speech to the Constituent Assembly of India. And now after 75 years, time has come, and the ground is prepared, to redeem that dream within 20-25 years. Our Present Prime Minister Sri Narendra Modi has taken *Sankalp* to make India Vikasit, at par with the developed countries of the day, by 2047, that is, the centenary year of India's Independence. It aims to reshape India into a technologically advanced, economically strong, and socially inclusive nation. The dreams of developed Independent India were in the minds of the People of India and the leaders like Mahatma Gandhi. Gandhi expressed his wishes in the book 'India of My Dreams'. In the later period, development narrative came into the visions of subsequent Prime Ministers from Smt. Indira Gandhi up to Man Mohan Singh and in each of the Five Year Plans the objectives, based on the contemporary situations, were reiterated.

Jamshed Ji Nusserwanji Tata (1839-1904), the venerable industrialist and philanthropist, who founded Tata Group, India's biggest conglomerate company, said. "*I do not want India to be an economic super power; I want India to be a happy country".*

People cannot be happy unless and until their *basic needs* are fulfilled, therefore, the first priority is raising the incomes of the people. As we shall see later in part two, the *end* of development is stated, *Happiness in life*, along with long, healthy, knowledgeable and meaningful life.

Countries of the world were mainly agricultural till 16-17th century. Agricultural development was synonym of economic development. Then during 18th century Industrial Revolution came in England and use of machinery in production changed the situation. Industrial Revolution spread in Germany and other countries of Europe and they became rich. Then Industrial development became synonym of economic development. Development of science and technology and widespread use of machinery changed the entire scenario. The countries which went through Industrial Revolution became advanced, and the rest depending upon agriculture remained backward. In the Twenty First Century, Artificial Intelligence (AI) is playing a vital role in development. Use of computers, super computers, digitization and wide use of Robotics are revolutionizing the scenario. Newer generation technologies are changing the world fast. And now the countries which are ahead in adopting them are becoming rich and advanced. We must look India's future development in this perspective.

Owing to the sustained growth in India, particularly after 1991, it is 5th largest economy in the world with a GDP of around $ 4 trillion. The population size of above 1.4 billion, surpassing Peoples Republic of China, has an edge over the world, for its young population, ready to reap advantages of demographic dividend. Today it is a Super Power standing among top few in geo political game. India's voice is now heard in international forums, like the UNO, and in solving the war and disputes in

between the countries like Russia and Ukraine, and Israel and the Philistine and elsewhere.

The paper is organized in four parts. With the introduction of the topic in the first part, the paper in the second part looks briefly into the Development Theories presented by the Economists and the Nobel Laureates, from time to time, particularly pertaining to the Less Developed Countries_ the LDCs, like India. In the next part it elaborates briefly upon the realities of Indian economy: the successes and failures since 1947 and up to 2024_ the present time. It looks into the reasons of the 'State Failure' and 'Failure of Socialism', and the challenges faced by the country after liberalization and privatization in 1991. It also analyses where we initially erred and failed. In part four, the paper presents suggestions to realize the Dream of a Developed Bharat.

Part -2

Now we shall take up in what way development has been defined and what are the main development theories. What factors lead to growth and what deter it.

Development is defined in Economics in terms of Life-sustenance, Self-esteem, and Freedom (Gaulet, 1971). Freedom is three dimensional: Freedom from want, freedom from ignorance, and freedom from squalor. Nobel Laureate Amartya Sen, too, defines Development as Freedom. Sen explores the relationship between economic development and individual freedom. He describes human freedom as both the primary end objective and the principle means of development. His concept of freedom is multi dimensional; not only pertaining to economic freedom but also incorporating social, political, and other freedoms. This year's Nobel laureates in Economics got the coveted prize for explaining the role of Institutions in determining economic outcomes. Institutions matter in how economies perform. Douglas C North won the prize in 1993 for his articulation of the role of institutions.

Daron Acemoglu and James A Robinson wrote the book *Why Nations Fail*. Simon Johnson, the third, had collaborated with Acemoglu and Robinson to produce an influential paper in 2002 published in the Quarterly Journal of Economics, "*Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution*", whose thesis is elaborated in the book and has won them the Nobel Prize.

A functional system to enforce *contracts* is vital for economic efficiency and that the lethargy of the judicial process hurts growth. The Nobel winners explained how growth-constraining and growth-promoting institutions come into being. Further they posit the possibility of growth retarding institutions being changed into growth friendly ones through popular pressure.

The Nobel winners of 2024 also focus upon Democracy as the basic political system which promotes fast growth. However, the Chinese Economists have contested the contention. Chinese scholar Yuen Ang's critique of AJR presents a challenge to their deterministic, teleological model. In her book, *How China Escaped the Poverty Trap*, Ang refutes AJR's assertion that inclusive institutions are as *ex-ante* requirement for economic growth. Instead she introduces the concept of "*directed improvisation*", a decentralized mechanism of institutional adaptation driven by iterative experimentation at sub national levels. This process allows institutions to co-evolve with emergent economic conditions, directly contesting AJR's static binary classification of institutions as either inclusive or exclusive.

Ang's model highlights the *endogenous*, path-dependent nature of institutional evolution aligning with Douglas North's concept of '*adaptive efficiency'*. China's use of Special Economic Zones in the 1980s exemplifies this, enabling decentralized experimentation in regions such as Guangdong,

decoupled from national-level reforms, thereby fostering institutional plasticity through selective scaling of successful policies.

China's rapid growth under extractive conditions- characterized by elite dominance, week property rights, and limited political pluralism- precedes institutional inclusivity, suggesting a feedback loop where growth induces, rather than follows, institutional reforms.

Further, it has been stated that western development was not purely driven by inclusive liberal institutions rather it was accompanied by exclusion and cronyism. The Industrial Revolution in Britain was fuelled in part by the exploitation of labour and political and economic disenfranchisement of large segment of population. Their economic success was mainly dependent upon the exploitation of their colonies. It has been argued that the Global North's development came from exploiting the Global South. For instance, in Africa, colonial powers established extractive institutions to siphon off resources, leaving countries such as Congo, impoverished despite their natural wealth. India, the "Golden Bird" was denuded of her wealth by the British, which is now estimated in trillions of dollar, and the British Rule for two hundred years almost, made the country impoverished. India's wealth made Britain rich and powerful while India languished in misery for two centuries together.

Even after the World War two, the trade policies of the West were tilted in their favour. Singer and Raul Prebisch's thesis of 'D*eteriorating Terms of Trade'* of the poor countries shows how unfair trade practices were favouring the rich countries and were against the '*primary producing'* countries.

Prior to the current debate on development, many theories of development and under-development were developed by Economists from time to time. Ragner Nurkse's concept of "Vicious- circle of poverty" operating in the Less Developed Economies_ the LDCs shows how and why they remain poor for long owing to the demand side and supply side factors. Unless and until a Big Push in favourable direction comes in the form of large investments, the countries can not break the vicious-.circle, and develop. Lewis presented the 'two sector model' of an industrial sector and the agricultural sector. Harvey Leibenstein presented Critical Minimum Effort thesis where he presented 'Income – raising forces' and Income- depressing forces' thesis, operating in the economies and suggested *Critical Minimum Effort* to come out of poverty. Nelson presented thesis of "*Low Level Equilibrium Trap*" in which he showed the relation between per capita income and the population. Gunnar Myrdal gave the "*Theory of Cumulative Causation*" to explain the operating forces in the economy which present hurdles to growth and development of a poor economy. P N Rosenstein Rodan provided the theory of '*Big Push*". The crux of this theory is that the obstacles of development are formidable and pervasive. The development process by its very nature is not a smooth and uninterrupted process. Then the theories of Balanced and Unbalanced growth were presented. While Nurkse, Leibenstein, Rodan and Lewis proposed *Balanced Growth Strategy*, Hirschman, Singer, Flemming etc. called for *Unbalanced Growth Strategy*. The principle of the Unbalanced Growth approach is that for growth in these countries to be stimulated, what is needed is an *imbalance* rather than balance among the different sectors of economy.

The theories of development and under-development state that the growth process is not easy and smooth. There are "Spread Effects and the "Backwash effects" in an economy which ultimately decide the outcome as articulated by Myrdal earlier.

Besides economic factors, non-economic factors also play a very decisive role in growth and development. They include political freedoms, the state of societal development, the philosophy of

life followed by people, the "Will to Economize", quality of human resource, and the level of integrity and honesty among individuals, in the country and so on.

In recent decades newer dimensions have been added to growth and development saga. Not only GDP growth and per capita income growth are important but the qualitative aspects of life are also of great importance. The quality of life dimension was added presumably by 1990. Physical Quality of Life Index (PQLI) was prepared in different countries incorporating, Life- expectancy at birth, level of education and child mortality. Later on the direction of growth moved towards Human Development and Human Development Indexes were prepared in the countries to count upon where they stand in '*Quality of Life'* parameters. The objective of development became attaining long life, healthy life, and knowledgeable life.

Subsequently, 'Growth with justice', 'Human face of development', Environmental viability of growth, and 'Inclusive growth' became popular. The ultimate objective of growth and development is also a matter of search and research in modern time. Happiness in life is all the *end* of economic pursuits. Life should be 'meaningful and happy'. Happiness narrative began from Bhutan which is a Buddhist country with minimum desires and minimal materialism in life.

Part-3

In this section we shall have a bird's eye view of development saga in India since 1947 till 2024.

Our present Prime Minister Sri Narendra Modi wishes India should be a Developed Country by 2047. As mentioned above, Mahatma Gandhi also had a dream of India. He presented his ideas in the book 'India of My Dreams'. He wished a developed economy based on agriculture and cottage and small industries, and do away with machines which replace labour. Nehru's vision was that of an Industrialized India which was based on how the advanced countries of the West developed after Industrial Revolution and raised the income levels and living standards of the people, high to very high. He also visualized how Russia developed fast after Bolshevik Revolution in 1917 and adopted Communism, State Control of resources, and Planning. The Country wished to be a Socialist country but keeping away Communist *regimentation;* as also it wanted the Capitalist model of wealth creation and *efficiency*. The major weakness of Capitalism had been *exploitation* of labour and consumers which was *unjust* and which divided the society into the rich and the poor. Therefore, India opted for a *Mixed Economy* to make India *Socialistic*. It was considered an *ideal mix* of both the systems Capitalism and Communism, but keeping away their evils. The Constitution of India talks of Social and Economic justice as the objective of Economic and Social Policies. It provides fundamental freedoms which are curtailed in Communist system. It also wished Inclusive growth via focusing on the interests of the last man, *Antyodaya*. Nehru became the first Prime Minister and he created Planning Commission in 1950. He created Public and Private sectors and assigned their roles, with leading role of the State in taking care of country's quick development. It had been some Leftist and some Capitalist although the leaning had been leftist. This was considered to bring *social justice*. The Industrial Policy Resolution brought out by Syama Prasad Mukherjee, the then Finance Minister, in Parliament, in 1948 charted the roles of Public and Private sectors and Industrial Revolution in India. Subsequently in 1956 a full fledged Industrial Policy was announced in the Parliament. Five Year Development Plans started in 1951. The First Plan emphasized on the development of agriculture and rural economy. Land Reforms were brought to raise productivity of the land and establish social justice. Many landmark institutions were created in Nehru's period.

Nehru was a *Nation Builder* and as scholars say, he was a '*modernizer par excellence'*. And under his

guidance economic policies were shaped. He put India on the path of rapid industrialization. In this order government had to play major role in developing the economy. In the Mixed Economy, the Public Sector took the responsibility of the 'Commanding heights of the economy' for development. (Apparently it was a Russian replication). As already stated Industrial Policy Resolution 1948 prepared the ground for Mixed Economy by defining the roles of the State sector and the Private sector. Private sector had a supplementary role in this design. In 1956 Industrial Policy was announced in Parliament. As India had been an agricultural economy with low productivity of land and as an outcome low income of the farmers, Land Reforms came to improve the situation. The objective was to raise productivity through Abolition of intermediary Zamindars and Jagirdars, Tenancy reforms and giving ownership rights to cultivators, controlling rack-renting, and Consolidation of holdings etc. This was also to attain social justice and removing injustices from the land system. *Bhoodan* and *Gramdan* movements were also started by Sant Binova Bhave and Jai Prakassh Narain, the Socialist leader.

In Nehru period many big projects were undertaken like Hirakud dam (1947_opening date 1957) in Sambalpur Orissa, Bhakara dam in Bilaspur, Himachal Pradesh in 1948 (opening date 1963) and, Nangal dam is another dam at Nangal in Punjab downstream of Bhakra dam.

Tata Institute of Fundamental Research was founded on 1st June, 1945 and Homi Jahangir Bhabha was its first director. Bhabha Atomic Research center_ a premier nuclear research center came into existence in 1954. These Institutions played a very vital role in India's future development and improving nation's capability in science and technology.

Chinese invasion in 1962 and India's failure was a big setback to country. The realization came that India have much to do on military front also, to make it strong.

After Nehru's death in May 1964, the command came in the hands of Lal Bahadur Sastry. It was the time when population of the country was increasing by 2.25 per cent per annum and by mid 1960s it was above 50 crores from 33-34 crores in 1947. But food production had not risen and Food Crisis developed in the country. Foreign Exchange crisis had already engulfed the country since the beginning. At the same time war broke out with Pakistan in 1965. The country realized that India also needs to become militarily strong. And a large part of resources were diverted from economic development to Defense development. Scarcity was all around of food and other essential commodities. Then Rationing and Controls were introduced and Public Distribution Shops were opened. And to check proper distribution Inspectors and other officials were appointed by the government. Scarcity generated black marketing and black marketing flourished through bribery to officials. The system created Inspector Raj and black money generation, which later on became a big rogue for the development of the country. The ideals of economic and social justice promulgated in the Indian Constitution went haywire.

Later on after Lal Bahadur Sastry's untimely death in Tashkent, Mrs. Indira Gandhi assumed power. She dreamt of a Poverty- Free India. The country was in deep crisis. Food- crisis was there, the inflation was galloping in two digits, agricultural productivity was not rising, and the country was in distress. Indira Gandhi immediately brought “Twenty Point Programme” for poverty alleviation and then Intensive Rural Development Programme (IRDP) and Intensive Area Development Programme (IAAP). As also she nationalized 12 major Banks in 1969 and later on 6 more in the name of “Social Control” of Banking, to provide loans to the unemployed and the poor at cheap rates. The criteria of bank loan were changed by linking it to productivity and productive purpose in place of property as

collateral. It was considered that one of the major causes of poverty is unemployment in the country. Many other employment generation programmes were started during her period.

During 1970s and onwards much political upheavals took place when the Congress party started losing majority in elections and the coalition governments were formed. Subsequently Morarji Desai and Chaudhary Charan Singh assumed power for a brief period and attempted to do away with Nehru's industrialization policy and lead the country on Gandhian path of rural development and village economy. However, the period of their governments was short and by 1985 Rajiv Gandhi, son of Indira Gandhi assumed power.

Rajiv Gandhi was an aeronautical Pilot and a man of modern age. He initiated to upgrade the technological capabilities of the country and looked for the Outward- Looking policies in place of Inward-Looking policies of import substitution etc. The economy was liberalized and many of the controls were done away with. It was like releasing the economic "Tiger from the chains". The growth rate of GDP then became 5 to 5.5 per cent per annum from erstwhile 3 to 3.5 per cent per annum for decades.

During the early nineties when Narasimha Rao assumed power and Man Mohan Singh became Finance Minister, the country was again in deep Balance of payments crisis and its credibility was lost. Prior to Narasimha Rao the government of Chandra Shekhar Singh had to shipload gold to the IMF to secure loan. And under the compulsions the economy was privatized and globalized through Financial sector reforms and the Trade sector reforms. This was a monumental change when economy transformed from a Socialist economy to a Market economy in 1991. Man Mohan Singh had a dream of "Development with Human Face". The State became a Facilitator State in place of a Producer-State. The economy after liberalization and these reforms assumed a growth rate of GDP of 6-7-8-9 per cent per annum. Within the past 32-33 years since 1991 many of the MNCs came to India and many of the International brands opened their outlets here.

The transformation of Indian economy after globalization has been fast. Many of the achievements are landmark. India has attained a status of 5th largest economy in the world, only after America, People's Republic of China, Japan, and Germany in its GDP size. During the past 15-20 years it has a record of poverty alleviation through JAM trinity and providing essential assets and public goods to the poor and the marginalized. India's Digital Economy is progressing. Notwithstanding, the challenges are far demeaning. The unemployment problem, particularly of the educated youth is staggering; corruption is widespread as per Transparency International estimates; Good Governance is marred by "extractive practices" of Rent-Seeking and Criminalization of politics. Role of Black Money still plays a big role in Elections and Government formation from Local to State, to the Parliament. More than 32 per cent of the elected Parliamentarians in India are tainted. They have reported to the Election Commission of India before contesting elections, cases of heinous crimes like murder, attempt to murder, loot and robbery and crime against women, as per the data of Democratic Watch organization. For these reasons the "trickle- down" is barred hence problem of Inclusive growth is serious. Funds going for poverty removal to the poor and the marginalized are siphoned off by the Political Leaders, the Bureaucrats, the middlemen, and the agencies involved to cater to all this.

Illiteracy, poverty, gender discrimination, casteism, communalism, regionalism, and violence still prevail in the country. These are the big shackles which have chained progress and prosperity for centuries. It is very difficult to come out of the mire and become free from these bondages.

Growth and development is a Marathon and not a Sprint, says Raghuram Rajan, the former Governor

of the Reserve Bank of India. And in the author's opinion it is a Hurdle Race.

As stated above, after the First Five Year Plan, the growth rate of Indian economy remained in between 3 to 3.5 per cent and the objective of five per cent per annum growth of the Plans was never realized. As the population was rising at the rate of 2.5 per cent per annum, the per capita income of people remained stagnant at merely one per cent per annum. During the period 1950-51 up to 1991 that is for about 40 years India remained poverty ridden. Poverty remained in the range of 40-45 per cent. The dreams of nation builders to make India strong and shining belied almost. The ideology of Socialism failed. Socialism and the State failed to come up to the aspirations of the people. The delivery of public goods and services were the first citadel to fall. The growth which generated during the four five decades in the country went to the high and mighty. Inequality of income and wealth escalated owing to the failure of the "Trickle Down". A '*weariness from planning'* emerged and people became fed up with the inefficiency, bribery and corruption in government offices. These were the death nails in the coffin of Socialism in India. Economy could not perform. And the public Institutions became corrupt and crippled. The Public sector institutions started losing heavily and subsequently Disinvestment Ministry was created to handle them to Private entrepreneurs. This was mainly because the *motivation* factor which is the key to private entrepreneurs' success was altogether *missing* with government officials. It was partly because of over centralization of decision making power in government departments. There were no *transparency* and *accountability*. And no punishment was there either.

As stated above the baton of development and growth was passed on to the private entrepreneurs' hand in 1991 with opening up of economy for globalization during the regime of Narasimha Rao and Man Mohan Singh.

India gained through high growth rate after reforms. And within 25-30 years became world class. It became 5th economy in the world with a national income of $ 4 trillion around.

During the past 10-15 years poverty significantly declined in the country from above 40 per cent to 11 per cent as per the Niti Aayog estimates. The growth had been technology driven in, say, the past 25 years and owing to government policies to provide direct benefit transfer of the government provisions to the poor beneficiary. It was made possible through JAM trinity. Leakages to a great extent were checked. The progress of Digital economy is another landmark.

When we glance at the structural change in economy, we find that services sector is playing a leading role now. Its share in GDP is above 50 per cent. The role of agriculture and allied sector and that of manufacturing has declined to 17-18-19 per cent. In 1950-51 agricultural sector's share in GDP was 55 per cent.

Services sector is divided in two parts. One employing highly skilled in science and technology and the remaining employed in low wage employment in MSME and unorganized sector. And the share of labour in unorganized sector is around 90 per cent, where no Factory Act applies and no provision of Social Security is there. This is the stark reality of the service sector.

Agricultural sector sustains about two third of Indian population where the growth rate is around 2 to 4 per cent. In this sector a plateau is reached. China is now the manufacturing hub of the world while Indian manufacturing is at low key. Indian manufacturing sector is lagging behind for long. Many of the Indian entrepreneurs just import Chinese goods, assemble them and market in Indian market. Production and innovation are missing. Another part of the story is that many of the rich businessmen are leaving India to settle abroad, frustrated with the government policies. They are investing abroad.

Notwithstanding, the success story of India, the failures are formidable.

Whereas the country successfully reduced poverty to a large extent, in the Global Hunger Index it stands at rank 105 in 127 nations. About 14 per cent of Indian population or 200 million people are under nourished. The situation is stated as "extremely alarming". India is world's fastest growing economy; at 6.8 per cent in FY 2024, with an estimated GDP of almost $ 4 trillion, however, its per capita income, of $2,485 in FY 2024 was less than a fourth of the global average of $13,920 in FY 2022, indicating the wide income inequality that would result in vastly varied disposable income. Food inflation which was 3.8 per cent in FY 2022 is now around 9 per cent in 2024. In December 2023, 36 per cent of the 89.1 million children under six years measured were found stunted, 19 per cent were under weight and 6 per cent children under five were wasted.

Another big challenge is that of rising prices particularly food prices. Although Reserve Bank of India is attempting to limit it in between 4-6 per cent, it is getting success mainly in *core* inflation while food prices are rising at the rate of 9 -10 per cent in recent years. It is mainly because of the structural factors and the outward factors like Russia Ukraine war and Israel Palestine war on which country has no control. The structural factor indicates towards bottlenecks in supply and tilt of the economy towards tertiary sector. Income is rising fast due to growing tertiary sector but commodity producing sector_ agriculture and manufacturing are lagging behind, therefore there is a demand–supply mismatch causing persistent inflationary trend in economy.

The situation on unemployment front is alarming and no government is able to solve it. Due to 1.4 billion plus population of India, every year new entrants are entering into the job market in the range of 12 to 14 million, while hardly one third or so are getting employment and the remaining add to the existing pool of 4.5 to 5 crore unemployed . Unemployment rates among the youth (ages 15-29) remain significantly higher than those for the general population. In 2022, the unemployment rate for urban youth was 17.2 per cent, compared to 10.6 per cent in rural areas. According to CMIE data unemployment rate in India stood at 7.8 per cent in September, 2024. Eighty three per cent of the jobless Indians are youth, says International Labour Organization (ILO) Report.

Under employment and Low-Wage employment is yet another cause of poverty in India. It is said, unemployment is just a tip of the iceberg, while the deeper cause of poverty in India is Low- Wage employment.

The biggest challenge in India is that of widespread corruption which has crippled the system. It has infected all the Institutions and offices in India. It has engulfed every walk of life. From under the table greasing the palm of government officials, to getting public services like health care and education, to getting favourable judgment from judiciary, it is present in some form. Getting a bed in hospital, getting admission of child in school, getting a berth in railway compartment, everywhere one faces the challenge. No one in India has not paid bribe to any of the government official in his life time, is a stark reality.

Corruption started in India in scarcity period in war time before Independence. It escalated after 1960. Eventually, it was the time when those who had fought for India's freedom and had seen sacrifices given by them, their fathers and forefathers were in command of offices and institutions. They had a different value system. Then they were replaced by those born and brought up in 'free India' and were ambitious and eager to run fast via easy money collection. During the crisis period of food and essential commodities in 1960s and rationing and control, and licensing certain unscrupulous government employees and middlemen started to earn easy money via black marketing. The disease spread fast in every branch where there was a possibility. Kautilya in *Arthashastra* has narrated 40

ways of embezzlement by the officials managing government revenue department. He said, "*just as fish moving under water cannot possibly be detected either as sipping or not sipping water, so government servants employed in the government work cannot be found out (while) taking money (for themselves*)".

Corruption in India has made the *society sick*. It has made the *political system sick*. It has made the *economic system sick* .It has made *the judicial system sick.* The three pillars of Democracy, the Legislature, the Executive, and the Judiciary, all are infected with corruption in India.

A recent report by the Association for Democratic Reform (ADR) and New Election Watch (NEW) depicts that 40 per cent of the sitting MPs of the 17th Parliament in India had declared criminal cases against them to the Election Commission. Out of them 25 per cent (194) were accused of serious crimes including murder, attempt to murder, kidnapping and crime against women.

About the Judiciary, a news report published in The Times of India, dated May 25th, 2007, is quoted. The Transparency International's Global corruption Report, 2007 alleges that a whooping Rs. 2,630 crore bribe is paid every year to court officials in India. Money was paid to the officials in following proportion: 61 per cent to lawyers; 29 per cent to court officials and 5 per cent to middlemen. The loss of confidence in judiciary is mainly due to the long gestation period of litigation with crores of cases pending disposal. Chapter titled 'Indolence in India's Judiciary' stated, 'Although provisions for the independence and accountability of the judiciary exists in India's Constitution, corruption is increasingly apparent.'

In a news report in the Times of India, dated 5th July 2022, the Allahabad High Court has taken cognizance of "nexus *between crime and politics as a serious threat to democracy*" and called upon the Election Commission of India to "*wean away criminals from politics*".

In Transparency International Index Corruption India ranks 93 among 180 nations in 2023.

Part-4

This section of the paper will attempt to suggest the possible remedies.

People's perception in India is that most of the Indian Political Leaders are corrupt and 'Self-serving'; the Executive is almost corrupt and inefficient in delivering quick results, and the Judiciary is also not untouched with corruption. Common man is suffering and is in compulsion to tolerate corruption. It has become a 'way of life' in India to live with corruption and bribery. There is no other way of survival. Democracy, "*of the people, for the people, and by the people"*, of late, has been hijacked in India by the criminal in politics.

To my mind, we failed on two counts initially after the Independence in 1947:

1. In bringing about a Population policy to control population in India;
2. In bringing about an Education Policy to provide compulsory basic and quality education to all.

And the net result after 75 years is huge population burden on the country. It is a gigantic task to feed and nourish and provide essentials of life to 1.4 billion plus population. Besides, the quality of population is low. The country abounds low quality population. No discipline, no ethical and moral value in most of them. It is owing to not providing them 'quality education' and inculcating 'discipline' in them. Had the country checked population in the initial stages and commanded the youth in between the age group of 14-18 for *compulsory military training* and sending them for *compulsory 'community service'* like how to control the traffic, and how to handle emergency care in the accidental cases, the practices followed in almost all the Western countries who are counted as the First World,

the chaos everywhere in India would not have arisen. Had we taken care of these few steps earlier India would have become world class. The author has witnessed by his own eyes how and why those countries are the First World Countries and why India is among the Third World Countries. They have given sacrifices; they are disciplined and punctual to time. The countries are neat and clean while India suffers from dirt and filth everywhere. Their departmental stores and outlets do not sell adulterated and low quality products, while adulteration of food items is common in India. They have high standards for drugs while in India many medical stores, particularly in village and remote areas, are selling fake and sub- standard medicines even today.

For making India *Viksit Bharat* by 2047, determined effort will have to be made to break the "Vicious Circle". And this requires a "Big-Push". Our Prime Minister Modi has taken determination to eliminate Corruption and Black money since his first term in 2014. And many of his efforts are in this direction, for example, Direct Benefit Transfer (DBT) through Jan Dhan Yojana (Bank account to the poor), Identification by Adhar, and communication through Mobile connection, taking advantage of Information Revolution in the country. And the leakages have declined to a significant extent. Faceless Income Tax is a remarkable step to control corruption in Revenue department, Digitization of economy is also a significant effort to make the things online and lessen human interference. Technology will transform the scenario. Corruption is a hydra –headed monster in India. In three four decades it has entered into the blood of people, say in the DNA, if this term is not an exaggeration. It is a mythical *Raktbeej* monster, whose killing was very difficult, as severing his head meant his blood falling on the ground; and with each blood drop on the ground emerged other monsters. This allegory is well suited when we elaborate upon bureaucratic corruption, political corruption, and corruption in judiciary in India. The percentage system emerged in the government department since the beginning, since early fifties, as the veterans stated to the author. And it is a deep rooted secret. No bills are passed without a "cut", no tender is passed and payment to contractor is made without a certain percentage cut. And this tells upon the quality of public work. Usually there is a patronage of some political leadership in such cases. And the practice flourishes and goes on smoothly and unhindered. Those who are on these lines know how to get the things done. Railway tenders, Coal tenders go to criminal mafias of the area, who sometimes become Ministers in the government. This is criminalization of politics and the nexus among bureaucrats, politicians, and the mafias, and some of the big businessmen, which was noticed and spoken about by one of the Presidents of India decade's back, in his address to the nation.

Only state's efforts will not eliminate the menace unless and until civil society rises up against it. In mythological narration of *Raktbeej* even the mighty Lords could not kill him. Then goddess Kali was invoked. And Goddess Kali killed him and let his blood not fall on the earth. This narration tells how to eliminate a bigger evil; a very strong determination and efforts are required.

The focus moves on the ethical and moral training where the role of moral education becomes a pre-condition. The educational reforms are the first which could produce men of high integrity and character. For, it is the character of the people which decides the fate of the nation.

Educational institutions should stand up to the standards comparable with the Chinese, American, and European countries, so that our students could compete with them. China which started late than India, is much ahead of us in educational achievement. Their original research papers outcompete all in the world almost. It is said that, "*the battle of Waterloo was won on the playfields of Eton".* It is the schools and colleges and their teachers which produce Kings and the Warriors; they produce scholars

and the executives and the leaders of top class. It was Aristotle who nurtured Alexander the great; it was Kautilya who nurtured King Chandragupta Maurya. In the ancient time in India, it was Bashistha who inculcated values in Ram to become an ideal for the ages. Good teachers produce men of character. And men of character are the foundation on which a great nation is built.

In India during the past two three decades education has gone into the hands of businessmen, industrialists, and the education mafias. There has been a "*commodification of education"*. Education now has become an *industry* where businessmen have entered to reap profit, in the camouflage of missionary work. Due to large number of students, which is owing to large population, governments are incapable to handle the crowd; private sector's entry had become a compulsion. So they are in the field.

A ground report of the intermediate and graduate level colleges shows that in the rural and remote areas, schools and colleges are run by education mafias, which are under the patronage of some political leader. Mass copying is a common practice there. Students take admission for the sake of attaining Degree which make them eligible for jobs. Principles of the institutions and the Managers make huge sums in crores of rupees every year in this game, particularly in Bihar and Uttar Pradesh. As the number of colleges are growing up so their profits are growing up. It is menacing. Education is neck deep in corrupt practices. How to tackle the situation and free education from such elements is a challenging task for the government and society. But this has to be done at any cost to realize the dream of *Vikasit Bharat* by 2047.

To sum up

Now the time has come to make India technologically advanced, economically strong, and socially inclusive. The five key facets that would stand out for India are: Technology, Innovation, Entrepreneurship, Women, and Water. Then:

1. Greater power should be given to Local governments
2. Federal priorities have to be extended to all the units of the federalism
3. Women and minority groups should be included in the decision making process.

All these will deepen Democracy in India

The three Nobel Laureates in Economics in 2024 have produced scholarly work on Why Nations Fail. They advocate Democracy, as democracy ensures freedom and the "*rule of law".* And these two are expected to lead countries to progress and prosperity. Daron Acemoglu in his book Why Nations Fail talks of the role of the institutions in failing the nation. He states," Every nation has the potential to succeed economically and socially. The key factor is the institutions that they have chosen to organize their society, politics and economy. Successful nations establish institutions that secure property rights, fair laws with equal access and opportunities, and robust state institutions. These institutions support the disadvantaged, safeguard the less powerful, and regulate large corporations effectively".

The substance is, when the democratic institutions fell down, the nation will fail.

At present performance of Indian economy at 7 per cent around is among the top in the world economies including China, the USA and the other European countries. India could withstand the crisis which devastated world economies from time to time since 2008. That shows the resilience of it. If Indian per capita income level reaches $12,500 by 2047_considred to be cut-off to move from middle-income status to high-income status, with a projected population of 1.6 billion, it will be $ 20 trillion economy, close to the size of the USA today. It will be an economic Super-Power. Even if it achieves a level of income of $ 10,000 per capita India will be a $16 trillion economy, the third largest

in the world.

It would be a Happy Country if it is able to contain certain income inequality and succeeds in making growth inclusive by reaching the gains from growth to the last man in the society. And it is not impossible counting upon the determination and efforts and policy changes, and by making the ground clean from dirt and filth of corruption and inefficiency and making institutions viable and strong. This will deepen democracy in the country as well.

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THE INFORMAL ECONOMY AND WOMEN'S PARTICIPATION: STATE-WISE EVIDENCE FROM INDIA

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ABSTRACT

The informal sector constitutes a vital component of the Indian economy, with women representing a significant share of its workforce. Many women are actively involved in different types of work within it. Despite their active participation, workers in this sector remain exposed to problems like social, economic, and health-related insecurities, rendering them highly vulnerable to risks and uncertainties. The challenges were further aggravated during the COVID-19 pandemic, which created major hardship for informal workers. This study seeks to examine the multifaceted participation of women within the informal economy. Drawing on data from World Bank, Agricultural Census 2015-16, the Periodic Labour Force Survey (PLFS), National Family Health Survey 5, the analysis investigates women's involvement in agriculture , land ownership, involvement of women with respect to enterprise type, nature of activities, educational attainment etc.To provide a holistic understanding, a state-wise comparative assessment has been undertaken, highlighting gender-based variations across regions.

Keywords: *Women, informal sector, employment, social security, state*

INTRODUCTION

India, which is the fifth largest economy of the world , has a labour market largely dominated by the informal or unorganised sector. The Unorganized Workers' Social Security Act, 2008 defines an unorganised worker as a home-based worker, self-employed worker, or wage labourer in the informal sector, as well as those in the formal sector who are not covered under any of the legislations listed in Schedule II of the Act—such as the Employee's Compensation Act, 1923; the Industrial Disputes Act, 1947; the Employees' State Insurance Act, 1948; the Employees' Provident Fund and Miscellaneous Provisions Act, 1952; the Maternity Benefit Act, 1961; and the Payment of Gratuity Act, 1972 (Ministry of Labour & Employment, Government of India). In general, informal workers lack written contracts, paid leave, health benefits, and social security coverage. The informal sector contributes over 50 percent to India's Gross Value Added at basic prices (Murthy, 2019). Further, the Periodic Labour Force Survey (PLFS) 2022–23 reports that nearly 86.8 percent of India's total labour force is employed in the informal sector.

The informal economy remains the largest source of employment for unskilled and low-skilled workers in India (Sharma, 2012), with socially and economically marginalised groups forming the majority of its workforce. Over time, linkages between the formal and informal sectors have

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deepened. Women, who are often less educated and less skilled, engage in informal economic activities to supplement family income. Historically, women's participation in agriculture and household-level production has been significant. In modern contexts, women are also visible in construction, manufacturing, and services sectors, mostly as casual labourers without access to health, social security, pension, or disaster-related protections. The COVID-19 pandemic further exposed their vulnerabilities, highlighting their precarious situation. Despite their contribution, women remain severely underpaid.

Sharma (2012) observed that around 94 percent of female workers in India are employed in the informal sector, contributing to both agricultural and non-agricultural activities, yet facing gender-based discrimination and persistent wage gaps. Mohapatra (2012), in the context of Odisha, analysed women's vulnerabilities linked to migration and structural issues, concluding that many live at subsistence levels with compromised rights. Leach (1999) examined women's work, particularly in the informal sector, and highlighted the influence of education and training, calling for policy-driven research to address barriers in male-dominated occupations.

Chakraborty (2020) studied women's plight during COVID-19 and found them disproportionately affected due to the invisibility of their work. Between 2011–12 and 2018–19, the share of married women with young children in the labour market dropped from 33 percent to 24 percent. Self-employment remains their main livelihood, but nearly one-third (31 percent) worked as unpaid family helpers in 2018–19. About 83 percent of women surveyed reported severe income losses. The study recommended employment guarantee schemes as protective measures.

Bonnet, Vanek, and Chen (2019) analysed informality and related social indicators, showing strong links between poverty and informal employment, lower education levels and higher informality, and greater prevalence of informality among youth. Similarly, Nguyen (2015) studied education's impact on women's participation in the informal sector across countries, establishing a strong negative correlation between education and informality, and suggesting targeted educational policies for poor women.

In this backdrop, the present study aims to examine the current status of women in India's informal sector.

Objectives: The main objectives of this study are-

1. To compare the female labour force participation rate in informal sector among all the states/ UTs in India.
2. To examine any wage differential among male and female employees in India.
3. To explore the challenges like accessibility of credit and provision of social security, health security schemes for the informal workers in India.

METHODOLOGY

This study is purely based on secondary data. In the first instance, an attempt has made to explore the rural-urban and male-female divisions among the informal workers to draw a comparative picture among the states of India. Secondary data sources like annual periodic labour force survey (PLFS), National Family Health Survey-V (NFHS-V) and KLEMS Report, 2024 are used. Pie diagram and histograms are used. Descriptive statistics like ratio, percentage are used in this study.

RESULT AND DISCUSSION

The distinction between formal and informal sectors and formal and informal workers are not cleared. Workers who are worked in formal sector are also considered as informal workers if they are not

entitled to any social security benefits, pay leave, maternity and health benefits, and do not have any written job contracts. In this context, all the operations and employment related to Agriculture are considered as informal and all employment generated by it are also informal. Although, labour force participation rate inAgriculture gradually declining in the world, female participation in Indian agriculture is higher than male participation during 1991 to 2022. In India, about 78 percent of female were engaged in agriculture in 1991 India which was reduced to 59.24 percent in 2022 (refer to table 01). While both total and male labor force participation in agriculture have been on the decline since 1991, female labor force participation has been rising since 2020. This notable rise in women's participation in Indian agriculture is often referred to as the 'feminization of agriculture' (Goswami & Bhattacharyya, 2024). This phenomenon occurs despite the overarching global trend of structural changes in agriculture. The primary reasons for the rising female participation in Indian agriculture and on the same time, falling male participation in agriculture and traditional livelihoods may be attributed to the rural-urban migration in search of livelihoods in other sectors.

Table 1:Gender-wise Participation of labour force in Agriculture in the World and in India
Participation of labour force in Agriculture

	World			India		
Year	Female	Male	Total	Female	Male	Total
1991	42.12	44.2	43.38	77.75	58.66	63.41
1995	39.58	42.03	41.06	76.86	57.40	62.33
2000	38.94	40.37	39.80	74.36	54.51	59.64
2005	35.47	36.6	36.15	66.08	48.32	53.07
2010	31.76	33.41	32.76	65.30	46.18	51.06
2015	27.44	29.26	28.54	57.72	39.83	44.27
2020	25.80	27.86	27.05	58.02	40.16	44.68
2022	25.61	26.86	26.37	59.24	37.09	42.86

Source: World Bank 2022-23

Although in India largest proportion of working women is involved in agriculture, their roles tend to be limited to casual labor in harvesting and post-harvesting works, animal husbandry for dairy, eggs, and meat production (FLO, 2019). The reasons for this may include: 1. the predominance of men in agricultural activities; 2. agricultural tools and equipment are primarily designed for male users; 3. women often face illiteracy, a lack of skills, and insufficient knowledge about credit and advanced technology (Majumdar & Shah, 2017). Furthermore, it has been observed that there exists a 24 percent disparity in land productivity between farms of the same size managed by men and those managed by women globally. Women also have limited autonomy in decision-making processes and possess low

ownership of agricultural resources such as land, livestock, produce, and credit (www.fao.org). Additionally, women receive lower wages compared to men in agriculture, with an established wage gap of 18.4 percent for comparable agricultural work worldwide; this discrepancy is even more pronounced in India (www.fao.org).

Table 2: Operational Landholdings possessed and owned by women

Sl. No.	Size Group (Quantity of landholding)	2010-11	2015-16
1.	Marginal (<1 ha)	13.63	14.68
2.	Small (1-2 ha)	12.15	13.44
3.	Semi-medium (2-4 ha)	10.45	11.76
4.	Medium (4-10 ha)	8.49	9.76
5.	Large (>10 ha)	6.78	7.88
6.	All Size groups	12.78	13.96

Source: Agricultural Census 2015-16

Table 2 shows that operational holdings of female in agriculture are mostly possessed by marginal landholdings and it rises with time, which can be easily seen in the year 2015-16.

Table-3

Percentage of regular wage/salaried employees in Usual status (ps+ss) in non-agriculture sector without any written job security, no paid leave and no any social security coverage in rural areas								
Gender	**Male**				**Female**			
State\UT		**Not eligible for paid leave**	**Without any specified SSB***	**Not eligible for paid leave, without written job contract and without any specified SSB***		**Not eligible for paid leave**	**Without any specified SSB***	**Not eligible for paid leave, without written job contract and without any specified SSB***
	With no written job contract				**With no written job contract**			

Andhra Pradesh	65.4	54.1	64.0	50.4	60.8	47.2	69.5	44.5
Arunachal Pradesh	8.4	6.5	11.9	5.9	5.4	1.6	21.7	1.6
Assam	47.3	48.3	50.6	40.5	35.1	44.3	49.0	25.9
Bihar	70.6	64.6	63.5	60.5	55.0	51.9	51.2	27.6
Chhattisgarh	72.5	52.6	62.8	41.8	61.7	52.0	71.4	39.5
Delhi	76.9	41.4	63.7	31.2	100.0	68.8	99.5	68.8
Goa	6.0	17.0	10.3	5.4	45.8	48.0	51.3	45.8
Gujrat	73.8	57.9	61.0	45.4	76.3	66.5	67.2	47.1
Haryana	61.6	52.6	49.4	40.9	55.1	49.1	67.2	41.9
Himachal Pradesh	42.9	49.2	41.6	34.1	49.5	66.6	51.4	37.2
Jharkhand	67.9	57.5	62.4	52.8	38.1	34.5	74.3	32.9
Karnataka	40.5	37.8	44.7	28.1	42.6	41.0	60.3	34.9
Kerala	58.1	55.6	63.0	50.8	48.3	44.7	58.2	37.0
Madhya Pradesh	60.8	59.6	61.9	53.1	34.0	48.7	57.6	30.7
Maharastra	63.9	50.3	50.2	40.9	69.3	57.3	65.3	44.4
Manipur	18.9	14.0	21.5	10.6	28.0	13.7	30.8	10.1
Meghalaya	36.5	19.3	48.7	18.5	19.3	11.6	41.4	9.1
Mizoram	7.6	4.3	4.5	2.5	17.6	32.8	17.6	17.6
Nagland	11.4	11.6	11.4	9.4	10.2	13.8	14.7	6.5
Odisha	51.7	46.0	51.9	39.8	31.6	30.8	54.5	18.4

Punjab	84.5	59.1	75.1	54.8	85.3	54.1	81.8	50.9
Rajasthan	86.0	61.6	68.2	53.4	54.9	32.1	57.8	27.2
Sikkim	17.0	43.1	58.3	13.8	13.2	44.2	56.8	10.4
Tamil Nadu	54.2	42.3	51.3	40.6	51.6	45.4	49.6	34.9
Telangana	56.9	43.7	47.5	33.1	41.5	30.3	55.7	27.3
Tripura	38.2	29.7	40.1	28.1	55.6	52.1	65.6	46.9
Uttarakhand	45.9	46.3	43.2	33.3	53.2	56.0	51.6	44.0
Uttar Pradesh	67.7	71.1	66.3	57.1	56.3	60.5	77.9	33.3
West Bengal	63.1	52.8	66.8	48.7	62.7	44.0	73.2	41.4
Andaman & N. Island	34.6	52.2	36.6	30.4	40.5	54.0	40.7	34.0
Dadra & Nagar Havli & Daman & Diu	76.5	23.0	29.5	14.9	81.6	20.4	15.4	7.1
Jammu & Kashmir	42.6	43.3	43.5	37.1	37.4	35.4	54.3	21.2
Ladakh	21.7	19.7	19.7	19.7	0.0	0.0	3.4	0.o
Lakshwadeep	44.0	66.1	66.5	34.8	4.7	28.2	54.6	4.7
Puducherry	49.8	43.1	34.3	22.8	34.4	29.4	36.6	26.2
All India	62.9	53.7	57.9	45.8	54.6	47.1	61.9	36.4

Analyzing table-3, we get:

- States/UTs with the highest percentage of vulnerable male workers in all the forms considered commonly, include Rajasthan, Uttar Pradesh, Chhattisgarh, Punjab and Madhya Pradesh. Among all the categories, Mizoram has been able to stay in a far better positon than other regions considered with much lower percentage of vulnerable male workers, followed by Nagaland and Arunachal Pradesh. If looked region wise, then it can be concluded that the condition is comparatively better in the North East region. Centra India has performed poorly, registering very high percentages.
- In case of female workers, the common states/UTs with highest vulnerabilities are Delhi (100% in all the considered sections), Chandigarh, Punjab and Madhya Pradesh. Among the regions considered, Ladakh has performed quite well registering the lowest percetage of vulnerable female workers in the informal sector.

Chart 1: Percentage Distribution of Employed Women by Type of Earnings in India in 2022:

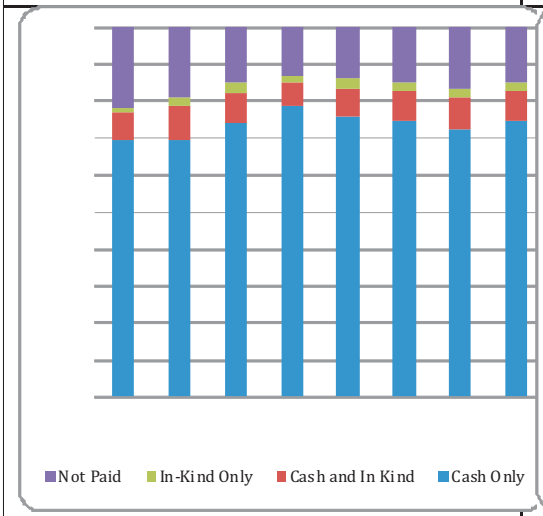

Chart 2: Percentage Distribution of Employed Men by Type of Earnings in India in 2022:

Source: NFHS-V

Most of the female worker working as helper in household enterprises is underpaid and many time no payment at all. There is also gender based wage differential exists between male and female workers in India. In the age group (20-24), this difference is highest between male and female in the payment receiving in the form of cash. Percentage of female receiving no any payment for their work is higher than the male. According to KLEMS report 2024, 57 percent of informal workers are self employed, that has risen since 2020-2021. Male self-employed workers earn an average of Rs. 15,763 monthly, while female workers earn significantly less at Rs. 5,637. So, there is a huge gap in both (male and

female workers) the earnings. Moreover, 37 percent of women engaged in unpaid family labour. Between July 2022 and June 2023, average earnings for the self-employed dropped by 3 percent, reflecting increased distress, largely due to the rising share of lower paid female workers. 21.8 percent of informal workers are casual workers. Out of this, male casual workers earn Rs. 432 daily, while females earn Rs. 291. Women engagement in agriculture is increasing and feminisation of Indian agriculture is well known. However, Indian agriculture is already having surplus labour and negative marginal productivity.

Women are attached with the employments which do not even pay them proper remuneration because of their low skills and technical knowledge, low or no education, poor social and economic condition etc. Education is a determining factor to get a better employment opportunity in the job market.

Table 4:Female Labour Force Participation Rate with various years of educational attainments:

Age Group	Years of Educational Attainment	FLFPR-USUAL (%)	FLFPR-CWS (%)
>=15	6.5	37	31.3
15-24	9.8	19.9	15
15-64	6.9	39.2	33.2
>=25	5.6	41.9	36
25-54	6.6	47.2	40.7

Source: PLFS

Table 4 reveals how female labour force participation rate varies among different levels of education and age groups of female workers. The highest percentage of female labour force participation rates in both Usual and CWS category are highest with the female of age group 25-54 with average 6.6 years of educational attainment. However, with the highest years of educational level of attainment i.e. 9.8 years, the women in the age group 15-24 is lowest in both usual and CWS categories. This may be due to women in this age group are still attaining education and yet to enter in the job market. Female Labour Force Participation Rate (FLFPR) in both Usual and CWS status are 37 and 31.3 percent respectively for the women with age group below and equal to 15 years. These women may be education drop out and actively participate in the labour market. Working women of age below 15 years are child labour. Is there a prominent presence of child labour in the informal sector of India?

In the table we presented share of workers in informal sector among workers in usual status (ps+ss) in non –agriculture sector.

Table 5: Percentage of workers engaged in proprietary and partnership enterprises among workers (ps+ss) engaged in non–agriculture sector estimated from PLFS (2021-22), PLFS (2022-23) and PLFS (2023-24):

Category of workers	PLFS(2023-24)	PLFS(2022-23)	PLFS(2021-22)
Rural			
Male	82.7	83.9	81.0
Female	65.5	65.2	61.6
Person	78.9	80.2	77.3
Urban			
Male	69.4	69.1	67.7
Female	56.5	55.5	55.0
Person	66.2	66.0	64.9
Rural+Urban			
Male	76.8	77.9	75.2
Female	61.2	60.8	58.4
Person	73.2	74.3	71.8

The percentage of male, female and person (male+female) are engaged in proprietary and partnership enterprises among workers engaged in non–agriculture sector is increasing in rural area in three consecutive years from 2020-21 to 2022-23. However, in urban areas, percentage of male workers is slightly declined in the year 2021-22. Percentage of women workers is constantly increasing in all these consecutive years in both urban and rural areas. However, according to KLEMS report, 2024, increase in women employment lead to late marriages and fertility rate (KLEMS, 2024). Percentage of male worker engaged in proprietary and partnership enterprises among workersengaged in non–agriculture sector is higher than female workers for the three consecutive years in urban and rural areas.

In case of male and female employment across the entire non-agriculture enterprises, the percentage of workers in Government, local body or public sector enterprises is low. It is highest in case of Proprietary and partnership enterprises. Fewer women are engaged in government/local body/public enterprises than men.

Women working in informal sector mostly comes from poor income background and almost half of

them are the sole-supporters of the family. Struggling already with a lot, they even have faced gender discrimination in the workplace which is almost inexistent in the formal sector (Sharma, K.,2012). Again, discrimination against women in the urban labour market is more as compared to the rural labour market (Geetika, et. al., 2011). Moreover, in the informal economy, women get low income, they have to work for long hours in poor working conditions. There is also the aspect of women engaging in unpaid care work which lowers their income and extends their working days. Thereby they are facing difficulties to save or invest for old age. Another concerning fact, as suggested by a survey conducted by the National Commission for Women(NCW), is that around 70 percent of women working in the informal sector face some form of harassment or violence. Another great disadvantage faced by women in the unorganized sector is that they do not get maternity benefits, which, makes women more prone to instability in working conditions.

There is a problem also that is faced by women in India is that lack of access to credit. In India, according to the Global Findex 2021, the share of adults that borrowed was at 13 percent. The share of women borrowers in India is lower still at 10 percent as compared to 15 percent of men. So, there is found a systematic gender gap in credit usage. In 2020, women in India receive credit equivalent to only 27 percent of the deposits they contribute, whereas, men receive credit equal to 52 percent of their deposits. During covid-19 pandemic the cash reserves were lacked both in case of male and female but female cash reserves were high as compared to male. But female had less opportunity to borrow than male and it is mostly due to women not taking advantage of their credit history by applying for loans, also the financial institutions do not grant credit equitably to women. (Klapper and Arora, 2022) (https://blogs.worldbank.org).

. It can be summed up that the unorganized sector can provide women with economic empowerment only when these problems are challenged and addressed properly.

If we see in case of business turnover, it is found from the previous studies that women owned 9.98 million proprietary (sole owner) non-agricultural informal enterprises, but this comprised only 18 percent of the 54.77 million such enterprises. 22 percent of all employed in these enterprises were women. 81 percent of enterprises owned by women were in their homes, compared to 35 percent of enterprises owned by men. Nearly one-half of the operators of women owned enterprises worked a 4-6 hour a day while 70 percent of men worked a 7-10 hour day. The average annual income per own account enterprise was much lower for those owned by women (Rs. 26,109) than by men (Rs. 62,335), however, the difference was much narrower in the case of establishments with at least one hired worker (Raveendran, 2017).

CONCLUSION

In conclusion, this study highlights that a majority of female workers are concentrated in the informal sector. Their inability to secure regular jobs in the formal or organized sector is mainly due to low educational qualifications, limited skills and technical knowledge, as well as social and psychological barriers. The presence of gender bias is evident in this sector, where women face discrimination in terms of wages, receiving significantly lower pay compared to male workers. Employers often prefer hiring women for this very reason. Despite these inequalities, many women have no option but to remain in the informal sector because of their limited capacity and poor socio-economic conditions.

Moreover, social security schemes and labour laws rarely extend to them, leaving them without minimum workplace protections. This makes both their employment and livelihood highly vulnerable to risks and uncertainties. Therefore, it is crucial to address the challenges faced by informal workers,

irrespective of gender, in both formal and informal sectors. Policymakers should design inclusive measures that cover informal workers as well. Ensuring effective implementation of labour laws and social security programs is essential. Since India's economy is largely dominated by the informal sector, the well-being and development of informal workers will play a decisive role in realizing the country's demographic dividend in the coming years.

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DECENTRALIZED FINANCIAL SYSTEM AND ITS FUTURE OF IN INDIA

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ABSTRACT

Decentralized Finance (DeFi) is rapidly transforming the traditional financial landscape on a global scale, and India is no exception to this revolution.The objective of paper isinvestigating the current State and Future Potential of DeFi in India. Decentralized Finance (DeFi) is gaining momentum in India, showcasing both the current state and future potential of this transformative financial ecosystem.

Keywords- *Decentralized Finance (DeFi), Financial inclusion.*

INTRODUCTION

Decentralized Finance (DeFi) is rapidly transforming the traditional financial landscape on a global scale, and India is no exception to this revolution. As India strives to enhance financial inclusion and embrace digital advancements, the future of DeFi holds immense promise in reshaping the country's financial ecosystem. This essay aims to explore the potential of decentralized finance in India, including the opportunities it presents, the challenges it faces, and the key drivers that will shape its growth.

One of the significant opportunities that DeFi offers in India is financial inclusion. By leveraging blockchain technology and smart contracts, DeFi has the potential to provide access to financial services to the unbanked and underbanked populations, bridging the gap between various socio-economic groups and reducing inequalities. Additionally, DeFi can enable access to capital for individuals and small businesses. Through decentralized lending and borrowing platforms, individuals can secure loans and investments without relying on traditional financial intermediaries. This empowerment can stimulate entrepreneurship, drive business growth, and foster economic activity, particularly among those who have historically faced challenges accessing formal financing. Decentralized Finance (DeFi) is a groundbreaking concept revolutionizing traditional finance, providing direct financial services without intermediaries. Its significance lies in democratizing finance, promoting inclusion, and fostering innovation. DeFi empowers individuals by giving them control over transactions and assets, ensuring transparency and security through blockchain technology. It bridges the gap of financial exclusion, enabling access to services for the unbanked. DeFi also encourages innovation by creating new financial products and disrupting existing systems.

OBJECTIVE

The objective of Research is Investigating the Current State and Future Potential of DeFi in India. Decentralized Finance (DeFi) is gaining momentum in India, showcasing both the current state and future potential of this transformative financial ecosystem. In terms of the current state, several DeFi projects and initiatives have emerged, aiming to address financial inclusion and streamline traditional financial processes. These projects include decentralized lending platforms, decentralized exchanges,

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and yield farming protocols. While the adoption of DeFi is still in its early stages in India, there is a growing interest among individuals and institutions to explore the possibilities offered by this technology. Looking ahead, the future potential of DeFi in India is immense. With a large unbanked and underbanked population, DeFi can bridge the gap by providing access to financial services, such as loans, savings, and investments, directly to individuals without the need for intermediaries. Additionally, DeFi can empower small businesses and startups by enabling peer-to-peer lending and innovative fundraising models.

OVERVIEW OF THE DECENTRALISED FINANCE

Definition and Principles of DeFi: Explanation of key features and advantages of DeFi

Decentralized Finance (DeFi) refers to a financial ecosystem built on blockchain technology that aims to provide open, permissionless, and inclusive financial services without relying on intermediaries or centralized authorities. It leverages smart contracts, which are self-executing contracts with predefined rules, to automate and enforce financial agreements.

The principles of DeFi revolve around transparency, accessibility, security, and composability. Transparency is achieved through the public and immutable nature of blockchain, where all transactions and data are visible to participants. Accessibility is emphasized by allowing anyone with an internet connection to access and utilize DeFi applications without requiring permission or extensive documentation. Security is a key principle of DeFi, with a focus on leveraging cryptography, consensus mechanisms, and code audits to ensure the integrity and protection of user funds and data. Additionally, composability is a fundamental principle of DeFi, allowing different DeFi applications and protocols to seamlessly interact and combine functionalities to create more complex and innovative financial services. financial industry.

These principles work together to create a decentralized financial ecosystem that offers a range of services, including lending and borrowing, decentralized exchanges, stablecoins, yield farming, and more. By removing intermediaries and operating on a global and permissionless infrastructure, DeFi aims to increase financial inclusion, provide greater control and ownership of assets, and foster innovation in the financial industry.

It's important to note that the principles of DeFi are not set in stone and may evolve as the technology and ecosystem develop. However, the core ideals of transparency, accessibility, security, and composability will likely remain foundational to the future of decentralized finance.

Global Adoption and Market Trends:

Overview of DeFi's growth and impact worldwide Decentralized Finance (DeFi) has witnessed significant global adoption and has become one of the fastest growing sectors in the blockchain industry. The increasing interest and usage of DeFi can be attributed to several market trends and factors. One notable market trend is the surge in Total Value Locked (TVL) in DeFi protocols. TVL represents the amount of cryptocurrency locked in various DeFi applications and serves as an indicator of the market's overall activity. The growth in TVL highlights the increasing trust andconfidence in DeFi platforms as users actively participate in lending, borrowing, and yield farming activities.

Another significant market trend is the rise of decentralized exchanges (DEXs). DEXs provide a platform for users to trade cryptocurrencies directly from their wallets, without the need for intermediaries. The popularity of DEXs has soared due to their enhanced security, liquidity, and user control over funds, challenging traditional centralized exchanges.

Stablecoins, which are cryptocurrencies pegged to a stable asset like fiat currency, have also played a

crucial role in the growth of DeFi. Stablecoins provide stability and reduce volatility, making them suitable for transactions and as collateral in lending protocols. The increased use of stablecoins has facilitated liquidity and expanded the range of financial services available in the DeFi ecosystem. Interoperability has emerged as a significant market trend in DeFi. As the number of DeFi protocols and platforms grows, the ability to seamlessly interact and share assets and data across different networks becomes essential. Interoperability solutions enable the efficient flow of liquidity and facilitate composability, enabling developers to combine multiple DeFi services to create innovative financial products.

CURRENT STATE OF DEFI IN INDIA

Regulatory Landscape: Analysis of existing regulations and their impact on DeFi

Decentralized Finance (DeFi) is an emerging sector that poses unique regulatory challenges for governments worldwide, including India. Currently, the regulatory framework for DeFi in India is evolving, and there is no specific legislation tailored to address its intricacies. The absence of clear guidelines has implications for the growth and development of DeFi in the country.

The existing regulations in India primarily revolve around traditional financial systems and do not explicitly cover DeFi. However, certain regulations and laws can indirectly impact DeFi activities. For instance, the Reserve Bank of India (RBI), the country's central bank, has expressed concerns regarding the use of cryptocurrencies, which are often the basis for many DeFi projects. The RBI issued a circular in 2018 restricting regulated entities from dealing with cryptocurrencies, which had a temporary impact on the Indian cryptocurrency ecosystem.

Furthermore, securities laws and anti-money laundering regulations are applicable to DeFi platforms that offer financial instruments resembling securities or facilitate transactions with fiat currencies. These regulations aim to protect investors and prevent illicit activities, but their application to decentralized platforms can be complex.

The impact of existing regulations on DeFi in India is two-fold. On one hand, the absence of specific regulations tailored to DeFi can create uncertainty and discourage potential investors and innovators from participating in the ecosystem. This lack of regulatory clarity may also hinder the development of DeFi projects, as legal compliance becomes a challenge. On the other hand, existing regulations designed for traditional finance can indirectly restrict certain DeFi activities. While regulations are essential to protect consumers and maintain market integrity, a balance must be struck to ensure that innovation and growth are not stifled. The need for regulatory frameworks that are adaptable and can accommodate the unique characteristics of DeFi is crucial.

Market Players and Initiatives: Overview of major DeFi projects and initiatives in India

The decentralized finance (DeFi) ecosystem in India is witnessing a growing number of projects and initiatives aimed at revolutionizing the financial landscape. These projects span various aspects of DeFi, including lending, borrowing, decentralized exchanges, and yield farming. Here is an overview of some major DeFi projects and initiatives in India:

1. Matic Network (now known as Polygon): Polygon is a layer-2 scaling solution for Ethereum that aims to enhance scalability and usability. It provides infrastructure and tools for developers to create scalable and interoperable decentralized applications (dApps) and offers various DeFi protocols, such as decentralized exchanges and lending platforms.

2. InstaDApp: InstaDApp is a decentralized finance portal that allows users to manage one multiple DeFi protocols in place. It offers features like collateral optimization, borrowing, lending,

and automated portfolio management. InstaDApp simplifies the user experience and provides a seamless interface to interact with various DeFi protocols.

3. Aavegotchi: Aavegotchi is a unique DeFi project that combines decentralized lending with non-fungible tokens (NFTs). It introduces digital collectible ghosts called Aavegotchis that can be collateralized to borrow assets on the Aave protocol. These NFTs have different traits and attributes that impact their value and utility within the ecosystem.

4. Opyn: Opyn is a decentralized options protocol built on Ethereum. It allows users to trade and create options contracts on various underlying assets. Opyn offers risk management solutions, hedging strategies, and leveraged positions within a decentralized and transparent framework.

5. Razor Network: Razor Network is a decentralized oracle network that provides secure and reliable price data for DeFi applications. Oracles play a crucial role in obtaining off-chain data and bringing it on-chain, enabling smart contracts to interact with external data sources. Razor Network ensures data integrity and security for various DeFi projects.

6. MyWish:MyWish is a platform that allows users to create and deploy smart contracts without the need for programming skills. It offers a range of smart contract templates, including those for DeFi applications like token creation, crowdfunding, and time-locked wallets. MyWish simplifies the process of deploying smart contracts for DeFi enthusiasts and developers.

These are just a few examples of the major DeFi projects and initiatives in India. The ecosystem is dynamic and continues to evolve as more projects emerge, leveraging blockchain technology to offer innovative financial solutions. These projects aim to enhance financial inclusivity, accessibility, and security, and contribute to the overall growth and adoption of DeFi in India. It's important to note that the DeFi space is constantly evolving, and new projects are being developed. It is advisable to conduct thorough research and due diligence before engaging with any DeFi project or initiative. hindering DeFi adoption in India:

Challenges and Limitations

Identification and analysis of challenges hindering DeFi adoption in India The adoption of decentralized finance (DeFi) in India faces several challenges that hinder its widespread acceptance and growth. Understanding and addressing these challenges are crucial for the successful integration of DeFi into the Indian financial ecosystem. Here, we identify and analyze some key challenges

1.Regulatory Uncertainty: The lack of clear and specific regulations tailored to DeFi creates uncertainty for both users and developers. The absence of regulatory frameworks that address the unique characteristics of DeFi can deter potential participants and limit innovation. Establishing clear guidelines and a balanced regulatory environment is necessary to build confidence and foster responsible growth in the DeFi sector.

2. Security Concerns: DeFi platforms are built on blockchain technology, which is generally considered secure. However, vulnerabilities in smart contracts, decentralized applications (dApps), and third-party integrations can pose security risks. Incidents of hacks and exploits have occurred, leading to significant financial losses. Enhancing security measures, conducting thorough audits,and promoting best practices in smart contract development are crucial to mitigate these risks and build trust among users.

3.Scalability and User Experience: Scalability is a critical challenge facing DeFi, particularly during periods of high demand. Transaction congestion and high gas fees on the Ethereum network can hinder user experience and limit the scalability of DeFi applications. The development of layer-2

solutions and the exploration of alternative blockchain platforms can address these scalability challenges and improve the overall user experience.

4. Financial Literacy and Accessibility: DeFi relies heavily on individuals' understanding of blockchain technology, cryptocurrencies, and smart contracts. Limited financial literacy and awareness of DeFi concepts among the general population act as barriers to adoption. Additionally, accessibility to DeFi platforms and services, including internet connectivity and mobile infrastructure, can be a challenge in certain regions. Educating users and enhancing accessibility through user-friendly interfaces and mobile applications can help overcome these barriers.

5. Market Volatility and Risk Management: The inherent volatility of cryptocurrencies, which often serve as the foundation for DeFi projects, presents risks to users. Sudden price fluctuations can impact the value of assets held within DeFi platforms and pose risks to borrowers and lenders. Developing risk management mechanisms, such as decentralized insurance and robust risk assessment protocols, can mitigate these risks and enhance the stability of the DeFi ecosystem.

6. Interoperability and Fragmentation: The fragmentation of DeFi protocols and the lack of interoperability between different platforms hinder seamless user experiences and liquidity flow. Users face challenges when navigating across multiple platforms, and liquidity fragmentation can reduce efficiency. Promoting interoperability standards and fostering collaborations among DeFi projects can enhance the overall ecosystem's efficiency and user experience.

Several challenges hinder the adoption of DeFi in India. Regulatory uncertainty, security concerns, scalability, financial literacy, market volatility, and interoperability issues need to be addressed to create a conducive environment for DeFi growth. By fostering collaboration between regulators, industry participants, and technology experts, and implementing measures to enhance security, scalability, and accessibility, India can overcome these challenges and unlock the transformative potential of decentralized finance.

FUTURE POTENTIAL OF DEFI IN INDIA

Financial Inclusion and Access to Capital

Examining how DeFi can enhance financial inclusion and provide access to capital for underserved populations.

DeFi holds the potential to enhance financial inclusion and provide access to capital for underserved populations by leveraging blockchain technology and eliminating traditional barriers. Through global accessibility, individuals in remote or underserved areas can participate in DeFi protocols and access financial services. Peer-to-peer lending and borrowing on DeFi platforms enable individuals without access to traditional banking services or credit histories to obtain loans and access capital based on their digital assets. Stablecoins and currency agnostic systems reduce volatility and enable individuals to transact in various currencies, regardless of their local currency or bank account. Tokenization of assets opens up investment opportunities for underserved populations, allowing them to gain exposure to previously illiquid assets. Decentralized identity and credit scoring systems enable individuals without formal identification documents or credit histories to participate in financial activities. Microfinance models and decentralized savings accounts provide small loans and encourage savings among underserved populations. Addressing challenges such as infrastructure limitations, regulatory frameworks, and user financial inclusion through DeFi. reduce costs. education is crucial for responsible and inclusive growth of DeFi. Collaborations among governments, regulatory bodies, technology developers, and community organizations play a vital

role in fosteringfinancial inclusion through DeFi.

Efficiency and Cost Reduction

Exploring the potential for DeFi to streamline financial processes and reduce costs

DeFi has significant potential to streamline financial processes and reduce costs. By leveraging blockchain technology and smart contracts, DeFi eliminates intermediaries, automates operations, and reduces transaction fees. Peer-to-peer lending and borrowing, decentralized exchanges, and cost-effective cross border transactions are some examples. The transparency and auditability of blockchain enhance trust and efficiency while minimizing the risk of fraud. However, challenges like scalability, security, and regulatory frameworks need to be addressed for widespread adoption. Overall, DeFi has the capacity to revolutionize the financial landscape by offering efficient, cost-effective, and accessible financial services to individuals and businesses.

Innovation and New Business Models

Highlighting how DeFi can foster innovation and enable new business models in India.

DeFi has the potential to foster innovation and enable new business models in India by offering a decentralized and permissionless financial ecosystem. Here, we highlight how DeFi can drive innovation and support new business models:

1. Accessibility and Inclusivity: DeFi eliminates traditional barriers to entry by providing open access to financial services. Individuals and businesses, regardless of their background or location, can participate in DeFi platforms and access a wide range of financial products and services. This inclusivity enables the emergence of new business models that cater to underserved populations and niche markets.

2. Tokenization of Assets: DeFi allows for the tokenization of real-world assets, such as real estate, art, or commodities. This tokenization unlocks liquidity and enables fractional ownership, allowing businesses to explore innovative models like fractional investment, asset-backed lending, and more. It expands opportunities for businesses to leverage their assets and create new revenue streams. mechanisms.

3. Decentralized Exchanges and Automated Market Makers (AMMs): DeFi platforms facilitate decentralized exchanges and AMMs, which enable efficient and automated trading of digital assets. This creates opportunities for businesses to launch new tokens, liquidity pools, and trading strategies. It fosters innovation in fundraising models, liquidity provision, and decentralized trading

4. Programmable Smart Contracts: DeFi platforms are built on smart contracts, which are programmable and self-executing agreements. This programmability enables businesses to create innovative financial products, automate complex workflows, and establish customized rules and incentives. It encourages the development of innovative business models and financial instruments that were not feasible in traditional financial systems.

5. Open Collaboration and Interoperability: DeFi promotes open collaboration and interoperability between different platforms and protocols. This enables businesses to leverage existing DeFi infrastructure, integrate with complementary services, and build upon existing innovations. It encourages the development of synergistic business models and fosters a collaborative ecosystem that drives innovation and creativity.

6. Permissionless Innovation: DeFi allows for permissionless innovation, enabling businesses to experiment and iterate without relying on centralized authorities or intermediaries. This flexibility facilitates rapid prototyping, testing, and deployment of new business models, products, and services.

It encourages entrepreneurial spirit, fosters competition, and stimulates innovation in the financial sector. DeFi in India has the potential to foster innovation and enable new business models by providing accessibility, tokenization of assets, decentralized exchanges, programmable smart contracts, open collaboration, and permissionless innovation. By embracing DeFi, businesses can leverage the transformative power of decentralized finance to create innovative solutions, tap into new markets, and drive economic growth in India.

CASE STUDIESAND USE CASES

Decentralized Lending and Borrowing Platforms: Case studies of successful decentralized lending and borrowing platforms in India.

1. InstaDApp: InstaDApp is a leading decentralized lending and borrowing platform in India. It allows users to leverage their digital assets as collateral to borrow funds or lend them to earn interest. InstaDApp offers a user-friendly interface that connects users to multiple DeFi protocols, including lending platforms like Compound and Aave. It provides seamless integration and access to a variety of lending options, ensuring competitive interest rates and efficient borrowing experiences.

2. Koinfox: Koinfox is an innovative decentralized lending and trading platform in India. It enables users to borrow funds directly from other users in a peer-to-peer lending model. Borrowers can offer collateral in the form of digital assets, while lenders can earn interest on their idle assets. Koinfox uses smart contracts to automate the lending process, ensuring transparency, security, and quick loan settlements. The platform also offers advanced trading features, allowing users to execute trades while using their collateral as margin.

3. Credflow: Credflow is a decentralized lending platform specifically designed for small and medium sized enterprises (SMEs) in India. It offers businesses access to quick and hassle-free loans by connecting them to a network of lenders. The platform leverages blockchain technology and smart contracts to facilitate secure and transparent lending transactions. Credflow also provides data analytics tools to assess creditworthiness and manage loan repayments effectively. The platform's focus on serving the needs of SMEs in India has contributed to its success and popularity.

4. Rupee Coin: Rupee Coin is a decentralized stablecoin project in India that aims to facilitate lending and borrowing in a stable digital currency. It provides a stable and reliable medium of exchange for users, allowing them to transact and borrow without exposure to the volatility of other cryptocurrencies. Rupee Coin uses a collateralized reserve mechanism to maintain the stability of the stablecoin. By offering stability and liquidity, Rupee Coin enables seamless lending and borrowing activities within the Indian DeFi ecosystem.

These case studies demonstrate the successful implementation of decentralized lending and borrowing platforms in India. They highlight the advantages of blockchain technology, smart contracts, and peer-to peer models in providing efficient, transparent, and inclusive financial services. These platforms have played a pivotal role in promoting financial inclusion, empowering individuals and businesses to access capital, and creating new opportunities for growth and innovation in the Indian financial landscape.

CONCLUSION

Summary of Findings:

Summarizing the key findings and insights from the research

The research on the future of decentralized finance (DeFi) in India reveals unique findings and insightful perspectives into its potential trajectory in the country. The study emphasizes the significant

growth potential of DeFi in India, citing the increasing interest and adoption of DeFi platforms and protocols. It underscores the necessity for a transparent and supportive regulatory framework that promotes innovation while addressing concerns related to security and financial stability.

DeFi emerges as a promising solution for enhancing financial inclusion in India, providing access to financial services for underserved populations. The study highlights the transformative impact of peer-to peer lending, decentralized savings, and microfinance models on improving financial inclusivity.

Technological advancements, including scalability, interoperability, and user experience, play a pivotal role in driving the future growth of DeFi in India. The study underscores the importance of robust infrastructure and user-friendly interfaces to attract a broader audience and facilitate mass adoption. Collaboration among regulators, industry stakeholders, and technology developers is identified as acritical factor for the responsible and sustainable growth of DeFi in India. The study also emphasizes the need for comprehensive educational initiatives to enhance awareness and understanding of DeFi among users and businesses.

In conclusion, the research underscores the immense growth potential of DeFi in India, highlighting the significance of regulatory support, financial inclusion, technological advancements, collaboration, and education. By addressing these aspects, India can position itself as a leading hub for decentralized finance, ushering in new opportunities for financial innovation and inclusive development.

Future Outlook and Recommendations

Providing recommendations for fostering the growth of DeFi in India

The future of DeFi in India looks promising. To foster its growth, clear regulations specific to DeFi are needed, along with investments in technological infrastructure. Education and awareness programs should be implemented to increase understanding among stakeholders. Strategic partnerships between traditional financial institutions and DeFi platforms can drive integration, while measures should be in place to ensure investor protection. Additionally, government support for innovation is crucial. By implementing these recommendations, India can create a supportive environment for the growth of DeFi, enabling it to revolutionize the financial landscape and promote financial inclusion.

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THE ORGANIC FARMING AND EMPLOYMENT IN INDIA: A COMPREHENSIVE ASSESSMENT

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ABSTRACT

Organic farming has become a potential solution to sustainable agricultural development, environment conservation, and mass production of job opportunities in India. Over the past few years, the demand of chemical-free and eco-friendly agricultural products across the world has been growing at a fast pace and has provided new markets to the farmers, youth in the rural areas, and agro-entrepreneurs. India, with the highest concentration of organic farmers in the world, has experienced significant growth in certified organic area with the support of various programs like PKVY, NPOP and MOVCDNER. Organic farming is not only associated with the proper health of the soil and the low cost of inputs, but also the increase in labour needs because of the use of manual methods, the use of bio-inputs preparation, and multifunctional farms. This paper looks at the current situation and the future projections of organic farming in India and how it can be used to develop sustainable employment, livelihoods in rural areas and also as part of environmental sustainability. It also examines some of the key challenges like entry barrier to certification, barriers to market access and poor infrastructure, and offers policy guidelines on ways to reinforce organic value chains. Given the right institutional underpinnings and market connections, organic agriculture will be able to serve as an engine of inclusive and green economic development in India.

Keywords: *Organic Farming, Sustainable Agriculture, Employment, Environment, Rural Development.*

INTRODUCTION

Agriculture has been the mainstay of the Indian economy with almost half of the population being employed. Nonetheless, traditional agricultural practices have gradually been experiencing problems of soil erosion, deteriorating yield, escalating costs of inputs, and environmental pressure. With this background, organic farming has come out as a suitable and sustainable alternative that has not only provided environmental advantage, but also generated economic prospects to millions of rural families.

The organic farming trend in India has had a very strong momentum in the last decade, which is attributed to the increased awareness of the consumers, opportunities of exporting, and well-coordinated government-based initiatives that ensure a sustainable farming process. Organic production improves the quality of the soil, decrease chemical dependency, and promote farming

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systems that are based on biodiversity. Additionally, organic farming is labour-intensive and this means that it provides a large number of employment opportunities especially in the rural areas where diversification of jobs is highly important.

Institutional support has been enhanced through the government programs like the ParamparagatKrishiVikasYojana (PKVY), Mission Organic Value Chain Development to North Eastern Region (MOVCDNER), and National Programme on Organic Production (NPOP). Meanwhile, the growing domestic demand, retail network, and speedy development of the market of organic export have enhanced market opportunities.

The paper analyses the extent of organic farming and job creation in India in a well-designed, systematic research study. The analysis shows the current trends, existing literature review, government initiatives, and opportunities and challenges of improving the ecosystem of organic agriculture in India.

REVIEW OF LITERATURE

- **FiBL& IFOAM (2022).** The idea is to help to highlight India as one of the global leaders in organic farming, or at least in the participation of the farmers. Their study reveals that organic agriculture generates more labour and improves the long run fertility of the soil.
- **APEDA (2023).** Focuses on the consistent increment in the organic certified territory and export volumes in India. The report names such key export products as cereals, spices, oilseeds, and processed organic foods and points out the employment opportunities in certification, food processing, and logistics.
- **Kumar & Mehta (2021).** Arguing on how organic agricultural systems help in providing rural jobs by diversifying, producing compost, intercropping, and value-added processing. They note the lack of training, marketing, and certification as the key obstacles.
- **The Government of India - Agriculture Census (2021-22).** Concludes that organic production helps sustain an ecologically sound environment and lowers the costs of long-term cultivation especially to small scale and marginal farmers. The challenges such as the transition period require policy focus.
- **Sharma (2020).** Concludes that organic agriculture can be a key to changing the rural economies by establishing climate-tolerant agriculture and green jobs, particularly in rain-fed and tribal areas.

ORGANIC AGRICULTURE AND GREEN JOBS-

- **Environmental Sustainability-** Organic farming is important in enhancing the creation and preservation of natural balance of agricultural ecosystem. It focuses on using organic manures, compost, green manure and biodiversity-based practices by which it plays a key role in increasing soil organic carbon necessary in soil fertility and long-term productivity. The better organic matter of the soil also enhances the ability to retain water, hence crops become more resilient to droughts and weather irregularities in form of rainfall, which is increasingly becoming very common owing to climate change. Moreover, organic farming favours biodiversity by supporting mixed cultivation, pest predators that are natural, pollinators and useful soil creatures, which are all robust to enhance ecological well-being. Notably, the need to use chemical fertilizers, pesticides, and herbicides is avoided, thus avoiding the degradation of the soil through acidity and loss of nutrients, which is one of the causes of land degradation. The chemical free method is also used to protect rivers, ponds,

and groundwater against the harmful agrochemical runoffs, and therefore it protects aquatic organisms and keeps the water resources pure. All in all, organic agriculture leads to a more sustainable, regenerative and environmentally conscious agricultural system.

- **Increasing Domestic and International Demand-** The demand of organic agricultural products has grown at a very high pace in India and also in other parts of the world because there is increased awareness on health, nutrition and also food safety. The urban consumers especially are becoming more health conscious in their food habits and are demanding residue free, chemical free food substances like organic fruits, vegetables, grains, pulses and spices. The result of this change in consumer preference has greatly widened the domestic market of organic produce and major supermarket chains, online stores and specialty organic stores have opened specific areas of organic products. At the international level, the export of Indian organic products has been on the increase particularly by the high end markets like the United States, the European Union and the Gulf countries. These areas appreciate the diversified organic products that India has to offer such as tea, spices, basmati rice, millets, oils, and processed food products. These growing market interconnections indicate the robust business and economic prospects of organic farming which is a viable option to generate income and diversify agriculture to Indian farmers.
- **Employment Opportunities Along the Organic Value Chain-** Organic farming plays a huge role in rural jobs as it generates extensive levels of labour- and skill-intensive jobs along the agricultural value chain. Organic agriculture unlike the traditional method involves diversified crop production, hand cultivation, composting, vermicomposting production, natural pest control methods, and this involves all of these practices which are producing consistent employment to the local labourers. Also, sorting, grading, packaging, and handling of the post-harvest which are critical in organic farming also puts pressure on the workforce. In addition to the activities that take place in the farms, the organic sector leads to other job opportunities in processing facilities, quality certifier bodies, testing labs, supply chain management, and export logistics. The other services offered by the certification audits, traceability, and organic branding also offer entrepreneurial opportunities to the rural youth. Women especially gain a lot through bio-input production, seed storage, organic farming in their kitchen gardens and mini-food processing. Therefore, the organic value chain does not just work to support agriculture, but also the wider rural economy through the creation of employment in several related sectors.

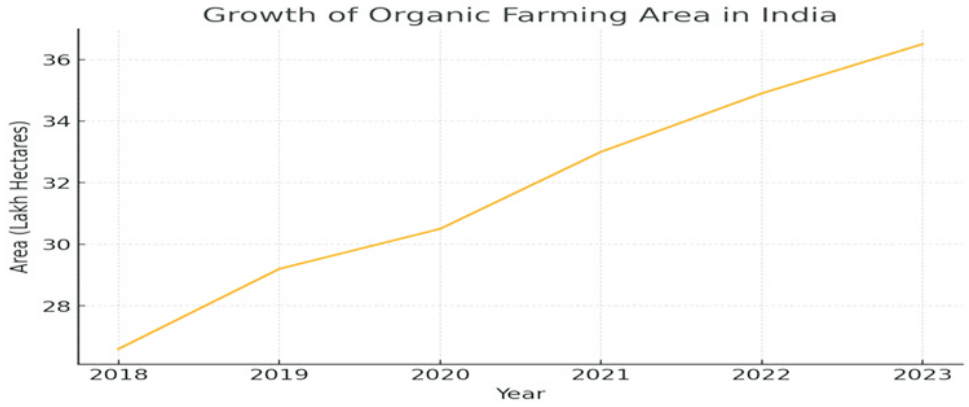
Table 1: Organic Farming Area and Employment Generation in India (2018–2023)

Year	Organic Area (Lakh Hectares)	Employment Generated (Lakh Persons)
2018	26.6	18.2
2019	29.2	19.0
2020	30.5	19.8
2021	33.0	20.7
2022	34.9	21.4
2023	36.5	22.1

(Source: APEDA Organic Statistics, 2024)

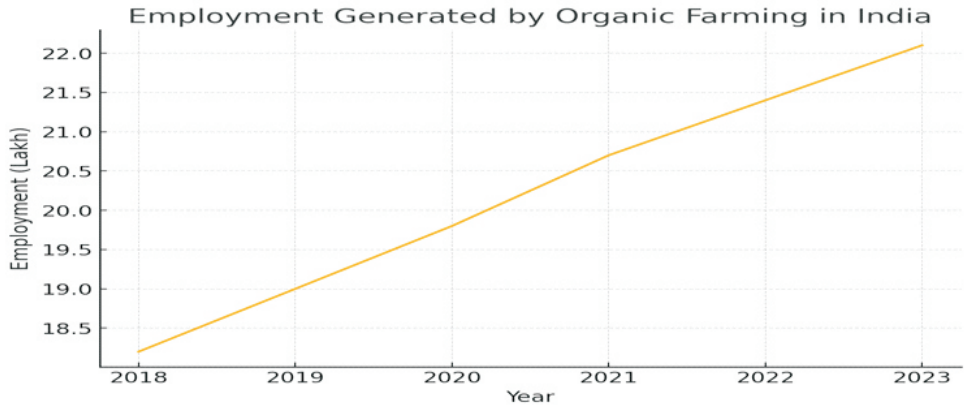
Table 1 shows the increase in organic farming and employment in India in the years 2018-2023. According to the statistics, it is evident that the growth of organic agriculture is steady, as domestic demand and policy support as well as the increase in export opportunities have grown. The total organic area is 26.6 lakh hectares in 2018, then increased steadily in the years to 36.5 lakh hectares in 2023, which is a very considerable growth of almost 37%. This increase shows that farmers are becoming more interested, more aware and that there are more growth in cluster based organic farming programs like PKVY and MOVCDNER.

Organic farming also has a promising job opportunity as it has been pointed out in the table. The number of jobs created in the industry also rose by 21% as the number of people employed in 18.2 lakh in 2018 compared to 22.1 lakh people in 2023.



Graph 1: Organic Farming the Area in India (2018-2023) Growth.

Graph 1 indicates the increasing tendency of the area of organic farming in India within the six years. The line graph depicts that the trend is on a steady upward trend since 2018 to 2023 with the year not declining. Organic area (hectares) grew by 2.6 to 29.2 lakh hectares between 2018 and 2019, respectively, as a result of the initial adoption momentum that is enabled by government initiatives. Organic farming also grew even in the pandemic years (2020-2021) reaching 30.5 lakh and 33 lakh hectares respectively in 2020 and 2021. This underscores the sustainability of organic farming and transition of farmers to sustainable and low-input systems in times of unpredictability.



Graph 2: Employment caused by Organic Farming (2018-2023).

Graph 2 shows the growth in the number of jobs created by organic farming in 2018-2023. The trend of employment has been increasing steadily with 18.2 lakh people in 2018 and 19 lakh people in 2019 as it can be seen that organic cultivation is labour-intensive. With the rise in organic practices, it gave rise to more employment to 19.8 lakh in 2020 and 20.7 lakh in 2021. These growths are directly related to such manual tasks like soil preparation, bi-input manufacturing, mixed cropping, manual pest management, and post-harvest processing.

The employment curve is increasing further even in the post-pandemic years to 21.4 lakh persons in 2022 and 22.1 lakh in 2023 and is seen to support the fact that organic agriculture has become a dependable source of income particularly to the rural women and young people. The graph shows strong correlation between the expanding organic acreage and the demand of labour through the smooth and upward trend.

CHALLENGES

- **Barrier to certification-** The certification process is one of the very difficult issues of organic farming. Organic certification under NPOP or any other accreditation system is a long process that requires documentation, frequent inspections, and adherence to stringent requirements. To small and marginal farmers, who form the majority of the agricultural population in India, all these procedures tend to be too time consuming and costly. The certification cost itself, and the absence of local certifying bodies in most areas, becomes a significant form of barrier to entry. Lack of official certification means that farmers cannot be able to access better markets or export routes which makes it less economically viable to produce organic products. This has seen most farmers being trapped into local markets with lower price realization.
- **Transitional Yield Decline-** When the production process has changed to organic agriculture, the yields of crops are usually lower in the initial two or three years. This stage is called the transition stage as it takes years of natural recovery to restore soil fertility after the use of chemicals on the farms. At this period, farmers deal with the deteriorating productivity and cannot even sell their produce as certified organic, and this causes economic losses. Smallholders with low land and capital are vulnerable to such changes in yields which pose significant risks to them. The absence of compensatory support or transition incentives tends to deter farmers to go organic or build on it during the initial years.
- **Poor Market Accessibility-** Despite the current increase in the demand of organic products, most Indian farmers often have difficulties in getting organised procurement outlets and high-end markets. The organic supply chains are also comparatively limited and majority of the rural areas do not have any special organic mandi, collection points or exporting linkages. This has the effect of farmers not being able to distribute their produce at the premium prices that organic products would fetch because of going through intermediaries to sell them. Their bargaining power is also exacerbated by the lack of powerful organizations (FPOs) or cooperatives of farmers. The unavailability of this market decreases the profitability and does not encourage the long-term investment in organic farming.

Table 2: Challenges vs Opportunities in Organic Farming

Challenges	Opportunities
High certification cost	Rising domestic & export demand
Low initial yields	Premium pricing for organic products
Poor infrastructure	Growing online and retail markets
Lack of farmer training	Expanding government training programs
Market fragmentation	FPO-led aggregation and branding

Opportunities-

- **Increasing Domestic and Export Demand-** The fact that the demand of the organic food products both in domestic and overseas market is soaring is one of the greatest opportunities in the organic farming industry. The growing concerns about lifestyle diseases and food safety have seen Indian consumers especially in urban areas shift to healthier and chemical-free food options. Meanwhile, the global markets like the United States, European Union, Japan and the Gulf countries are growing their quantity of imports of organic spices, tea, fruits, vegetables and grain based products in India. This gradual rise of demand opens good market prospects to Indian farmers and guarantees them of better price realization and makes more farmers think of organic farming as a good alternative to make a profit.
- **Organic Products-** Organic foods usually sell at high prices as compared to the conventional foods because they are believed to be more nutritious, have environmental sustainability as well as safety against chemical residues. This is a significant incentive to the farmers since they increase their income margins particularly when sold in certified organic markets. Farmers can through the niche grocery stores, online markets, export agreements and organic retail chains gain substantially in income. This competitive price also counterbalances the immediate reduction in yield in the transition period hence enhancing economic stability in the long term among the farming households.
- **Expanding Online and Retail Markets-** The retail market in India has experienced a significant growth in the organic product category in the supermarkets and specialty stores that deal in organic products and through the eLearning systems. The availability of certified organic foods has grown in online stores like Amazon Organic, Big Basket and other farm-to-table delivery programs, giving the consumer more access to these foods. The emerging market opportunities offered by the expansion of such digital and retail channels offers new market opportunities to organic farmers who can avoid intermediaries and directly target the customers. This minimizes the reliance on the traditional mandis and enhances the price discovery, and thus income security of the farmers is improved.
- **Increasing Government Training Programs-** Government led training programs such as PKVY, MOVCDNER, NMSA and Skill India are also mushrooming and are providing training programs in sustainable agriculture practices, organic certification, bio-input preparation, pest management and value chain development. Such training activities enhance the level of technical knowledge among the farmers and prepare them with the

required skills to implement an entirely organic system. Also, extension services and KrishiVigyanKendras (KVKs) aid in disseminating knowledge and field-level demonstrations, and to defeat technical barriers, farmers can make use of them. The larger the access to training, the larger the number of communities that, in the rural areas, have the ability to transition to organic agriculture knowing they have the resources and time to do so.

- **The FPO-Led Aggregation and Branding-** Farmer Producer Organizations (FPOs) are a significant opportunity to overcome the market fragmentation in the organic market. FPOs also assist farmers to organize themselves into collectives to gain economies of scale in the processing of their produce, negotiate higher prices, lower marketing expenses, and enhance access to certification services. They also facilitate general branding, packaging and bulk supply- even allowing them to enter into large scale retail and export markets. Collective bargaining helps the FPOs to have more voice in the value chain and guarantees uniform quality and minimizes problems of individual smallholders. This model allows farmers to go large scale, integrate in to organized supply chains and enhance their visibility in the market.

GOVERNMENT INITIATIVES

Initiative	Objective	Year
PKVY	Cluster-based organic farming	2015
MOVCDNER	Organic value chains in NE states	2016
NPOP	Standards & certification for organic products	2001
PGS-India	Community-based certification	2015
JaivikKheti Portal	Online organic marketplace	2018

These initiatives support certification, cluster development, marketing, and training.

ORGANIC INNOVATIONS

Innovation	Sector	Impact
Sikkim Organic Model	State-wide organic policy	First fully organic state in the world
Organic Advisory	Agro-tech	Digital advisory, input supply, marketing
Organic Millets Mission	Food security	Boosts nutrition & farmer income
Vermicomposting Enterprises	Rural entrepreneurship	Supports youth employment

These examples highlight how organic farming creates sustainable employment and supports rural transformation.

The plans of India on the expansion of organic farming and employment-

- **Empowerment of Farmer Producer Organisations (FPOs)-**Helps collective bargaining, branding and marketing.
- **Economic Projects Organic Export Zones-**Can increase foreign income and generate processing employment.

- **Giving Certification Support-**The certification expense is subsidized to small farmers.
- **The combination of Organic farming with Agro-Tourism**-Creates rural hospitality employment and eco-tourism.
- **Start-ups-Promotions-**Fosters innovation in food production, distribution and web based marketing.

CONCLUSION

Organic farming is an important avenue in terms of sustainable agricultural development, environmental conservation, and massive rural job creation. India has a huge smallholder population and a varied agro-climatic region with huge potential of making it a global centre of organic agriculture. Even though issues like certification, training deficiencies, and infrastructural limitations still exist, government efforts and increasing demand in the market creates good platforms upon which further growth can be attained in the future. The economic viability of organic farming can be further unlocked through strengthening value chains, marketing the FPOs, increasing market access, and educating the people through better training programs. Through policy interventions and market-based approaches, organic agriculture can play an important role in ensuring the security of rural livelihoods, environmental sustainability, and people-centred economic growth.

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THE ECONOMIC AND SOCIAL UPLIFTMENT OF WOMEN IN BIHAR: GOVERNMENT ROLE OF GOVERNMENT SCHEMES IN INCLUSIVE DEVELOPMENT

Dr. Resham Vijay Ratne* Dr. Suman Kumar**

ABSTRACT

The empowerment of women has become one of the pillars of inclusive and sustainable development especially in economically and socially inferior states like Bihar. The Government of Bihar in partnership with the Government of India has adopted a very broad spectrum of women-focused schemes over the past 20 years to increase the degree of female involvement in education, work, business, health and government. The paper examines the role of women in economic and social empowerment in Bihar as a result of the intervention by the government in the form of Self-Help Groups(SHGs) under Jeevika, MukhyamantriKanyaUtthanYojana, MahilaSamakhya, reservation of women in Panchayat Raj Institutions, and financial inclusion programs. The study uses secondary data as well as policy reports and trend-based analysis to determine that the participation of women has increased household incomes and social indicators and enhanced grassroots governance. The paper also ends with a policy roadmap to further women-led development in Bihar.

Key Words: *Bihar economy, Government schemes, Social upliftment, SHGs, Women empowerment.*

INTRODUCTION

The female population of Bihar is approximately half of the population, but in the past, they were not involved in economic and social life as most of them were lowly literate, poor, and were bound by patriarchal traditions and had no institutional facilitation. As the state has realized this structural imbalance, it has progressively altered its developmental approach to women cantered government and inclusive development.

The women in Bihar have over the last few years shifted the passive beneficiaries of the welfare schemes to active players in the economy production, social change and local governance. The role of the government schemes in transformation is catalytic because of efforts by the government to transform the education, skill development, financial inclusion, and political participation. Women inclusion in the development processes has not only enhanced gender equity but also has increased the level of development at the household and community levels.

REVIEW OF LITERATURE

- **Sen (1999)** defines development as the growth of human capacities and freedom and agency of women as the key outcome of development. Sen believes that when women have better

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education, health, and economic empowerment, the welfare of an individual and the group social development improve. As it has been noted, especially female literacy, enhances decision-making power in the household, and human capital formation in the long term.

- **World Bank (2012)** has set empirical evidence which shows that investments in women education and health produces high social returns. Educated women tend to engage in labor force, guarantee improved health and nutrition within their families and invest in education of their children. The report underlines the fact that gender equality helps in reducing poverty and inclusive growth particularly in the developing regions.
- **Kabeer (2015)** emphasizes that collective institutions like Self-Help Groups (SHGs) can contribute to better economic empowerment of women. The bargaining power and social visibility of women is heightened through access to credit, savings and livelihoods based groups. The paper asserts that SHGs can be used as avenues of economic participation and social change especially in rural areas.
- **Agarwal (2018)** underscores the fact that the involvement of women in local organizations and economic cooperatives will result in improved governance and management of resources. The participation of females in the grassroots decision-making process enhances the policy sensitivity to issues of health, sanitation and education requirements and in this process the social development outcomes are strengthened.

Government Initiatives That Are Woman-Centric and the Effect they have-

Jeevika, Economic Empowerment

Jeevika has contributed a revolutionary role of mobilizing rural women into Self-Help Groups. With the availability of microcredit, savings, and training of skills, women have been involved in agriculture, dairy, food processing, tailoring, and minor trade. SHGs no longer rely on moneylenders and have a better household income.

Literary Education and Feminine Literacy

Promotional programmes like MukhyamantriKanyaUtthanYojana, free bicycles, uniforms, and scholarship have also done a lot to enhance school retention and higher education enrolment by girls. With education, and early marriage has been postponed and the employability has been enhanced which has strengthened the role of women in economic and social life.

Female Work Participation

The education and training of skills, livelihoods through SHGs and employment programs by the government have made women more involved in paid labor. There is an increased level of participation of women in agriculture, education, health services and micro-enterprises.

Health and Social Well-Being

Maternity health care has been enhanced through schemes like JananiSurakshaYojana and PM MatruVandanaYojana. There are great gains on institutional deliveries, and this has made maternal and infant mortality lower and the overall welfare of women better.

Political Participation

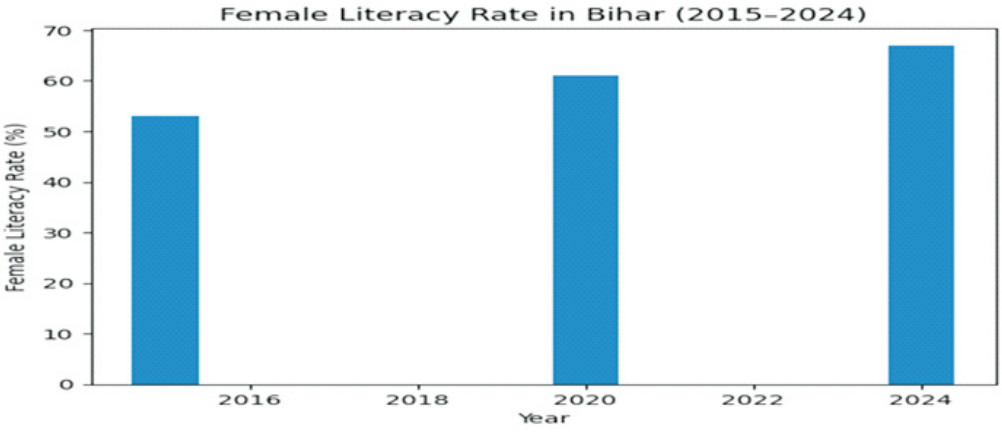
Bihar has seen more women in government practice as 50 percent of the seats in Panchayati Raj Institutions are reserved to women. Women leaders are healthy, sanitary, focus more on drinking water and education resulting in more inclusive developmental outcomes.

Data Trends and Graphical Analysis

Table 1: Women Empowerment -Key Indicators in Bihar (2015-2024).

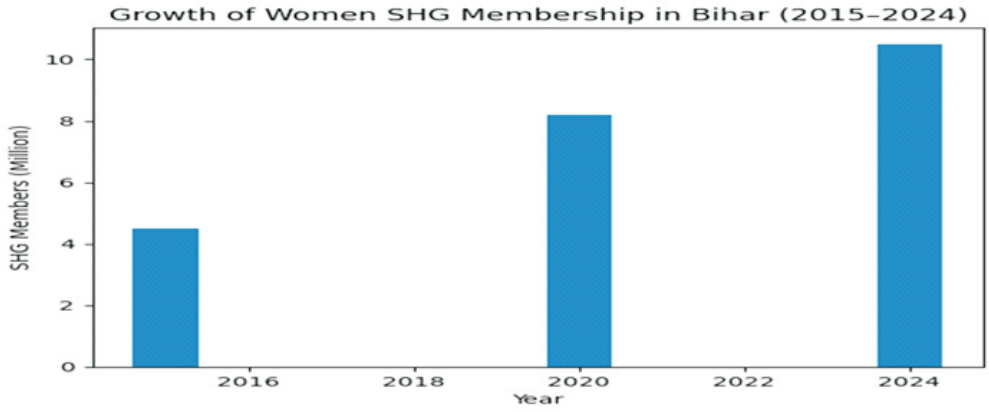
Indicator	2015	2020	2024
Female Literacy Rate (%)	53	61	67
Women SHG Members (Million)	4.5	8.2	10.5
Female Work Participation (%)	18	22	26
Institutional Deliveries (%)	63	79	89

Source: Economic Survey of Bihar, NFHS, Jeevika Reports.



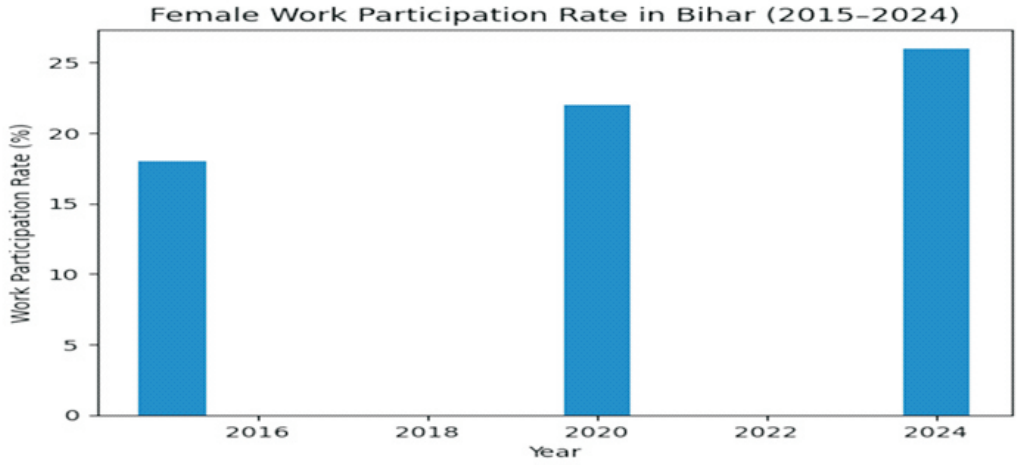
INTERPRETATION

The trend indicates that the women literacy has been continually increasing, and this indicates that the education of the girls is just getting more and more investment and there is better access to education.



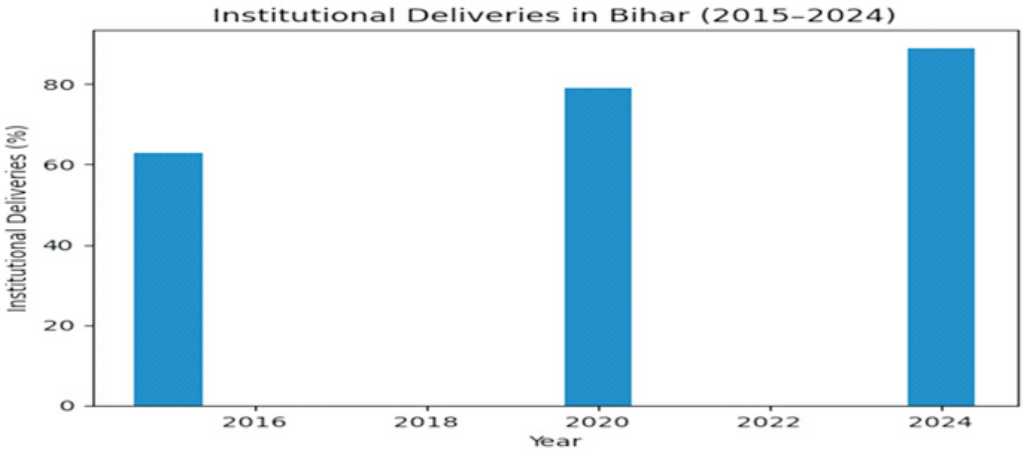
INTERPRETATION

The fast growth of SHGs signifies an increase in the level of financial inclusiveness and joint economic involvement among women.



INTERPRETATION

The increase in the female work participation shows better livelihood prospects and understanding of the economic roles of women.



INTERPRETATION

The sudden rise in the number of institutional deliveries makes a point towards the increased access and awareness of maternal healthcare.

The Dilemmas, Openings and government interventions towards Awareness on Female empowerment in Bihar

DILEMMAS OF WOMEN PARTICIPATION AND EMPOWERMENT

Even with significant improvements, women in Bihar still have a number of structural and socio-economic issues which restrict their full role in the socio-economic development.

Low education and skills mismatch especially in the rural settings are one of the main challenges.

Despite the enhancement of female literacy, several women have no access to higher education and skills that are relevant to the market, which limits their access to formal and better-paying jobs. The issue of early marriages and household roles also interferes with educational progress.

The other significant challenge is scarce job opportunities. A big percentage of women are still stuck in non-productive and unpaid informal labor. Unavailability of childcare, restriction in mobility and security make women less capable of maintaining regular pay work or in the business sector.

The social norms and gender bias that have been found in the patriarchal world still affect the decision-makers in the household and community. The economic input of women is not taken seriously and the opposition to women leadership is still evident in some parts, so women cannot be able to participate effectively in the governance even with the political reservations.

Also, the lack of awareness and being offline is an obstacle to receiving government schemes by women. Most of the women especially marginalized ones do not have a clue of the benefits available or have challenges accessing online platforms that are needed in the registration and delivery of services.

WOMEN-LED DEVELOPMENT IN BIHAR OPPORTUNITIES

Nevertheless, Bihar is one of the states that offers great opportunities to enhance the economic and social roles of women.

Massive growth of Self-Help Groups (SHGs) through Jeevika has developed a robust institution of development that is female-led. SHGs also allow the entrepreneurship, collective bargaining, financial inclusion, and development of leadership (especially in rural regions).

The increasing focus on education and health outcomes can provide long-term opportunities. Enhanced literacy among women and maternal health has added to productivity, employability and social confidence of women which has facilitated increased involvement to economic activities and governance.

The emergence of political involvement of women with 50 percent reservation in Panchayati Raj Institutions has created opportunities in which women are able to shape the priorities of development on the local level. Such aspects as sanitation, drinking water, health, and education have demonstrated positive results of female leadership.

Besides, new opportunities emerge through the rise in digital and financial inclusion. Digital literacy programs and mobile banking and Direct Benefit Transfers (DBT) may improve the empowerment of women to control resource allocation and the reliance of the middleman.

GOVERNMENT INITIATIVES TOWARD AWARENESS AND INCLUSION

By understanding that policy provision is not the only measure to empower women, the Government of Bihar and Government of India have taken a number of steps to increase awareness on the part of the women.

SHGs, Anganwadi workers, ASHA workers and local institutions have all been actively promoted by the government to conduct community based awareness programs. These are grassroots level players that push information about education incentives, health schemes, nutrition schemes and financial inclusion schemes.

Awareness is usually disseminated using Information, Education, and Communication (IEC) approaches. The low literacy and digital access women are reached with the use of wall paintings, street plays, village meetings, and local media campaigns.

The growth of Direct Benefit Transfer (DBT) has made women beneficiaries more open and transpirable with direct linkage to bank accounts. This has enhanced transparency of the schemes, minimized leaks and empowered women financially.

Capacity-building and training, especially within Jeevika, is another aspect that the government has focused on to teach women rights concerning the law and financial matters, use of digital tools, and leadership. Such initiatives increase awareness and at the same time create confidence and agency.

CONCLUSION

The role of women has evidently come out as a revolutionary item in the economic and social development of Bihar. The facts used in this paper indicate that the role of women has greatly changed to active participants in education, livelihoods, health, and governance due to the intervention of special government actions. Women have been able to enjoy more opportunities of resources, decision-making, and economic opportunities through initiatives like Self-Help Groups under Jeevika, incentive programs in education to girls and maternal health programs, financial inclusion programs and political reservation of places in local institutions.

The positive changes in literacy among women have fortified human capital formation and increased the capability of the women to contribute effectively to the workforce and community related matters. Being able to gain more work and earn higher household incomes has led to decreased poverty vulnerability, made households more economically resilient, and enhanced their labour participation. At the same time, advances in maternal health, and delivery in institutions have enhanced the well-being of women so that they can continue with their engagement in productive and social activities. The increasing number of women representing the institutions of Panchayati Raj has further strengthened the aspect of inclusive governance; the more emphasis has been put on education, sanitation, health, and basic services on the grassroots level.

The results verify that women-focused development is both socially fair and economically effective in that it produces high social returns and developmental benefits in the long term. These successes however, must be maintained through constant policy reinforcement, good creation of awareness, and institutional fortification. It will be necessary to scale up successful initiatives, deal with regional inequalities, combine skill development and emerging digital and market opportunities. Finally, women empowerment is the key of attaining inclusive and sustainable development in Bihar, as the active role that women play enhances the economic performance, social integration, and democratic governance.

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UNDERSTANDING SELF-CARE TIME AND ITS DETERMINANTS AMONG MARRIED INDIVIDUALS IN INDIA

Nandani Yadav* Ram Prakash**

ABSTRACT

This study examines the time allocated to self-care activities among married individuals in India using nationally representative data from the Time Use Survey 2019. Descriptive analysis reveals that married men spend slightly more time on self-care (12.34 hours) compared to women (11.92 hours), indicating a modest gender gap. A multiple regression model further confirms that gender significantly influences self-care time, with women spending approximately 18 minutes less per day than men, even after controlling for other variables. Age positively affects self-care time, while higher socioeconomic status, larger household size, and urban residence are associated with reduced time for personal wellbeing. Access to time-saving facilities such as modern cooking and outsourced washing services increases self-care time, highlighting the role of household infrastructure in easing time constraints. The findings underscore the presence of structural and gender-based inequalities in time allocation within households and emphasize the need for policies that promote equitable division of domestic responsibilities, encourage adoption of time-saving technologies, and recognize self-care as an essential component of wellbeing and time poverty reduction.

Keywords: *Self-care, Time Use Survey, Married Individuals, Gender Differences, Determinants.*

1. INTRODUCTION

In India, the allocation of daily time across paid work, unpaid domestic and care work, and personal maintenance is deeply shaped by entrenched gender norms and household structures. The nationally representative Time Use Survey 2019 (TUS 2019) provides a unique opportunity to examine how married individuals distribute their time, particularly with respect to self-care, in a manner that reflects both socio-economic conditions and intra-household gender dynamics. Existing literature using time-use data consistently reports a pronounced gender gap: women spend substantially more time than men on unpaid domestic and caregiving activities, irrespective of their level of education, employment status, or marital status. For example, Gupta and Pattanaik (2023) show that patterns of time allocation for unpaid domestic and care work in India remain heavily skewed toward women, while Nikore (2022), using TUS 2019 data, demonstrates that Indian women perform many times more unpaid care work than men, underscoring the gendered burden that sustains household economies.

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However, these studies largely focus on unpaid domestic and care work, with comparatively little empirical attention given to "self-care time" — that is, the time individuals allocate to personal maintenance, rest, and wellbeing — especially among married adults. Given the substantial household responsibilities that often fall on married women, self-care may represent a critical yet neglected dimension of wellbeing and time poverty. Analysing self-care time helps to reveal whether, and to what extent, married individuals, particularly women, are able to secure personal time beyond domestic and caregiving duties, thereby shedding light on intra-household inequalities in leisure, rest, and personal wellbeing.

Drawing on descriptive analysis and regression-based modelling of TUS 2019 data, this paper examines how demographic characteristics (such as gender and age), household attributes (including household size, economic status, and dwelling-related facilities), and place of residence (urban/rural) influence time spent on self-care among married individuals. In doing so, the study extends the existing literature beyond unpaid care and domestic work to focus on personal time allocation, and contributes to a deeper understanding of how structural and household-level conditions shape not only labour and care burdens but also opportunities for rest, self-maintenance, and overall wellbeing. By centring self-care among married persons, the paper seeks to provide fresh insights into time poverty, gender inequality, and wellbeing in Indian households, with important implications for social policy, gender equity, and quality of life that go beyond the conventional focus on paid work and unpaid domestic labour.

1.1 Objectives of the Study

1. To analyse the average time spent on self-care activities by married individuals using the Time Use Survey 2019.
2. To examine gender-wise differences in self-care time among married people.
3. To identify and assess the determinants of self-care time among married individuals through regression analysis.

1.2 Hypotheses

1. H1: There is a significant difference in the average time spent on self-care activities between married males and married females.
2. H2: Married females spend significantly less time on self-care activities compared to married males.
3. H3: Demographic and household characteristics, such as age, education level, socioeconomic status, household size, and availability of time-saving facilities, significantly influence self-care time among married individuals.

2. LITERATURE REVIEW

Existing research using time-use data has consistently highlighted significant gender disparities in the distribution of household responsibilities, unpaid domestic labour and caregiving activities. Gupta and Pattanaik (2023) demonstrate that women in India spend a considerably greater amount of time on unpaid domestic and caregiving tasks compared to men, irrespective of their employment or educational status. Their analysis using national time-use data further reveals that women's participation in unpaid care work is a persistent phenomenon even when they engage in paid employment, suggesting that household responsibilities remain largely feminised. Nikore (2022) reinforces this argument by showing that Indian women perform a disproportionately high share of unpaid household work, contributing significantly to household functioning but with limited

recognition in economic evaluations. She argues that women's unpaid work sustains domestic life and compensates for deficiencies in state provisioning, yet their contributions are often invisible in policy frameworks.

Focusing more specifically on the implications of unpaid work for wellbeing, Sinha (2024) underscores that excessive involvement in unpaid care tasks often results in time poverty, restricting individuals—particularly women—from allocating sufficient time to rest, leisure and self-care. Her analysis reveals negative associations between care-related time burdens and measures of psychological wellbeing, emphasising that the implications of unpaid work go beyond employment constraints and extend into personal health outcomes. Using evidence from the Time Use Survey 2019, Rathore (2024) finds that sociodemographic and household characteristics significantly influence unpaid domestic work patterns, in particular highlighting that larger household sizes and lower socioeconomic status are associated with increased unpaid workload for women.

While much of the literature focuses on unpaid domestic and caregiving roles, relatively few studies examine the allocation of time toward self-care activities, particularly among married individuals. The neglect of self-care in time-use research limits understanding of wellbeing dimensions within households. Some broader studies on time poverty suggest that when unpaid household responsibilities are high, time available for personal care and restorative activities tends to decline, disproportionately affecting women. This gap highlights the need to investigate self-care time as an indicator of personal wellbeing and autonomy, rather than treating time solely as a labour or household resource. Studies on marital dynamics suggest that gendered household roles become more entrenched post-marriage, with women experiencing reduced autonomy over time allocation compared to men, often at the expense of their wellbeing.

In contrast to literature that primarily assesses unpaid work or labour market participation, a few emerging studies emphasise the importance of analysing personal time use such as rest and self-maintenance to understand quality-of-life outcomes. The current analysis extends this literature by focusing specifically on self-care time among married individuals, framed within the broader discourse on gendered time allocation, time poverty and wellbeing. It situates self-care as a crucial yet understudied aspect of time allocation, arguing that understanding determinants of self-care time can offer deeper insights into household power dynamics, socio-economic constraints and gender inequalities.

Together, previous studies provide a strong foundation to examine self-care time among married individuals. However, by shifting focus from unpaid work to personal time, this study contributes to existing literature by addressing an empirical and conceptual gap. It advances the argument that personal time allocation is as significant as unpaid or paid labour allocation in understanding wellbeing, particularly in gendered household structures. Thus, the present study offers a novel perspective by analysing the determinants of self-care time using nationally representative data from the Time Use Survey 2019.

3. DATA AND METHODOLOGY

The study is based on secondary data obtained from the nationally representative *Time Use Survey (TUS) 2019*, conducted by the National Sample Survey Office (NSSO), Government of India. The survey covers individuals aged 15 years and above and records the time spent across various activity categories within a 24-hour reference period using a three-slot diary method: morning, afternoon, and evening. For this study, the sample is restricted to *married individuals* to assess self-care time

distribution within household settings where marital status may influence time allocation due to increased caregiving and domestic responsibilities.

Self-care time is used as the dependent variable and is measured in terms of hours allocated to personal care and maintenance activities during the reference period. The independent variables included in the analysis are demographic, socioeconomic, and household characteristics: gender (male/female), age (continuous), place of residence (urban/rural), educational attainment (categorised as illiterate, up to primary, upper primary, secondary, higher secondary, diploma, graduate, postgraduate and above), logarithm of monthly per capita consumption expenditure (lnmpce) as a proxy for economic status, household size, land possession, type of dwelling (owned/rented), cooking facility (traditional/modern), type of lighting, and washing facility (manual/outsourced). Additionally, social group (Scheduled Caste, Other Backward Classes, Others) and religion (Hindu, Muslim, Others) are used as categorical controls.

A two-stage analytical framework is adopted. First, descriptive statistics are computed to analyse the average time spent on self-care by married individuals and to explore gender-based differences. Mean values and standard deviations are presented for male and female respondents separately. Second, a multiple linear regression model is estimated to determine the factors associated with self-care time among married individuals. The general form of the estimated model is as follows:

$$\begin{aligned}\text{Self-care time}_i = {} & \beta_0 + \beta_1 \text{Gender}_i + \beta_2 \text{Age}_i + \beta_3 \text{Residence}_i + \beta_4 \text{Education}_i + \beta_5 \ln(\text{mpce})_i \\ & + \beta_6 \text{Household size}_i + \beta_7 \text{Land possession}_i + \beta_8 \text{Dwelling}_i \\ & + \beta_9 \text{Cooking facility}_i + \beta_{10} \text{Lighting}_i + \beta_{11} \text{Washing facility}_i \\ & + \beta_{12} \text{Social group}_i + \beta_{13} \text{Religion}_i + \varepsilon_i\end{aligned}$$

Where ε_i represents the error term, and the variables are defined according to the Time Use Survey coding format. Dummy variables are created for categorical factors, with *male, rural residence, illiterate, Hindu religion,* and *general social group* typically used as reference categories.The estimation results are interpreted to identify significant determinants of self-care time among married individuals. A negative coefficient indicates reduced self-care time relative to the baseline category, while a positive coefficient implies increased self-care time. Standard errors and p-values are used to assess the statistical significance of each variable, with a significance threshold of 5%.All analyses are performed using standard statistical software, and appropriate sample weights from the TUS 2019 dataset are applied wherever applicable to ensure representativeness of the results.

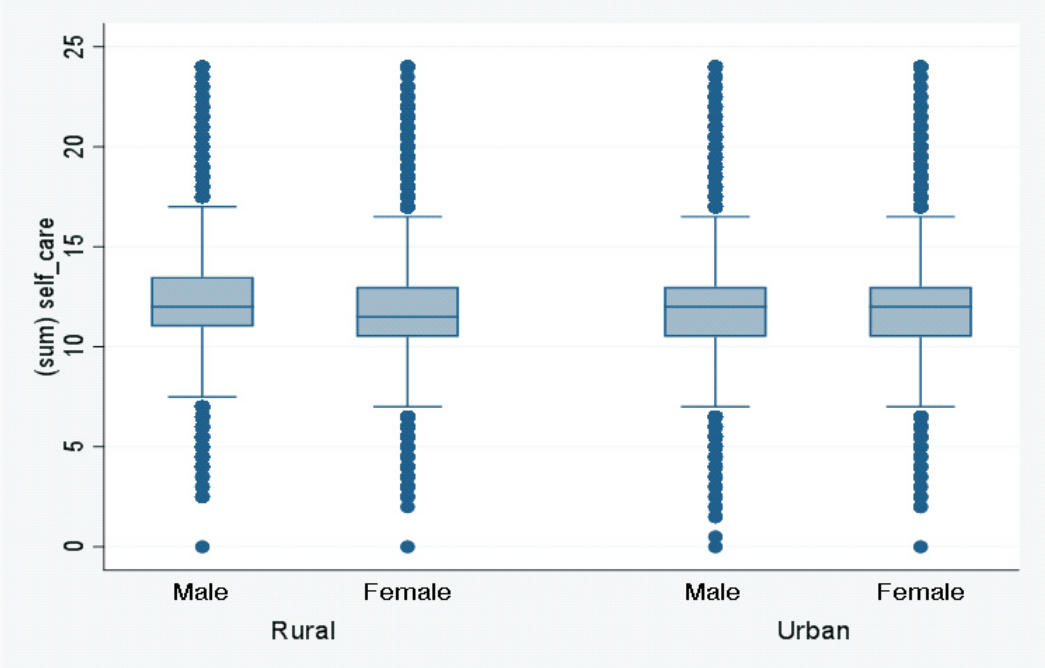
4. RESULTS AND DISCUSSION

A boxplot was constructed to visualise the distribution of self-care time among married individuals across gender and residence (Figure 1). The figure indicates that males consistently report slightly higher self-care time than females in both rural and urban settings. While the interquartile range remains similar across groups, females appear to have more lower-end observations, reflecting time constraints likely related to unpaid household responsibilities.

Table 1 presents the descriptive statistics of daily self-care time among married individuals by gender.

The results indicate that males spend slightly more time on self-care activities (mean 12.34 hours) compared to females (mean 11.92 hours). Although the difference between males and females is modest, it indicates that men have relatively higher access to personal time compared to women. This gap, though not extremely large, reflects underlying socio-cultural norms, where married women are more engaged in unpaid domestic and caregiving roles, resulting in comparatively less time for self-maintenance.

Figure 1:*Boxplot showing the distribution of self-care time among married males and females in rural and urban areas.*



Source: Time Use Survey, 2019.

These findings align with prior studies highlighting gender disparities in time allocation due to household responsibilities and social expectations within marital settings.

Table 1: Descriptive statistics of self-care time among married individuals by gender.

Gender	***Self-care (hrs)***	***Sample Size (N)***
Male	Mean: 12.34 | SD: 2.05 | Min: 0 | Max: 24	130,254
Female	Mean: 11.92 | SD: 2.01 | Min: 0 | Max: 24	134,728
Total	Mean: 12.12 | SD: 2.04 | Min: 0 | Max: 24	264,982

Source: Time Use Survey, 2019.

Table 2 presents the estimated coefficients of the multiple linear regression model used to examine the determinants of self-care time among married individuals. The results show that gender, age, socioeconomic status, household size and access to household facilities significantly influence self-

care time allocation. A negative coefficient indicates reduced self-care time, whereas a positive one reflects increased self-care time.

Table 2: Regression Results: Determinants of Self-Care Time among Married Individuals.

Variable	Coefficient	Std. Error	t-value	P>|t|	[95% Conf. Interval]
Female (ref: Male)	-0.3026203	0.0081129	-37.30	0.000	[-0.3185213, -0.2867193]
Urban (ref: Rural)	-0.0645936	0.0094659	-6.82	0.000	[-0.0831466, -0.0460406]
Age	0.0273676	0.0003149	86.92	0.000	[0.0267505, 0.0279847]
Literate below primary	-0.0218296	0.0160877	-1.36	0.175	[-0.053361, 0.0097018]
Primary	-0.0741919	0.013678	-5.42	0.000	[-0.1010003, -0.0473834]
Upper primary/middle	-0.1033677	0.0129837	-7.96	0.000	[-0.1288154, -0.07792]
Secondary	-0.0781718	0.0139814	-5.59	0.000	[-0.1055749, -0.0507686]
Higher secondary	-0.0575631	0.0162291	-3.55	0.000	[-0.0893718, -0.0257544]
Diploma upto secondary	-0.1773838	0.0476129	-3.73	0.000	[-0.2707039, -0.0840638]
Diploma higher secondary	-0.1987999	0.0433044	-4.59	0.000	[-0.2836755, -0.1139244]
Diploma graduation above	-0.0427333	0.0434183	-0.98	0.325	[-0.1278321, 0.0423654]
Graduate	-0.0967612	0.0174272	-5.55	0.000	[-0.130918, -0.0626044]
Post graduate above	-0.2503527	0.0253257	-9.89	0.000	[-0.2999903, -0.2007151]
lnmpce	-0.2101968	0.0084756	-24.80	0.000	[-0.2268088, -0.1935848]
Household size	-0.020636	0.0022411	-9.21	0.000	[-0.0250284, -0.0162436]
Land possessed	-0.4216196	0.1858286	-2.27	0.023	[-0.7858386, -0.0574006]
Modern cooking	0.0433206	0.0096101	4.51	0.000	[0.0244851, 0.0621561]
Modern lighting	-0.1271595	0.02313	-5.50	0.000	[-0.1724936, -0.0818254]
Manual washing	-0.0423247	0.0131019	-3.23	0.001	[-0.068004, -0.0166453]
Outsourced washing	0.3870048	0.035377	10.94	0.000	[0.3176669, 0.4563427]
SC	-0.0281284	0.014955	-1.88	0.060	[-0.0574399, 0.001183]
OBC	-0.1203219	0.0137089	-8.78	0.000	[-0.1471909, -0.0934528]
Others (social group)	-0.1032076	0.014454	-7.14	0.000	[-0.1315371, -0.0748781]
Muslim (ref: Hindu)	-0.0764828	0.0124475	-6.14	0.000	[-0.1008797, -0.052086]
Others (religion)	-0.0693803	0.0148499	-4.67	0.000	[-0.0984858, -0.0402748]
Owned dwelling	0.0893802	0.0128737	6.94	0.000	[0.0641481, 0.1146123]
Constant	13.5436	0.19834	68.28	0.000	[13.15485, 13.93234]

Source: Time Use Survey, 2019.

The results from the regression analysis further substantiate the gender gap in self-care time. The coefficient for females is -0.3026 ($p < 0.01$), implying that married women spend approximately 0.30 hours (18 minutes) less per day on self-care activities than married men, holding other variables constant. This suggests persistent gender inequality in access to personal time, consistent with the literature that identifies married women as disproportionately burdened with household duties. Age has a positive and significant effect ($\beta = 0.0274$, $p < 0.01$), indicating that older individuals are more

likely to spend additional time on self-care, possibly due to increased health needs or greater autonomy in daily routines.

Urban residence is negatively associated with self-care time ($\beta = -0.0646$, $p < 0.01$), suggesting that individuals living in urban areas spend less time on self-care compared to rural counterparts. This may reflect higher work intensity, time constraints, and greater engagement in economic activities in urban environments. Most education levels show a negative association with self-care time, indicating that higher education may be linked to greater labour market participation or structured routines, which may limit time available for self-care.

Socioeconomic status, measured using the logarithm of monthly per capita expenditure (lnmpce), also exhibits a significant negative effect ($\beta = -0.2102$, $p < 0.01$). This suggests that individuals from higher-income households tend to allocate less time to self-care, which may be explained by longer working hours or greater engagement in economic and social activities. Household size negatively influences self-care time ($\beta = -0.0206$, $p < 0.01$), indicating that individuals in larger households experience greater time pressure due to expanded domestic responsibilities, particularly in joint or extended family settings.

Household facilities also play a crucial role. The availability of modern cooking facilities has a positive effect ($\beta = 0.0433$, $p < 0.01$), suggesting that time-saving technologies may enhance personal care time. Similarly, access to outsourced washing services significantly increases self-care time ($\beta = 0.3870$, $p < 0.01$), highlighting how externalizing domestic tasks can free time for personal well-being. In contrast, reliance on manual washing reduces self-care time ($\beta = -0.0423$, $p < 0.01$), reinforcing the argument that unpaid household tasks limit personal time. The ownership of dwelling is positively associated with self-care ($\beta = 0.0894$, $p < 0.01$), possibly reflecting greater housing stability and reduced stress associated with residence-related insecurity.

Social identity also contributes to variations in self-care time. Individuals belonging to Other Backward Classes (OBC) and Other social groups spend less time on self-care than those from the General category. Furthermore, being Muslim ($\beta = -0.0765$, $p < 0.01$) is associated with decreased self-care time compared to Hindus, which may reflect distinct socio-cultural norms or time allocation patterns.

Overall, the results suggest that demographic, economic and household-level factors substantially influence personal time allocation among married individuals. The findings demonstrate that structural inequalities, particularly those related to gender, socioeconomic status and household responsibilities, restrict access to self-care time. Time-saving household facilities can contribute positively to personal care, indicating that interventions aimed at reducing domestic workload may help improve individual well-being. The analysis highlights the need for policies addressing gender disparities in household work and promoting supportive infrastructure, especially for women, to enhance opportunities for self-care and reduce time poverty.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The study examined the determinants of self-care time among married individuals in India using nationally representative data from the Time Use Survey 2019. The analysis revealed a modest but significant gender gap, with married women spending less time on self-care compared to married men, even after controlling for socioeconomic and household characteristics. This indicates that women may experience higher time pressure and reduced autonomy over personal time due to their

disproportionate involvement in unpaid domestic and caregiving responsibilities. Age was positively associated with self-care time, suggesting that older individuals tend to allocate more time for personal wellbeing. Conversely, higher socioeconomic status, urban residence, and larger household size were linked to lower self-care time, indicating that increased work intensity and expanded household responsibilities may reduce time available for individual wellbeing.

Household facilities, particularly outsourcing of washing tasks and access to modern cooking methods, positively influenced self-care time, demonstrating that the use of time-saving technologies and external support can free up time for personal maintenance. In contrast, manual washing and lack of supportive infrastructure constrained self-care opportunities. Social and cultural determinants also played a role, reflecting variations in household responsibilities and time allocation patterns across different communities.

Overall, the findings suggest that self-care time is shaped by both structural and household-level constraints, and that limited access to personal time—particularly for married women—may reflect deeper gender inequalities and time poverty. Promoting equitable time allocation within households is essential to enhance the wellbeing and quality of life of individuals, especially women.

POLICY RECOMMENDATIONS

1. **Promote equitable distribution of household responsibilities** through awareness programmes targeting both men and women to encourage shared participation in unpaid domestic and caregiving activities.
2. **Support time-saving household technologies**, including incentives or subsidies for modern cooking equipment, automated washing solutions, and other labour-reducing appliances to reduce domestic workload.
3. **Strengthen access to outsourced domestic services**, particularly in urban areas, through the promotion of affordable local services such as laundry and household assistance.
4. **Raise awareness on the importance of self-care and wellbeing**, integrating self-care education into community health initiatives, marital counselling, and public health campaigns.
5. **Incorporate time-use and self-care indicators into national social and economic assessments,** recognising personal time as an important component of wellbeing, in addition to paid and unpaid labour metrics.
6. **Encourage gender-sensitive policy frameworks**, particularly in social protection and welfare schemes, to reduce the unpaid care burden on women and create enabling environments for better time management.

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EXPLORING AND VALIDATING THE CHALLENGING FACTORS OF ENTREPRENEURSHIP IN PUBLIC PRIMARY EDUCATION (With Special Reference to Varanasi City)

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ABSTRACT

The prime goal of the study is to explore and understand the various challenging factors of teachers which may impact public entrepreneurship in public primary education in Varanasi city. Further, this study will try to provide an optimum solution for the same. Data has been collected from 50 respondents who are basically the primary teachers in state run government schools of Varanasi city. This data has been collected to identify the challenges as variables of teachers which can impact them in being a public entrepreneur in a long run. Public teachers are main stakeholders in public primary education of India. If we focus on their problems which impact their productivity and entrepreneurial skill on the grassroot level, it can lead to improved quality education and satisfied and productive public entrepreneurs in public education who really enrich the overall education process at primary level in the state of Uttar Pradesh.

Keywords: *Teachers as public entrepreneurs, Challenging factors, Exploratory Factor Analysis, Entrepreneurial orientation*

INTRODUCTION

Public-sector entrepreneurship (PSE) is a burgeoning field of study, yet its conceptualization remains somewhat nebulous. Despite the acknowledgment that the public sector holds potential for entrepreneurial endeavours akin to those in the private sector, there remains ambiguity regarding the precise constituents of the PSE construct. The resurgence of interest in public entrepreneurship coincides with escalating challenges faced by public services and society at large. Originating from conceptual roots dating back to the 1960s, public leaders are increasingly exploring avenues to infuse entrepreneurial vigor and innovation into traditional governmental frameworks and procedures.

Discussions surrounding innovation within the public sector abound among politicians, public administration professionals, scholars, and commentators. Alongside notions of efficiency and creativity, innovation is heralded as a mechanism for public bureaucracies, both governmental and non-governmental, to evolve into agile, responsive entities that serve their constituents (and taxpayers) more effectively. Public entrepreneurship is delineated as the conception of novel or innovative ideas, followed by the design and implementation of said ideas within public sector operations. The compatibility of public-sector entrepreneurship with democratic governance principles poses a pertinent question. While entrepreneurship is associated with autonomy, personal vision, confidentiality, and risk-taking, democratic administration emphasizes accountability, citizen involvement, transparent policy-making processes, and stewardship.

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There have been several studies done to measure Entrepreneurial Orientation in corporate sector but there is no study to explore and measure the Enterpreneurial Orientation in educational institutions especially in public primary sector in Uttar Pradesh. This study will try to strengthen the literature on possibility of pubic entrepreneurship in public education sector and exploration of various challenges for educational entrepreneurs as it examines the factors and their analysis. Therefore, this study tries to find out the challenging factors of the teachers who are being the possible public entrepreneurs in Primary public education sector of Varanasi, UP.

LITERATURE REVIEW

Despite over three decades of scholarly exploration into classical themes of entrepreneurial orientation, there remains an opportunity for research in the relatively underrepresented context of the public sector (Martens et al. 2016). Teasley (2009) highlights a significant gap in educational research, noting that scholars often overlook crucial aspects of school organization, curriculum, instruction, and resources when discussing the rationale behind school choice. The evident diversity in school performance suggests that not all schools operate with equal efficiency and effectiveness in fostering student achievement. While factors like family background and student aptitude are undeniably influential, variations in school operations also play a substantial role in shaping student outcomes.

For example, recent research has shown that charter schools, while generally more efficient than traditional schools, also exhibit a wider range of performance levels between the best and
average practices. This variability is unsurprising given the relatively recent emergence of charter schools in the education landscape. The competitive market environment doesn't inherently generate optimal practices; instead, such practices evolve over time through a process of creative destruction, wherein successful adaptations—whether through innovation or rapid emulation—are rewarded, while poor decisions lead to a loss of market share and potential organizational failure. As competition in public education intensifies, the imperative to innovate and adopt best practices is expected to grow. Consequently, it's reasonable to anticipate that a school's entrepreneurial orientation (EO) will significantly impact its performance in this evolving landscape.

It was not until 1983 that Miller conducted the foundational study on EO, focusing on entrepreneurial activities within firms. Miller's study defined an entrepreneurial organization as one characterized by proactiveness, innovativeness, and a propensity for risk-taking. EO, as described in subsequent research, encompasses critical decisions made by the entire organization. Moreover, entrepreneurial firms require managers who possess entrepreneurial styles and innovative strategies. Subsequent studies have consistently demonstrated a positive relationship between EO and firm performance. Given the importance of assessing EO in organizations, Miller, Covin, and Slevin developed a scale in 1983 to measure EO in corporate settings. While numerous studies have utilized this scale, there remains a gap in measuring EO within educational or technical institutions.

Timo Meynhardt and Fabian E. Diefenbach (2012) delves into the shifting paradigms of public sector management, highlighting an increasing expectation for public servants to exhibit entrepreneurial behaviors similar to their counterparts in the private sector. Despite these evolving expectations, there is a notable paucity of quantitative research exploring the determinants that drive entrepreneurial orientation (EO) within the public domain. Their study aims to address this gap by examining the influences on EO at the departmental level within public sector entities, integrating varied research perspectives to reconcile differing views on public management.

RESEARCH METHODOLOGY

This is an explorative and descriptive study which is mainly done to explore and to identify the most suitable variables which are basically teacher centric challenges. Hence it is exploratory in nature. The study is based on primary data and describes the major factors; hence it is descriptive in nature. A questionnaire is prepared as per the interviews and discussions held
with these institutions again and again. We used Delphi method for developing the questionnaire.
A physical survey is conducted among the public primary teachers who are the employees of public education sector of Varanasi City. The questionnaires have given personally to the respondents and collected also personally. The replies so obtained from these employees were considered for the analysis, the study includes a convenience sampling.

Respondents Profile :

Demographics	Particulars	No. of Respondents	%
Gender	Male	5	10%
	Female	45	90%
Age	20-30 Years	5	10%
	30-40 Years	35	70%
	Above 40 Years	10	20%
Experience	0 - 5 Years	5	10%
	5 - 10 Years	32	64%
	Above 10 Years	13	26%
Area	Rural Area	20	40%
	Urban Area	30	60%

DATA INTERPRETATION

We tried to find out maximum challenging factors of the teachers as public entrepreneurs like Motivation Level, overburden of work, Economical security, Job satisfaction level, work recognition and appreciation etc which affects any public employee and his role as a public entrepreneur in the government education sector. Most of the responses were obtained in four options particularly in positive(yes), Negative (NO), neutral (maybe) and unspecified (don't know) forms.

DATA ANALYSIS: (Teacher Motivation and Commitment in Government Primary Schools)

Teacher Motivation and Drive: Contrary to common perceptions, teachers in government primary schools often demonstrate significant motivation and enthusiasm to foster positive change within their institutions. A majority of educators exhibit a strong commitment to
improving the quality of education, indicating that they are not lacking in drive or determination to enhance the educational experience for their students.

Training and Expertise: A substantial proportion of educators (90%) do not perceive a lack of appropriate and adequate training or expertise in their work. This suggests that the training provided to teachers in government primary schools is generally considered sufficient by the majority of educators.

Centralization of Authority: Many public-school teachers feel that the centralization of authority within institutions restricts their individual autonomy. This centralized structure often limits teachers' freedom to implement personalized or innovative approaches in their classrooms.

Division of Work and Delegation of Authority: On the other hand, teachers generally agree that there is a clear division of labor and effective delegation of authority in government primary schools. This organizational structure ensures that responsibilities are appropriately distributed, supporting the overall functioning of the schools.

Competitiveness Among Colleagues: Most teachers report a sense of positive competitiveness among their colleagues. This healthy rivalry is seen as a motivating factor that encourages teachers to improve their performance, fostering an environment that can drive monumental reforms in public primary education.

Aggressiveness in Teachers: Public primary school teachers do not generally perceive themselves or their colleagues as aggressive. This suggests that while challenges exist, the working environment remains professional and conducive to constructive interaction.

Quality of Education: Teachers overwhelmingly feel confident in their ability to provide quality education to their students. This reflects their commitment to teaching and belief in their own effectiveness in the classroom.

Workload and Efficiency: A significant portion of teachers (85%) acknowledges that a lack of workforce in public schools leads to an overburdening of individual educators. This often forces teachers to assume multiple roles, which can negatively affect their teaching efficiency and overall productivity.

Sense of Duty and Accountability: A vast majority (95%) of public-school teachers express a strong sense of duty and accountability toward their work. This highlights their dedication to their students and their profession.

Job Satisfaction: In terms of economic and emotional satisfaction, most teachers are content with their jobs. They report feeling economically secure and emotionally fulfilled, with more than 85% indicating high levels of emotional satisfaction. This is a positive sign of their commitment to their roles as educators.

Job Security: Over 60% of teachers feel a sense of job security, which gives them the freedom to pursue innovative initiatives. This security supports teachers in taking risks and implementing new ideas that could benefit their students and schools.

Productivity Levels: More than 90% of teachers affirm that they are able to meet the expectations placed upon them, demonstrating high productivity levels. Furthermore, teachers rate their colleagues' productivity between 6-10 on a scale of 0-10, showing confidence in the work output of their peers.

Teaching as a Profession: While a majority (50%) of teachers view their work as a profession, more than half still regard it primarily as a job. This distinction is important for understanding the level of personal commitment and the perception of the profession within society.

Incentives and Motivation: Around 50% of teachers feel that they do not receive adequate incentives to enhance their responsibility, accountability, and enthusiasm. This lack of incentives may diminish their motivation to engage fully with their work and could be a factor contributing to burnout and dissatisfaction.

Sending Children to Government Primary Schools: Despite the widespread belief that public

schools are inferior, an impressive 85% of government teachers send their own children to government primary schools. This decision reflects their personal trust in the system, even though there is an acknowledged societal perception of these schools as lower in quality.

CONCLUSIONS

While there are clear challenges faced by teachers in government primary schools, such as insufficient workforce and limited incentives, the overall findings suggest that teachers are highly motivated, dedicated, and capable of delivering quality education. Centralization of
authority and a lack of adequate incentives remain significant areas for improvement, but the positive aspects, such as job security, accountability, and a strong sense of duty, provide a foundation for potential reforms. The role of positive competitiveness among colleagues and the commitment of teachers to their work are crucial factors that may contribute to long-term improvements in the public education system.

There are many teachers' centric factors which are challenging in establishing the entrepreneurship in public education in Varanasi City. Psychological factors as well as physical factors we taken into consideration for the calculation of these factors. These factors need to be understood by the government and let them resolved on grassroot level. So, the productivity and entrepreneurial orientation can be enhanced on the basic level of primary education level. India can improve its public schooling on grass root level by resolving the issues faced by public teachers because these are people who implement the educational policies on grassroot level.

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THE GLOBAL TARIFF WAR AND INDIA'S ECONOMIC RESILIENCE : SECTORAL IMPACTS, POLICY RESPONSES, AND FUTURE TRADE DIVERSIFICATION

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ABSTRACT

Trade wars, marked by tariff, retaliatory measures, significantly disrupt global economic growth by impeding established supply chains, increasing costs for businesses, consumers and reducing overall economic activity. This unpredictability discourages business investment and economic planning. Trade wars lead to create trade diversions and imbalances. They can also stifle innovation by disrupting international collaboration and knowledge flow. Smaller and emerging economies are particularly vulnerable. Ultimately, trade wars have multifaceted implications, including supply chain disruption; reduced investment diminished consumer spending and strained international relations, making effective dispute resolution crucial for stable global economic growth. India's recent trade strategy showed a balance between engagement with globalization and the nationalistic goal of Atmanirbhar Bharat (self-reliant India).

***Keywords**: Tariff, Atmanirbhar Bharat, Globalization*

INTRODUCTION

Trade wars and tariff policies are significant issues in global trade and economic relations in the 21st century. These strategies, involving tariffs and trade barriers, affect not only the economies of the concerned countries but also have broader implications (Amiti and Weinstein, 2019).This paper studies the long-term effects of these policies on international trade and economic relationships.

The global economy is a complex, interconnected system of worldwide economic activities, driven by international trade, finance, technological innovation, development and specialization. It enables the efficient exchange of goods make possible capital movement and the growth of global supply chains. However, it is susceptible to challenges such as economic disparities, inequality, geopolitical tensions and unforeseen shocks like the COVID-19 pandemic. Effective navigation requires international cooperation, coordinated policies, adaptability for sustainable growth and improved living standards in an increasingly interconnected world.

Globalization necessitates international trade, allowing countries to publicize their markets and supply goods and services at cheaper prices. This competition in the local market creates choices for products, resulting in a difference in the prices of goods from the foreign and domestic economies. Nations trade due to unequal distribution of production factors, natural resources, technology, entrepreneurial skills determining each country's ability to produce goods and services at the lowest cost, despite the limitless desires of the world. Trade benefits all countries if it's free trade. The World

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Commission on the Social Dimension of Globalization (2004) supports globalization, which should assistance all countries and elevate benefits. It advocates argue for trade restrictions, such as home market expansion and national security.

Tariffs are taxes imposed on items imported into a country that are determined as a proportion of the product's value. For example, a 10% tariff means that a product priced at Rs.100 will be taxed an additional Rs 10, boosting the price to Rs 110. Importing businesses, not exporters, are responsible for paying tariffs. A US corporation importing a $50,000 automobile must pay a $12,500 duty if the rate is 25%. Businesses frequently raise price to make up those costs. Increased tariffs make imported items more costly, which lowers demand. Because of this, American customers might buy more of these things, which would force businesses to bring in lesser quantities or look for less expensive alternatives.

Tariff barriers are common trade restrictions imposed by countries on imported or exported goods, with various types including specific tariffs based on the physical weight of the goods. Trade barriers, particularly tariffs are a prominent feature of global trade, implemented by governments to protect domestic industries but often resulting in supply chain disruptions, escalated costs and hindered economic growth. The United States is actively imposing tariffs on various sectors, including steel, aluminium and goods from China, with signals for potential tariffs on Taiwan's semiconductor exports. These actions create significant global supply chain uncertainties, impacting industries such as technology and automotive and causing market volatility for countries like India. Adapting through trade diversification and regional agreements, alongside the role of global trade organizations in dispute resolution, is crucial for navigating this landscape. Achieving a balance between policies and open-market access is essential for sustainable international economic stability.

An "ad valorem tariff" is type of tax makes on imported goods. It is calculated as a percentage of their value. This type of tariff is applied to the value of certain goods, whether they are being imported or exported. A specific tariff is type of trade tax which is a set amount per unit of the imported or exported product, based on its physical weight. If diverse rates of the tariff are forced on different countries are called discriminatory tariffs. If the same rates of a tariff are imposed on different countries, it is called non-discriminatory tariff'. All nations were subject to the same "non-discriminatory tariff." A revenue tariff is a type of tariff primarily designed to generate income. If the tariff is forced mainly to protect domestic industries from foreign competition, is called the protective tariff. Reduced tariff rates are a result of sovereign concessions made in trade arrangements called preferential tariffs.

The General Agreement on Tariffs and Trade (GATT) was established in 1948 aims to avert conflicts over trade to open trade. Initially focused on removing trade barriers, it eventually became a forum for discussing international trade issues, leading to trade wars. The COVID-19 pandemic has notably affected global trade, with a 3% drop in commodities volume in Q1 2020. Lockdowns and restrictions on travel and transport have exacerbated the decline, affecting the service sector and GDP. The economic recovery is uncertain, potentially boosting the global trade war, as seen in the recent trade war between China and the USA.

HISTORY OF TRADE WAR

Trade wars have been a significant aspect of the British Empire's history, exemplified by the opium wars with China in the 19th century, where Britain, having supplied opium illegally, faced Chinese military action after negotiations failed. The British navy's victory led to increased Western business in China (Nascimento and Sheng, 2021). In the United States, the Smoot-Hawley Tariff Act of 1930

raised duties to protect domestic farmers, resulting in global trade turn down as other nations retaliate with tariffs. (Charbonneau and Landry, 2018). In response to economic downturns, President Roosevelt enacted laws to reduce trade barriers, including the Reciprocal Trade Agreements legislation (Handley and Limao, 2022).

In the 1980s, the United States and Japan engaged in a trade war characterized by allegations of 'unfair' trade practices, primarily affecting the automobile and electronics industries. (Gopinath, 2016). As a result, the US imposed tariffs and voluntary export limitations on Japan to defend its industries and reduce trade deficits. As the 20th century progressed into the 21st, new trade dynamics emerged, largely fuelled by the rise of emerging economies like China. China's accession to the World Trade Organization in 2001 marked a significant step in its integration into global trade. It also led to escalating concerns regarding intellectual property rights, state subsidies and trade imbalances, particularly straining its relationship with the United States (Itakura, 2020).

Since 2018, the world had faced a trade conflict between the USA, its economic partners like the EU and China. The US forced additional tariffs on steel and aluminium imports from China potentially harm the Chinese market. In reaction, the US raised tariffs on selected Chinese products worth $50 billion. China and the United States are engaged in a trade war, with China imposing 25% tariffs on 106 products worth $50 billion. The United States intends to charge $50 billion in Chinese goods, while China threatens to levy taxes on $50 billion in American products (Carvalho, 2019).

Subsidies have been a major source of contention between countries, with industrialized economies cutting them by 21% in six years and developing countries by 12% in ten years. India's recent restrictions on agricultural produce from the US, EU, Canada, Brazil and Japan have raised questions about its compliance with the WTO peace clause. A swift return to normal is possible through free trade, open market and a favourable business climate. India imposed anti-dumping duties on over 99 Chinese goods in January 2019, protecting its domestic markets during the trade war. The duty imposed was significant, ranging from $13.07 per ton to $173.1 per ton. India needs major reform to renew its market. Recently restrictions on Indian agricultural produce by the US, EU, Canada, Brazil and Japan were imposed in August 2020.

REVIEW OF LITERATURE

The research review includes books, articles, journals and views from various economists. One notable book is "Trade wars are class war: Describe how rising inequality distorts the global economy and threatens International peace" by Mathew C. Klein and Michael Pettis (2020). The authors trace the roots of trade wars to policymakers and business leaders in China, Europe and the US.

The study conducted by EEPCINDIA and the ASEAN-India Centre (AIC, 2020), titled "COVID-19 Challenges for the Indian economy—Trade and foreign policy consequences," address the challenge in front of India's trade and foreign policy in awaken of the pandemic and discusses possible prospect implications.

Indian economists Dutta and Sundhram's (2014) book provide a complete analysis of the Indian economy, focusing on its structure, national income, and distant trade patterns. The book highlights six well-known American products to reveal surprising business partnerships that challenge typical trade myths and misunderstandings. They analysed the balance of payments situation in India's foreign trade.

A consensus among scholars like Sharma (2022), Kumar (2023), and Patel (2024) indicates that

policies targeting strategic competitors like China have inadvertently harmed other developing economies, particularly India.

Economic impacts, highlighted by Rao (2023) and Gupta (2024), show a decline in India's exports in sectors such as textiles and automobile due to US tariffs.

A counter-narrative put forth by Chopra (2022) and Srivastava (2023) suggests that these pressures could drive India towards enhanced self-reliance and a more diversified trade portfolio.

Malhotra (2024) and Jain (2023) emphasize that India's national ambition relies on effectively managing international trade barriers. Singh (2024), Pillai (2023) and Verma (2024) described about how the tariff war has affected India's foreign policy and strategic independence. Conversely, Das (2022) and Nobel laureate Abhijeet Banerjee (2023) maintain an optimistic perspective, citing India's economic resilience and domestic market potential. Though, the literature underscores the tariff war as a major challenge that requires planned organization for the comprehension of the Viksit Bharat vision.

Mannur, a Malaysian economist, examines the country's economy, which is highly dependent on foreign trade, challenges posed by trade barriers and restrictions. Salvatore, an American economist, presents theories and their relevance through real-world examples and applications.

OBJECTIVES OF THE STUDY

The study aims

To analyse the global trade war's impact on major global trade nations.

To find out the reasons behind the trade war.

To study the impact on the Indian economy and recommendations for future economic policies.

To study the cause after the trade war between the U.S.A and China.

To study the timeline of the trade war between the United States and China.

To determine the influence of the trade war on India's manufacturing industry.

STATEMENT OF PROBLEM

(a) How have the present global trade war considerably pretentious countries with significant participation in world trade? (b) How has the Indian market been affected by the global trade war?

SCOPE OF RESEARCH

To study of the effect of the USA and China trade war on the Indian developed segment from 2018 to 2025.

RESEARCH METHODOLOGY

The research utilized primary and secondary data collection methods, including books, open-source articles, internet blogs, periodicals and research papers, as well as reports and analyses from both governmental and non-governmental agencies.

CASE STUDY

US-CHINA trade war

The bilateral relationship between the United States and China has evolved significantly since World War II. It turns adverse effect follow the establishment of the communist government in China and the Korean War. A noteworthy improvement occurred during Secretary of State Henry Kissinger's visit in 1971. Though the trade war starts in 2018, its roots lie in prolonged economic and political tensions, including trade disturbances, intellectual property theft and unfair practices by China, which increased under the Trump administration. (Itakura, 2020). The trade conflict initiated in March 2018

with tariffs on steel and aluminium was followed by considerable tariffs on Chinese goods in July 2018, leading to mutual tariffs on American products.

The U.S.-China trade war has considerably affected both economies and worldwide performance. In the U.S., the rural sector faced losses from reduced access to China and retaliatory tariffs. China's manufacturing and exports suffered lead to slowdown economy. (Handley and Monarch, 2020).

The doubt has disrupted global supply chains and finely tuned financial market volatility. The "Phase One" trade deal in January 2020 included commitments for China to import an additional $200 billion of U.S. goods, with some tariff reductions; however, main issues like intellectual property rights remain unresolved. Ongoing diplomatic efforts, economic strategies will shape the future of U.S.-China trade relations in the middle of a backdrop of rising protectionism and geopolitical tensions.

From 2017 to 2025, the U.S.-China trade experienced significant fluctuations due to tariffs and policy changes during the trade war, as showed by data from the United States Census Bureau, which indicates a decline in total trade volume and ongoing trade deficits.

Year	US Exports to China (USD million)	US Imports from China (USD million)	Balance (USD million)
2017	129,997.2	505,165.1	-375,167.9
2019	106,600.0	452,200.0	-345,600.0
2024	143,200.0	438,700.0	-295,500.0
2025*	65,309.5 (Jan-Jul)	193,890.2 (Jan-Jul)	-128,580.7 (Jan-Jul)

Source: US Census Bureau

The US trade deficit with China decreased from over $375 billion in 2017 to $295 billion in 2024 lead to decreased imports and a slight recovery in exports. Whereas total imports from China declined considerably after 2018, the deficit persisted owing to in progress belief on Chinese goods. Exports faced a decline during the trade war years (2018-2020) but began recovering by 2024. In 2019, US agricultural exports to China increased in spite of overall decline, indicating variable sector impacts amidst trade tensions. Additionally, US services trade yielded a consistent surplus, reaching $33.2 billion by 2024. This sequence shows an evolution from targeted import tariffs to broad-based trade and technology restrictions, rare-earth controls, and intermittent attempts at diplomatic pause. Even with deals, high tariffs and mistrust remain recurring themes in US-China economic relations.

Table no. 1: Timeline of major Tariff events

January 2018	The US initiated tariffs of 20-50% on solar panels, washing machines, 25% tariff on steel. Imposed tariffs on $34 billion worth of USA goods.
March 2018	10% tariff on aluminium
Mid-2018	The US imposed a 25% tariff on $50 billion in Chinese tech imports.
September 2018	$200 billion in Chinese imports faced 10% tariffs.
January 2019	The US escalating to 25%, with China retaliating against $60 billion in US goods.
May 2019	The tariff rates fluctuated through 2019, with a significant increase.
January 2020	One trade deal in January 2020 marked a brief suspension of new tariffs, although tensions persisted.
2024	Increase the tariff 100% on electric vehicles, 50% on solar cells and 25% on electric vehicles, batteries, minerals, steel and aluminium.
February 2025	Tariffs resumed under the renewed Trump administration, leading to an escalation of trade conflict through mid-2025.

April 2025	US tariffs reached 145% on Chinese imports, with China retaliating accordingly. Implemented a 15% tariff on Coal and 10% on crude oil. Further imposed a 15% tariff on Chicken, Wheat and Cotton 3.10% tariff on Sorghum, Soybeans, fruits, Vegetables and dairy products
May 2025	Temporary ceasefire and reduced tariffs, but ongoing discussions highlight persistent high tariffs and underlying mistrust in US-China relations.

Chinese retaliatory tariff on US products

2018- China imposed tariffs on $3 billion of U.S. products (fruits, nuts, wine, steel pipes) and 25% tariffs on pork, recycled aluminium and others. When the U.S. levied tariffs on $50 billion worth of Chinese goods, China reciprocated with a 25% tariff on $50 billion of U.S. goods (including aircraft, autos, soybeans, chemicals).

2018 to 2019- With new U.S. tariffs on $200 billion of Chinese products, China launched 10% tariffs on $60 billion of U.S. imports and incrementally raised these rates. By late 2019, China's tariff coverage included most U.S. exports to China.

2020-2024- Following the "Phase One" deal in January 2020, China maintained many of these retaliatory tariffs but periodically expanded them to specific sectors, especially during renewed tensions.

2025 Escalations:

March-April 2025: China imposed additional tariffs up to 15% on farm products, expanded business restrictions, and restricted rare earth exports.

April 2025: In response to sharp new U.S. tariffs, China raised tariffs on all U.S. imports, initially to 84% and then to 125%. China further targeted U.S. rare earth reliance and blacklisted U.S. companies.

May 2025: Both US-China agreed to lower the new tariffs temporarily (down to 10% each) to ease tensions, though high background tariffs remained.

US-INDIA TRADE WAR

The burden of tariffs by the U.S. under the "America First" agenda has created both challenges and opportunities for India's economic interests (Athukorala, 2020). These measures have disrupted trade patterns, requiring a detailed analysis of their effects on India's exports, trade balance and employment.

Table no. 2: Timeline of major tariff events

2016-2017	No major tariff changes affecting India directly during these years. U.S.–India trade relations remained stable under the Obama administration and early Trump presidency.
Early 2018	Trump criticized India's high import tariffs, calling it the "Tariff King." Specifically cited 100% duty on Harley -Davidson motorcycles.
March 2018	The US imposed a 25% tariff on steel and 10% on aluminium imports globally, impacting India.
June 2018	India announces retaliatory tariffs on 28 U.S. goods (including almonds, apples and walnuts), although implementation is delayed.
March 2019	The US announces GSP withdrawal. India to lose duty-free access under GSP (~$5B worth of goods). Reason: India failed to provide "equitable and reasonable access" to US markets.
June 5, 2019	GSP withdrawal takes effect Officially the end of India's GSP benefits Major impact on labor-intensive exports.
June 16, 2019	India retaliates with tariffs on 28 US products (almonds, walnuts, apples, chickpeas, etc.) in response to US steel & aluminium duties.
2020–2023: COVID-19	Spotlight shifts to pandemic revival. No new tariffs; Due to supply chain disruptions trade war fluctuates. India's pharma exports to the U.S. rise due to global health demand.

2024	Recovery in exports (especially in textiles, gems and jewellery).
Feb, 2025	Trump signs an executive order imposing new tariffs on multiple countries (including 10% on all Chinese goods and 25% on NAFTA (North American Free Trade Agreement) members)
March, 2025	Steel and aluminium tariffs increased to 25% across the board. Exemptions removed.
April 2, 2025	India was hit with a "reciprocal tariff" of 27% on a wide range of exports to the U.S., affecting textiles, apparel, gems, jewellery, pharma and engineering goods.
April 3, 2025	"Liberation Day Tariffs" introduced. Baseline 10% tariff on all imports + higher brackets (up to 49%) for key partners like India.
April 9, 2025	India's full 27% tariff rate takes effect, severely impacting export competitiveness.
July 30, 2025	Trump announced a 25% reciprocal tariff on a wide range of Indian goods (effective Aug 1). Linked to failed negotiations & India's Russian crude imports.
August 6, 2025	Trump signed an executive order imposing another 25% tariff, making the total duty 50% on many Indian goods.
August 25, 2025	India's Department of Posts halted all parcel services to the US after new US customs rules ended duty-free exemptions.

IMPACT OF TRADE WAR ON WORLD ECONOMIES

Following the expiration of a trade deal deadline on August 1, Trump imposed tariffs on over 90 countries, including BRICS countries. While South Africa and China are subject to a 30% tax, Brazil is a subject to a 50% tariff5, 50% on copper (starting August 1), 25% on imported automobiles, their components, 50% on steel and aluminium is notable taxes. Tariffs of up to 200 percent were threatened on pharmaceutical imports, while details remain unclear. Products under $800 were no longer eligible for exemptions as of August 29.

Table no. 3: U.S. tariffs by country (2025 update)

Country/Region	U.S. Tariff Rate	Key sectors affected	Key Notes / Trigger
India	50%	Textiles, Gems, Leather, Copper	Russian oil imports
Brazil	50%	Aluminium, Copper	Reciprocal tariff logic
Syria	41%	Crude oil, Agricultural input	Security concerns
Myanmar	40%	Garments, Timber	Human rights issues
Switzerland	39%	Pharmaceuticals, Banking services	Financial secrecy concerns
Iraq	35%	Oil, Construction materials	Strategic instability
China	30%	Electronics, Steel, Automobiles	Tech rivalry, trade deficit
South Africa	30%	Minerals, Auto parts	Mineral exports
Kazakhstan	25%	Oil, Uranium	Energy sector influence
Bangladesh	20%	Textiles, Footwear	Textile dominance
Sri Lanka	20%	Tea, Apparel	Debt diplomacy concerns
Taiwan	20%	Semiconductors, Electronics	Semiconductor leverage
Vietnam	20%	Electronics, Furniture	Trade surplus with U.S.
Indonesia	19%	Palm oil, Rubber	Palm oil disputes
Philippines	19%	Electronics, BPO services	Defence pact renegotiation
Malaysia	19%	Semiconductors, Palm oil	Semiconductor tensions
Pakistan	19%	Textiles, Rice	Strategic ambiguity
Japan	15%	Automobiles, Electronics	Bilateral deal softened impact
South Korea	15%	Semiconductors, Automobiles	Bilateral deal softened impact
United Kingdom	10%	Pharmaceuticals, Machinery	Post-Brexit trade pact
European union	0-15%	Cars, Pharmaceuticals, Machinery	Partial exemptions via negotiated deal

Table 4. Various Trade wars and their Long-term effect on Global Trade

Trade war	Countries involved	Year	Long-term effect on Global Trade
USA-Japan Trade war	USA, Japan	1980	Mainly focus on technologies, efficiency and the change of Japanese investment into other regions.
USA-China Trade War	USA, China	2018-Present	Disruption of the supply chain led to instability of the financial market.
India – USA Trade War	India, USA	2019-Present	It increased bilateral negotiations and trade agreements with other countries.
USA-Canada lumber dispute	Argentina, Brazil	1982-present	Price fluctuations of lumber and the effect on USA and Canadian construction industries.

Source: Waugh, 2019

ECONOMIC IMPACTS

The US administration prioritizes reinforcing national security by imposing trade restrictions on sectors deemed critical for protecting sensitive technologies and rebuilding the domestic defence industrial base. These have led to actions on steel and aluminium, with anticipated measures for semiconductors. Key sectors identified as critical to national security include automotives, metals, batteries, bio-manufacturing, machine tools, microelectronics, pharmaceuticals, shipbuilding, technology products and transportation equipment.

1. Affected global trade

The World Trade Organization (WTO) predicts that global merchandise trade will only grow by 0.9% this year. This is partly because the US imported more goods early in the year to avoid new tariffs announced by then-President Donald Trump. The WTO also expects that these higher tariffs will negatively impact trade, reducing the projected trade volume growth for next year to 1.8% (down from an earlier forecast of 2.5%).

2. Agrarian and rural effect:

Agriculture is a common target in trade disputes. Agriculture-related tariffs can harm farmers by decreasing the market for their products, which may result in overproduction and price drops. Rural economies may see repercussions from this.

3. Consumer and company confidence:

Harmful consequences on supply chain, investment and economic growth. This may result in weaker corporate investment and consumer expenditure, which would exacerbate economic slowdowns. Consumers are facing higher prices and reduced product choices as retailers manage risks in unstable trade environments (Duminy *et al*., 2018). This situation not only raises immediate costs but also affects consumer confidence and spending, potentially slowing economic growth. Prolonged trade wars may result in lasting inflation and lower living standards, particularly impacting lower-income households that allocate more of their budgets to tariff-affected goods. (Fetzar and Schwarz, 2021; Lee *et al*., 2022).

4. De-globalization tendency:

Trade wars can put in to de-globalization tendencies, where countries prioritize self-sufficiency and local production over global trade. While this may offer short-term protection, it could limit the potential benefits of global economic interdependence.

5. Financial effect:

Trade wars can disrupt customary trade patterns, lead to reduced trade, create higher costs for businesses and consumers. Tariffs and trade barriers increase the cost of importing goods lead to escalate prices for consumers. This can decrease financial activity and lead to a turn down in general growth of economy.

7**. Growing market and growth**:
Growing markets heavily based on exports can be particularly at risk to the side effects of trade wars. These countries often have limited
diversification options and may face challenges in growth of trade relationships of trade.

9. Loss of optimism and support:
Long-lasting trade tensions and conflicts can rust trust and assistance between countries. This can delay combined efforts on various global challenges, such as climate change, public health crises and security issues.

10. Global inequalities in supply and demand:
Responses to tariffs may cause nations to shift the goods they export to additional markets, create supply imbalances in other areas. Changes in price, overproduction or under use of resources may resulted from this.

11. Human resources and talent growth:
Trade conflicts have the potential to affect workers dynamics by changing employment markets and skill demands. Changes in trade patterns may strength workers to adapt to new industries or skill sets, requiring investment in education and training.

12. Global company and area trade:
Trade conflicts may lead nations to pursue multilateral collaboration make stronger regional trade. When nations face similar trade obstacles, they may band together to bargain that low trade barriers and improve economic addition in a particular area.

13. Political associations:
Trade disputes can cause tensions in states politics, which may result in a crash of diplomatic relations. This can have repercussions further than only economics, affecting association on a diversity of worldwide concerns. Long-lasting trade disputes and financial unsteadiness can result in social and political turmoil in affected countries. Increased inequality, diminished economic possibilities and increased unemployment are all factors that stimulate misery and unsteadiness.

6. Technological advancement:
Trade disputes can spur nations to step up their R&D, innovation and adoption of new technologies. As countries endeavour to become more independent and less reliable on certain imports, they may spend in establishing new technologies and sectors that can generate long-term economic growth.

7. Trade, diplomacy and discussions: Trade conflicts may force nations to settle their differences diplomatically. Even if tensions could first rise, they can also present chances for communication and the growth of more equitable trading partnerships.

8. Expansion of trade conflicts:
Over trade may push nations to lessen their dependence on one market and broaden the markets they trade with. Long-term of trade conflict may result in an additional robust commerce network, the expansion process can be difficult and may disrupt existing trade connections.

9. Trade war winning and losing nations:
Trade wars have varying effects on nations. Some countries may benefit from trade conflicts as they seek new markets for their products or fill supply chain holes left by others. Those that depend significantly on particular markets or industries, on the other hand, may suffer greatly. Countries that rely significantly on agricultural exports, for instance, can suffer if their trading partners impose taxes on their goods.

The US tariff war is expected to disapprovingly affect Vidarbha cotton growers, leading to a 50% reduction in export orders and potentially affecting domestic cotton demand in the coming season. India's textile industry is expected to prefer American cotton over domestic produce if it reduces tariffs on imports, as the US is also keen to push long and medium staple cotton. India charges a 10% tariff on cotton imports. Farmers frequently settle for low rates, including last year, when prices fell below the minimum support price (MSP). The drop in cotton exports has an indirect effect on cotton prices. Lint prices have also decreased, with each confection now costing Rs. 56,000.

Table no. 5: India's Top 10 Export Categories (2024)

Rank	Export category	Export value (USD)	% of total exports
1.	Mineral Fuels (incl. Petroleum)	$75.4 billion	17.1%
2.	Electrical Machinery & Equipment	$40.2 billion	9.1%
3.	Machinery (incl. Computers)	$32.5 billion	7.4%
4.	Gems & Precious Metals	$29.9 billion	6.8%
5.	Pharmaceuticals	$23.3 billion	5.3%
6.	Vehicles	$22.1 billion	5.0%
7.	Organic Chemicals	$21.0 billion	4.7%
8.	Cereals (incl. Rice & Wheat)	$12.1 billion	2.7%
9.	Iron & Steel	$10.3 billion	2.3%
10.	Articles of Iron or Steel	$10.1 billion	2.3%

Table no. 6: India's Most Valuable products which are declining in export (2024–25)

Rank	Export Category	Export Value (USD Billion)	Change	Key highlights
1.	**Sugar (cane or beet)**	$2.26 billion	-39.2%	Sharp decline due to oversupply
2.	**Iron ores, concentrates**	$2.76 billion	-23.6%	Decline due to global demand shifts
3.	**Diamonds (Unmounted/Unset)**	$14.39 billion	−20.7%	Sharp decline in luxury goods demand
4.	**Processed petroleum oils**	$70.30 billion	-17.3%	Major export but declining due to global shifts
5.	**Unglazed ceramic flags, tiles, cubes**	$2.17 billion	-11.2%	Decline in construction material exports
6.	**Iron ferroalloys**	$2.64 billion	-13.2%	Weak steel industry demand
7.	**Solar power diodes/semi-conductors**	$1.80 billion	-6.7%	Decline in renewable energy exports
8.	**Yarn (85%+ Cotton)**	$3.36 billion	-4.0%	Decline due to global textile competition
9.	**Jewellery**	$12.27 billion	−3.4%	Slight drop, still a major export
10.	**Packaged Insecticides/Fungicides/Herbicides**	$4.21 billion	-2.7%	Slight decline in agrochemical exports

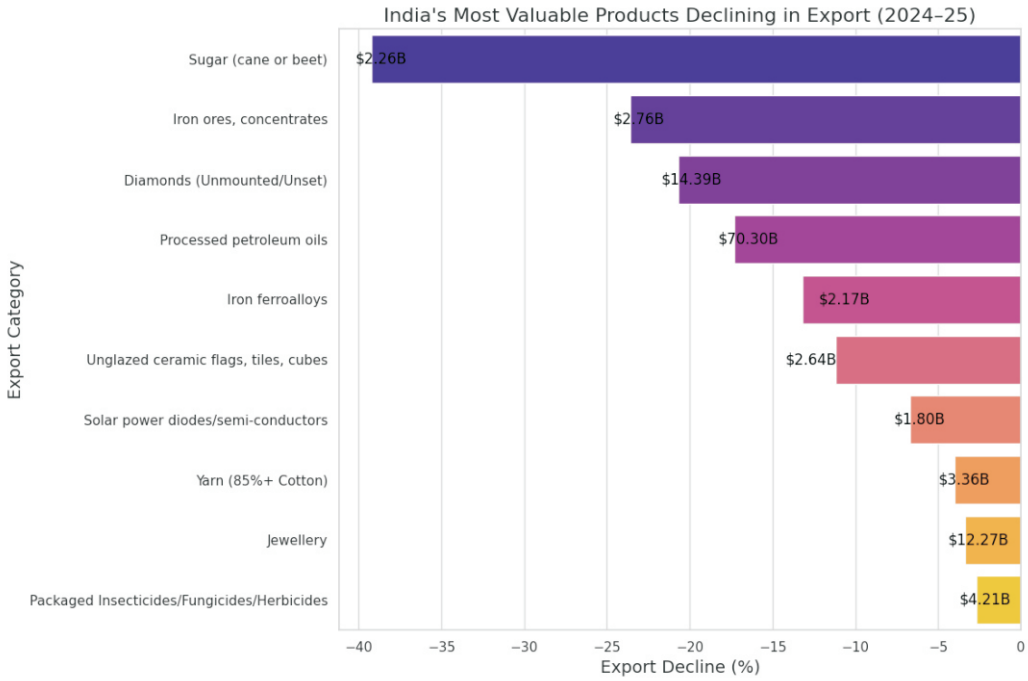
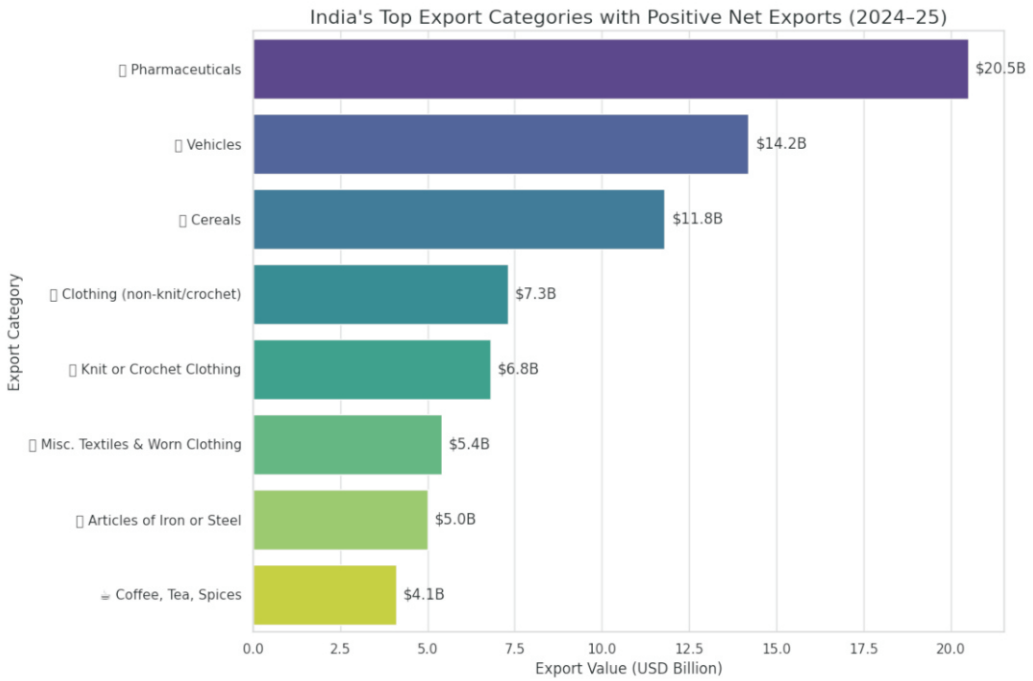


Table no. 7: India's Export Categories with Trade Surplus (2024–25)

Rank	Export Category	Export Value (USD Billion)	Change (%)	Trade Balance Trend	Key Highlights
1.	**Pharmaceuticals**	$20.5	+9.7%	Strong surplus	Global leader in generics & APIs
2.	**Vehicles**	$14.2	+8.0%	Positive balance	Exported to Africa, Latin America
3.	**Cereals**	$11.8	+5.6%	Surplus in Agri-exports	Basmati rice dominates
4.	**Clothing (non-knit or crochet)**	$7.3	+5.5%	Fashion surplus	Strong demand in EU & US
5.	**Knit or Crochet Clothing**	$6.8	+14.2%	Fastest-growing textile	High-value apparel exports
6.	**Fish**	$5.9	−3.6%	Despite decline	Seafood exports remain net positive
7.	**Miscellaneous Textiles & Worn Clothing**	$5.4	+14.4%	High surplus	Circular fashion and reuse markets
8.	**Cotton**	$5.3	−6.1%	Still surplus	Competitive despite global pressure
9.	**Articles of Iron or Steel**	$5.0	+5.5%	Industrial surplus	Pipes, rods, structural exports
10.	**Coffee, Tea, Spices**	$4.1	+25.8%	Exceptional surplus	Ayurveda-linked demand surge



Here's a structured table summarizing India's top product-level trade deficits for 2024, along with their year-over-year changes:

Table no. 8: India's Largest Product Trade Deficits in 2024

Rank	Product Category	Trade Deficit (US$ Billion)	Changes (2023 → 2024)
1.	Mineral fuels including oil	145.2	↑ 10.6%
2.	Gems, precious metals	53.4	↑ 36.4%
3.	Electrical machinery, equipment	44.8	↑ 2.4%
4.	Machinery including computers	29.1	↑ 4.8%
5.	Animal/vegetable fats, oils, waxes	15.0	↑ 2.5%
6.	Plastics, plastic articles	13.8	↓ 10.8%
7.	Optical, technical, medical apparatus	8.6	↑ 14.1%
8.	Copper	8.4	↑ 22.8%
9.	Fertilizers	7.6	↓ 25.8%
10.	Iron, steel	7.3	↑ 3.5%

FUTURE TREND IN TRADE POLICIES

Despite efforts to standardize international trade statistics, understanding digital trade remains complex. This study shows combining deep learning and algorithms to estimate bilateral exports and imports of digital products. The method identifies key search queries, trains doc2vec models and predicts trade values using similarity matrices. Findings from OECD countries showed that exports of digital products are more spatially concentrated and growing faster than those of physical goods.

Additionally, applied tariffs on digital products are lower than on non-digital goods, there is a positive association between digital exports and product-market regulations. Lastly, digital product exports positively affect economic complexity, providing insight into international trade's implications for digital products (Stojkoski *et al*., 2023).

RESEARCH FINDINGS

1. India's economy may face adverse effects from a trade war.
2. Delay in worldwide growth depressingly affecting exports and supplementary devalue the rupee.
3. Rising oil prices could make worse the current account deficit, demanding macroeconomic steadiness.
4. Reduce investment flows.
5. India's trade deficit with China reached a record $99.2 billion in the 2024-25 fiscal years, with total bilateral trade at $127.7 billion, making

China India's second-largest trading partner after the United States. This presents a huge opportunity for India.

6. Imports from China rose to $113.5 billion, while exports to China decreased to $14.3 billion.
7. India can decrease its trade deficit with China by boosting exports in sectors such as textiles, garments, and gems and jewellery, particularly if

there is a slowdown in Chinese exports to the U.S. The obligation of U.S. tariffs on Chinese goods may create opportunities for Indian firms to

enter the market.

CONCLUSION

The affects of trade wars and tariff policies make longer ahead of immediate fiscal effects, leading to significant enduring disruptions in global supply chains. These changes force companies to change sourcing and mechanized strategies, potentially increasing costs and reducing efficiency. Trade wars also create instability in financial markets, causing fast fluctuations in stock prices and potentially deterring investments, which may hamper economic growth. Countries respond by diversifying trade partners and forming new agreements, so realigning economic relationships and dependencies. Eventually the interconnectedness of the worldwide economy underscores the need for stable international trade policies to make sure sustainable universal richness

Trade wars weaken worldwide finance by fragmenting supply chains, preventing investment, innovation and creating market uncertainty that reduces economic growth. Sustainable global growth necessitates prioritizing cooperation over protectionism and strengthening multilateral dispute resolution mechanisms.

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SOCIO-DEMOGRAPHIC DIFFERENTIALS IN EMPLOYMENT STATUS IN INDIA

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ABSTRACT

This paper examines the socio-demographic differentials in employment status in India by analysing variations across region, gender, caste, and religion. Using secondary data from national-level surveys and employing descriptive statistical methods, the study classifies the population into four categories—employed, active unemployed, passive unemployed, and not applicable—to explore how social identities shape labour market outcomes. The findings reveal substantial disparities: rural areas show slightly higher employment than urban areas, while urban regions report a larger share of passive unemployment. Gender differences are striking, with female employment extremely low and a majority of women falling into the passive unemployed category, indicating heavy engagement in unpaid domestic work. Caste patterns show Scheduled Tribes and Scheduled Castes having relatively higher employment shares due to their concentration in manual and informal work, whereas upper and intermediate castes display higher passive unemployment. Religious differences further highlight uneven participation, with Buddhists and Khasi communities showing the highest employment proportions, while Muslims and Jains experience greater passive unemployment. Overall, the results demonstrate that employment outcomes in India remain deeply embedded within its socio-cultural structure. The study underscores the need for inclusive employment policies, improved access to opportunities for marginalised groups, and gender-sensitive labour interventions to reduce existing inequalities.

***Keywords**: Employment Status; Gender Disparity; Caste Inequality; Religious Differentials; Labour Market; Socio-Demographic Factors; Rural-Urban Divide; India.*

1. INTRODUCTION

Employment is a key indicator of economic performance and social well-being, reflecting not only the productive capacity of a country but also the inclusiveness of its development process. In a developing country like India, employment is closely linked with income generation, poverty reduction, and overall human development. Yet, the structure of employment in India continues to display deep inequalities that are rooted in social, cultural, and regional divisions. Despite periods of rapid economic growth and structural transformation, the distribution of work opportunities remains uneven across different sections of the population, revealing persistent barriers to equality and

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inclusion (Deshpande, 2020).India's labour market is characterized by a high degree of informality, underemployment, and gender disparity. A significant portion of the workforce is engaged in low-paid, insecure, or unpaid forms of work, especially in rural areas. The rural economy continues to depend heavily on agriculture and informal non-farm activities, whereas urban areas offer relatively more opportunities in industry and services. However, urbanization has not necessarily ensured better employment outcomes, as rising educational enrolments and limited job creation have led to growing passive unemployment among youth (Kannan & Raveendran, 2019).

Gender differences remain one of the most prominent dimensions of inequality in India's employment structure. Although women contribute substantially to household and community work, their participation in paid employment is strikingly low. Social norms, restricted mobility, lack of childcare facilities, and limited access to decent work collectively discourage women from entering the labour market. As a result, women are overrepresented in the category of passive unemployed—those not actively seeking employment but not engaged in paid work either (Chowdhury, 2011).Caste and religion further deepen these inequalities. The caste system historically determined access to education, occupation, and land, and these hierarchies continue to influence employment opportunities in modern India. Lower castes and Scheduled Tribes often depend on manual labour and low-paying informal jobs, while upper castes have greater access to education and secure employment (Thorat & Newman, 2010). Similarly, religious identities shape social networks and access to economic opportunities. Religious minorities, particularly Muslims, face systemic disadvantages and are often concentrated in low-skilled or self-employed informal activities (Singh & Kaur, 2022). The main objectives of this paper are:

1. To examine the regional distribution of employment status in India.
2. To analyse gender-wise differences in employment and unemployment.
3. To assess caste-based disparities in employment patterns.
4. To study religious differentials in employment status.

In this context, understanding the socio-demographic determinants of employment status becomes crucial for designing inclusive and equitable development policies. The current study explores employment status across four major dimensions—region, gender, caste, and religion—to assess the extent and nature of disparities in India's labour market. By examining who works, who remains unemployed, and who is excluded from the workforce altogether, the paper aims to contribute to the discourse on social inequality and economic participation in contemporary India.

2. REVIEW OF LITERATURE

Employment and labour market participation in India have been widely discussed in academic research, with a particular focus on the structural inequalities that shape economic outcomes across different social groups. The relationship between employment status and socio-demographic factors such as gender, caste, religion, and region has remained a persistent concern in understanding India's developmental trajectory. Deshpande (2020) emphasized that gender and caste continue to be crucial determinants of employment outcomes. Her work highlights that despite economic progress, deep-rooted social norms and discrimination limit access to stable and remunerative employment for women and lower-caste groups. Caste-based disparities, according to Deshpande, are often reinforced through the informal sector, where social networks and occupational segregation play a significant role in determining job opportunities.

Kannan and Raveendran (2019) examined India's employment trends during a phase of rapid economic transformation and urbanization. They found that while overall job creation increased marginally, the nature of employment became more precarious. Women, in particular, faced a paradoxical decline in labour force participation despite higher educational attainment. The authors linked this trend to structural and social factors—automation, changing family structures, and the lack of flexible work arrangements—which collectively restricted women's entry into paid work.

Chowdhury (2011) provided a detailed understanding of the gendered nature of work, arguing that social norms and domestic responsibilities significantly constrain women's participation in the formal labour market. He suggested that unpaid domestic and caregiving work, which remains invisible in conventional employment statistics, continues to absorb a large share of women's time, leading to their classification under "passive unemployed." Thorat and Newman (2010) contributed to the discourse on caste-based discrimination in employment. Their study provided empirical evidence of persistent exclusion in hiring, wages, and occupational mobility, particularly in the private sector. They argued that caste-based hierarchies continue to influence labour market outcomes through subtle and institutional forms of discrimination, even as India's economy becomes more modern and service-oriented. Religious identity also shapes employment outcomes, as highlighted by Singh and Kaur (2022), who observed that religious minorities, especially Muslims, remain disproportionately engaged in low-paid, informal, and self-employed sectors. The lack of social networks, limited access to capital, and regional concentration of certain religious communities contribute to their restricted mobility within the labour market.

Collectively, these studies suggest that employment outcomes in India cannot be understood purely in economic terms. Instead, they are shaped by a complex interaction of social hierarchies, cultural norms, and structural inequalities. Despite economic liberalization and policy reforms, barriers related to caste, gender, and religion persist in determining access to education, skill development, and decent work opportunities. The present study builds upon this literature by exploring how these socio-demographic determinants—region, gender, caste, and religion—continue to influence employment status in India, providing an updated empirical perspective on labour market inequality.

3. DATA AND METHODOLOGY

The present study is based on secondary data obtained from the Centre for Monitoring Indian Economy (CMIE),which provides one of the most comprehensive and up-to-date sources of household-level information on employment and unemployment in India. The data used for this analysis pertains to the year 2024 and covers a nationally representative sample across both rural and urban regions. The CMIE Consumer Pyramids Household Survey (CPHS) collects detailed information on individuals' employment status, socio-economic background, demographic characteristics, and household conditions, making it suitable for studying socio-demographic patterns in employment outcomes.

The analysis focuses on four major dimensions of social differentiation—region, gender, caste, and religion—to explore the disparities in employment status. Employment status has been categorized into four groups: *employed, active unemployed, passive unemployed,* and *not applicable*. The category "employed" includes individuals engaged in any form of paid work or self-employment, while "active unemployed" represents those who are actively seeking work but not currently employed. The "passive unemployed" category includes persons who are not engaged in paid work and not seeking employment, such as homemakers or those temporarily out of the labour force,

whereas "not applicable" includes individuals for whom employment status could not be clearly determined, such as children or the elderly.

For analytical clarity, descriptive statistical tools such as frequency distribution and percentage tabulation have been employed to capture variations in employment status across different social and demographic groups. This method provides an overview of the pattern of employment and non-employment among various sections of society and helps identify inequalities embedded in the labour market structure. The data were analyzed using statistical software to compute category-wise percentages, allowing comparison of employment patterns between rural and urban regions, between men and women, and across caste and religious groups.

This descriptive approach facilitates an understanding of how structural and cultural factors continue to shape employment opportunities in contemporary India. By relying on recent CMIE 2024 data, the study provides an updated empirical picture of India's labour market, highlighting the persistence of socio-demographic disparities despite ongoing economic growth and policy interventions aimed at promoting inclusive employment.

4. RESULTS AND DISCUSSION

4.1. Regional Pattern

The findings reveal that urban areas (60.99%) constitute a higher share of the total population compared to rural areas (39.01%). However, the proportion of the employed population is slightly higher in rural areas (26.61%) than in urban (25.62%). The passive unemployed rate is higher in urban areas (42.56%), indicating a larger share of non-participation in urban labour markets, possibly due to higher educational enrolment and disguised inactivity.

Table 1: Regional pattern of employment status.

Employment Status	Rural (%)	Urban (%)	Total (%)
Employed	26.61	25.62	26.00
Active Unemployed	2.25	3.19	2.83
Passive Unemployed	37.10	42.56	40.48
Not Applicable	34.03	28.63	30.69
Total	**100.00**	**100.00**	**100.00**

Source: CMIE 2024 data.

4.2. Gender-wise Pattern

Gender disparity is stark: 45.62% of males are employed compared to only 6.04% of females. Moreover, 58.37% of females are classified as *passive unemployed*, suggesting that women are largely engaged in unpaid domestic or care work. Men dominate paid employment and active job seeking, reflecting gender-based barriers to women's economic participation.

Table 2: Gender-wisepattern of employment status.

Employment Status	Female (%)	Male (%)	Not Applicable (%)	Total (%)
Employed	6.04	45.62	0.00	26.00
Active Unemployed	1.45	4.22	0.00	2.83
Passive Unemployed	58.37	24.45	0.00	40.48
Not Applicable	34.14	25.71	100.00	30.69
Total	**100.00**	**100.00**	**100.00**	**100.00**

Source: CMIE 2024 data.

Gender differences are sharp—men dominate paid employment, while most women fall under passive unemployment. This gap arises from social norms restricting women's mobility, unpaid domestic responsibilities, and limited access to safe and flexible jobs, resulting in their exclusion from the formal workforce.

4.3. Social group wisepattern

Employment outcomes vary substantially across caste categories. The Scheduled Tribes (39.02%) and Scheduled Castes (34.10%) have relatively higher shares of employed individuals, likely due to their engagement in informal and manual labour sectors. The Upper Castes and Intermediate Castes show higher shares in *passive unemployment* (53.70% and 53.90%), which may reflect better educational attainment and voluntary non-participation while pursuing higher studies.

Table 3: Social group wisepattern of employment status (in %).

Employment Status	Intermediate	Not Applicable	Not Stated	OBC	SC	ST	Upper Caste	Total
Employed	33.07	0.03	29.01	32.29	34.10	39.02	30.91	26.00
Active Unemployed	3.93	0.00	3.94	3.14	3.17	2.76	4.79	2.83
Passive Unemployed	53.90	0.02	53.17	51.58	48.85	40.52	53.70	40.48
Not Applicable	9.11	99.95	13.87	13.00	13.88	17.71	10.59	30.69
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: CMIE 2024 data.

Social group based variations reveal that Scheduled Castes and Scheduled Tribes show higher employment shares, mainly in manual or informal sectors. However, these jobs are low-paid and insecure, while upper and intermediate castes display higher passive unemployment due to longer educational involvement and preference for non-manual work.

4.4. Religious group wisepattern

Religion also influences employment patterns. The proportion of *employed* individuals is highest among Khasi (43.34%) and Buddhists (40.02%), while it is lowest among Muslims (30.91%) and Jains (30.87%). *Passive unemployment* is notably high among Hindus (51.23%), Muslims (51.08%), and Jains (56.09%), suggesting either higher education involvement or restricted female participation in paid employment.

Table 4: Religious group wisepattern of employment status (in %).

Employment Status	Buddhist	Christian	Hindu	Jain	Khasi	Muslim	Not Applicable	Other Religion	Parsi	Religion Not Stated	Sikh	Total
Employed	40.02	37.48	32.81	30.87	43.34	30.91	0.02	38.56	26.83	26.36	31.93	26.00
Active Unemployed	2.75	1.56	3.71	5.49	0.76	3.17	0.00	2.15	2.44	0.00	2.91	2.83
Passive Unemployed	44.69	43.59	51.23	56.09	19.35	51.08	0.02	39.87	41.46	47.29	55.90	40.48
Not Applicable	12.53	17.37	12.25	7.55	36.55	14.89	99.96	20.31	29.27	26.36	9.26	30.69
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: CMIE 2024 data.

Religious patterns show Buddhists and Khasi communities with higher employment, while Muslims and Jains record greater passive unemployment. Among Muslims, structural disadvantages and dependence on informal self-employment restrict job access, whereas Jains' low participation reflects educational continuation and social norms discouraging women's paid work.

5. CONCLUSION

The present study has brought to light the deep-rooted socio-demographic inequalities that continue to characterize India's employment structure. Despite several decades of economic growth and policy interventions aimed at generating inclusive employment, the distribution of work opportunities remains highly uneven across gender, caste, religion, and regional lines. The findings based on CMIE 2024 data clearly reveal that women remain the most disadvantaged group in the labour market. Female participation in paid employment is strikingly low, and a large proportion of women continue to be classified under passive unemployment, indicating their engagement in unpaid domestic and caregiving responsibilities. These results reaffirm that gendered social norms, limited mobility, and inadequate childcare and infrastructural support act as major deterrents to women's economic participation.Caste-based differences further illustrate the persistence of occupational and income inequality. Scheduled Castes and Scheduled Tribes, though showing relatively higher proportions of employment, are largely confined to insecure, low-paid, and informal forms of work, reflecting limited upward mobility. In contrast, the upper and intermediate caste groups, while having greater access to education and resources, exhibit higher levels of passive unemployment—suggesting voluntary non-participation during education or transition periods. This pattern underscores the continuing impact of social hierarchies on occupational choices and employment security.

Religious affiliation also emerges as an important factor influencing labour outcomes. Religious minorities, particularly Muslims, experience lower levels of employment and higher passive unemployment, pointing towards structural disadvantages and restricted access to formal employment channels. In contrast, smaller communities such as Buddhists and Khasis demonstrate higher employment shares, which may be linked to localized economic structures or differing gender norms. Such findings indicate that religious identities intersect with regional and social factors to produce distinct patterns of exclusion and participation.Regional analysis further suggests that urbanization alone does not guarantee improved employment prospects. While urban areas have larger educated populations, they also face higher levels of passive unemployment, particularly among youth, due to limited job creation and rising aspirations. Rural areas, on the other hand, display higher employment shares, but much of this employment is concentrated in informal and subsistence sectors, offering limited income and security. This duality highlights that both rural and urban labour markets suffer from structural deficiencies—underemployment in rural regions and disguised inactivity in urban ones.

Overall, the study concludes that employment outcomes in India are deeply shaped by socio-cultural structures that restrict equal access to economic opportunities. Addressing these persistent disparities

requires a comprehensive and inclusive approach. Policies should prioritize gender-sensitive labour reforms, expansion of public childcare services, targeted skill development for marginalized communities, and enforcement of anti-discrimination measures in recruitment and wages. Strengthening rural non-farm employment, promoting entrepreneurship among disadvantaged groups, and ensuring equitable access to education and credit can further contribute to reducing these inequalities. In essence, inclusive employment growth must be viewed not only as an economic objective but as a fundamental condition for achieving social justice and sustainable development in India.

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SILENCES AND STIGMAS: EXPLORING MEN'S KNOWLEDGE OF MENSTRUAL HEALTH IN INDIA

Prachi Singh*

ABSTRACT

Menstruation though a natural biological process, continues toremains a subject of silence, shame, taboo and stigma, especially in patriarchal societies like India. This paper examines men's knowledge, perceptions, attitudes and involvement with menstrual health in India through a secondary qualitative analysis of peer-reviewed Indian and global literatures. Drawing on evidence from rural and urban India, as well as comparative evidence from global studies such asUganda, Ghana and Nepal, the analysis identifies prevalent knowledge gaps, cultural taboosand misleading information among men and adolescent boys. Using frameworks of Social Constructionism and Stigma Theory, the analysis interprets how cultural norms, family secrecy, peer influenceand educational qualifications form male understanding of menstruation. Findings reveal that urban and educated men's awareness is gradually improving, still entrenched traditional stigma continues to limit their participation in menstrual health management. The study highlights the importanceof inclusion of male in education, policy attentionand media engagement to destigmatize menstruation and promote gender equality.

Keywords: *Menstruation, Male Knowledge, Stigma, India*

INTRODUCTION

Menstruation, though a natural and routine biological phenomenon, it remains a heavily stigmatized topic in India, especially within male conversations and discourse. While girls and women deal with a range of biological, social and educational challenges, men and boys are frequently excluded from formal education, family conversationsand public health policies and programmes which leads to limited understanding and perpetuated myths (Dube, 1988). The social exclusion and neglects of men from menstrual health management (MHM) sustains shame, silence and shape gendered misconceptions, affecting familial support, peer behaviour, and wider societal attitudes (Ghosh & Jamir, 2023; Baweja et al., 2020).

Studies from India reveal significant knowledge deficits among men. Mason et al. (2017) reports that adolescent boys in Maharashtra essentiallydepends on sisters, peers or from incidental or overheard conversations, which often leads to internalizing inaccurate or incomplete information. Abraham and Saliha (2025) find that rural boys interpretmenstruation with weakness, illness and impurity, which mirrors deeply penetrated cultural taboos. Likewise, Gundi and Subramanyam (2020) highlight the awkwardness, embarrassment and silence experienced by boys while having conversation of menstruation, shaped by gendered norms which discourage open inquiry.Urban researches show some gradual improvements: like, Sri Varsha et al. (2025) and Karthikeyan et al. (2024) observe and

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find that educated men display greater awareness, engagement, openness and willingness to challenge prevailing myths, these changesare often influenced by media campaigns and exposure and having interactions with menstruating female relatives.

Global studies also show similar patterns. Studies from Uganda, Ghana and Nepal shows that male exclusion, misinformation, and menstrual cultural taboos are widespread, not only unique to India. Patrick et al. (2025) found that men in Kampala possessed limited, inaccurate knowledge and perpetuated social misconceptions about menstruation but they were open to educational initiatives and engagement programs. Gbogbo et al. (2024) report that Ghanaian high school boys struggle with misconception deeply rooted in sociocultural beliefs, yet structured and targeted interventions significantly enhance awareness. In Nepal, Joshi (2019) highlights the meaningful role of community programs as an effective tool for fostering male engagement. Together these global findings contextualize India's challenges within a global comparative lens or broader cross-cultural discourse, underlining the importance of male-inclusive approaches to MHM.

In India, policy frameworks such as the Menstrual Hygiene Scheme (MoHFW, 2011) and the Swachh Bharat Mission (DDWS, 2014), largely focus on girls and women, often overlooking the educational need of men and boys. Data by NFHS-5 (MoHFW, 2021; IIPS & ICF, 2022) and UNFPA India (2022) continues to reveal persistent misinformation and minimum male engagement across rural and urban households. Scholars contend that involving men into menstrual discourse is critical for strengthening gender equality, public health and social inclusion (Mahon et al., 2015; Khan et al., 2023).

This paper employs secondary qualitative analysis of Indian and global studies to examine men's perceptions, attitudes and involvement in menstruation. Using social constructionism and stigma theory as analytical lenses to explore how cultural norms and social structures shape male understanding of menstruation and why silence still persists around the topic, and how emerging educational and policy interventions may shift societal attitudes and transform it.

LITERATURE REVIEW

1. Men's Knowledge and Awareness in India

Research consistently depicts that men in India have limited and often inaccurate knowledge about menstruation, shaped by social taboos, gender normsand gaps in formal education. Mason et al. (2017), in their qualitative study across Maharashtra, report that adolescent boys often depend on informal sources such as peers, sisters or overheard or incidental conversations and these sources often leads to incomplete or misleading information, which causes misconceptions that reinforces perceptions of menstruation as impure, secretive or as a source of embarrassment. Gundi and Subramanyam (2020) portray this phenomenon as “curious eyes and awkward smiles,” illustrating how the interplay of curiosity and cultural discomfort discourage open discussions.

In rural settings these knowledge deficits are especially found among boys, where their attitudes are often shaped by stronger cultural restrictions. It is observed that in households where menstruation is heavily stigmatized, boys tend to internalize secrecy and embarrassment, which leads misconceptions and avoidance behaviours. Abraham and Saliha (2025) found that rural adolescent boys often associate menstruation with illness, weakness or impurity, reflecting the persistent and enduring influence of cultural narratives and traditional beliefs on male understanding.

However, urban studies show some gradual improvement. Studies related to male medical and college students shows higher level of awareness and greater willingness to openly engage in menstrual discussions (Sri Varsha et al., 2025; Karthikeyan et al., 2024; Dubey et al., 2020). These findings

suggest that education, urban socialization and media exposure can weaken cultural silence. Yet misconceptions persist even among educated men; myths regarding hygiene, fertilityand gender roles still prevalent (Ghosh & Jamir, 2023; Mane et al., 2024).

2. Cultural Taboos and Social Silence

The stigma attached to Indian society regarding menstruation deeply impacts male knowledge and engagement in menstrual discourses. Secrecy within households reinforces gendered silences, which put limitations on conversations about menstruation. Dube (1988) situates this phenomenon and pattern within broader patrilineal and patriarchal structures and argues thatwomen' bodily experiences are socially regulated while men's ignorance is intentionally culturally sustained. Baweja et al. (2020) further reinforce that male discomfort is shaped by social and cultural norms that frame menstruation private and shameful and even genuine curiosity is socially sanctioned.

Media and educational initiatives and interventions produce mixed results. Although campaigns such as "Pad Man" and government programmes have raised awareness, but men are usually treated as secondary targets instead of active participants (Sharma et al., 2020). This partial exclusion perpetuates intergenerational silencewhereby male members of household lack both knowledge and social legitimacy to engage in menstruation openly.

3. Male Engagement and Household Exposure

Several studies underscores that family and peer networks shapes male's menstrual awareness. Srinivasan et al. (2019) found that boys with sisters or female relatives who speak about menstruation without hesitation tends to display higher level of knowledge and reduced level of stigma. Similarly, Kumar et al. (2024) in their study found that male partners often develop experiential knowledge while cohabiting with menstruating women, which enhances their supportiveness and practical involvement in menstrual hygiene practices.

Nonetheless, such exposure alone is insufficient to completely counter entrenched cultural taboos. Patrick et al. (2025), while studying male perceptions in Uganda, argue that information by itself does not eradicate stigma; social attitudes, cultural expectations, and peer norms continue to shape behaviour. This finding aligns with Indian contexts, where awareness got improved through exposure but deep-rooted silence intact, especially in rural and conservative households (Rathod &Muneshwar, 2023; Ahmad et al., 2021).

4. Global Comparisons: Similarities and Differences

Indian male knowledge deficit mirrors global pattern across many low- and middle-income countries. In Ghana, Gbogbo et al. (2024) found that adolescent boys consider menstruation as unclean because of framing by cultural beliefs, yet structured school-based interventions have significantly improved level of awareness. In Nepal, Joshi (2019) found that male engagement in MHM programs enhance their attitudes toward menstrual support and hygiene practices. In Uganda, Patrick et al. (2025) found that men acknowledge the importance of menstrual support but still their actions get restrained by community norms and gendered expectations.

These global studies collectively indicates that male exclusion from menstrual discourse is not unique to India but a global issue, but targeted interventions such as formal education, policy initiatives and peer discussions — can remarkably transform knowledge and attitudes. India, a country with its diverse cultural and linguistic landscape, presents both challenges and opportunities for designing context- specific, urban-rural interventions and culturally sensitive programming.

5. Emerging Trends and Positive Shifts

Despite the insistent stigma and misinformation, there are evidences of progressive change. Through media, educational settings, and online platforms urban youth and educated men are increasingly engaging with menstrual topics (Mane et al., 2024; Dubey et al., 2020). Male focused initiatives, such as school-based awareness programs and community campaigns, display potential to normalize discussions, reduce stigma and encourage supportive behaviours (Mahon et al., 2015; Khan et al., 2023).

Furthermore, traditionally female-focused policy frameworks are evolving and expanding their scope. Government programmes such as the Menstrual Hygiene Scheme (MoHFW, 2011), and educational mandates under Swachh Bharat Mission (DDWS, 2014), increasingly acknowledge the need for gender-inclusive approaches. UNICEF (2019) and NFHS-5 data (MoHFW, 2021; IIPS & ICF, 2022) support male engagement as a critical strategic approach to enhancing menstrual health literacy at the level of household and community.

So, it can be sum up thatIndian men show considerable knowledge gaps about menstruation due to inadequate education and silent household practices (Mason et al., 2017; Abraham & Saliha, 2025). Patriarchal norms and cultural taboos further inculcate stigma and create hindrances in discussion (Dube, 1988). Although family and peer interactions allow little space for some information, they hardly overcome wider societal restrictions (Srinivasan et al., 2019; Kumar et al., 2024). Patterns in Ghana, Nepaland Uganda were similar, where structured interventions appear to improvemale involvement (Gbogbo et al., 2024; Joshi, 2019; Patrick et al., 2025). Risingeducation levels, urban exposure, media representationand male-focused programmes are eventuallylessensstigma and enhancing awareness (Dubey et al., 2020; Mane et al., 2024; Mahon et al., 2015).

THEORETICAL FRAMEWORK

In India, understanding men's knowledge of menstruation need a sociological lens that places biological processes within cultural, social, and structural contexts. Two theoretical perspectives Social Constructionism and Stigma Theory—offer robust frameworks for interpreting the patterns emerging in secondary qualitative studies.

1. Social Constructionism

Social constructionism argues that knowledge and meaning are produced through social interactions, rather than existing independently as objective truths (Berger & Luckmann, 1966, as cited in Dube, 1988). Applied to menstruation, this perspective suggests that men's knowledge of menstrual health is shaped by cultural narratives, family norms, peer interactions, media representation and educational exposure. Patriarchal values and household secrecy produce a socially mediated image of menstruation that is mysterious, taboo, and gendered in Indian society (Mason et al., 2017). In India, Boys and men are socialized in a way that they perceive menstruation as private, shameful or impure, reflecting culturally constructed gendered knowledge (Dube, 1988; Abraham & Saliha, 2025).

It also highlights variation across settings. Asobserved by Sri Varsha et al. (2025) and Karthikeyan et al. (2024) urban and educated men shows more awareness and critical engagement with menstruation, demonstrating how social interactions and exposure to diverse knowledge networks can reshape culturally arbitrated perceptions. This theory explains that in rural areas knowledge gaps still persist, where social norms enforce cultural silence and restrict men's access to accurate information (Gundi & Subramanyam, 2020).

2. Stigma Theory

Stigma theory, which was introduced by Goffman (1963), illuminates about the social effects of deviation from normative expectations. Menstruation, though biologically natural, is heavily stigmatized in many societies, including India. Men's avoidance, discomfort or limited knowledge of menstruation preserves the "spoiled identity" of menstrual experiences, continuing secrecy and sustaining gender hierarchies (Goffman, 1963; Ghosh & Jamir, 2023). Boys incarnate these norms, which results in curiosity hindered by shame, which exhibit as misinformation, silenceor teasing (Gundi & Subramanyam, 2020; Mason et al., 2017).

It also explains intergenerational transfer of menstrual taboos. When households stigmatize menstruation, it creates social barriers which prevents men from gaining knowledge, which results in limited supportive behaviour and further reinforces gendered exclusion (Baweja et al., 2020). Similarly, studies done in Uganda, Ghana and Nepal reveal that even after realisation of importance of menstrual support, cultural stigma and peer pressure inhibit men's engagement in it (Patrick et al., 2025; Gbogbo et al., 2024; Joshi, 2019).

3. Integrating the Theories

METHODOLOGY

This study employs a qualitative secondary data analysis approach to explore men's knowledge, attitudesand insights regarding menstruation in India, which allows synthesis of existing peer-reviewed Indian and global studies and researches without primary data collection, which is suitable for sensitive topics like menstruation because cultural barriers and stigma mighthinder direct inquiry (Mason et al., 2017; Abraham & Saliha, 2025).

Datawere drawn from Indian studies which employed surveys, qualitative interviews, focus group discussionsand medical student assessments (Sri Varsha et al., 2025; Karthikeyan et al., 2024; Dubey et al., 2020; Gundi & Subramanyam, 2020), which was complemented by global studies from Uganda, Ghanaand others to provide cross-cultural context (Patrick et al., 2025; Gbogbo et al., 2024; Joshi, 2019). Additionally, Policy reports, national surveys andprogram guidelines (MoHFW, 2011; NFHS-5, 2021; UNFPA India, 2022; UNICEF, 2019) were examined to situate findings within governmental and institutional frameworks.

Studies were included on the basis that they focused on men or boys' knowledge, attitudes, perceptions or involvement with menstruation, and it offered qualitative or mixed-method dataand addressed Indian contexts; studies which lacked empirical data or focused only on women were excluded. A thematic qualitative analysis (Thomas & Harden, 2008) was conducted, coding for knowledge gaps, cultural stigma, engagement behaviour and educational interventions. This approach allows a rigorous, ethically soundand extensive sociological exploration of male knowledge, silences and stigma around menstruation (Mason et al., 2017; Patrick et al., 2025).

DISCUSSION AND FINDINGS

This section integrated insights from Indian and global studies, which highlights men's knowledge, attitudesand involvement with menstruation and examinethese findings through the Social Constructionism and Stigma Theory frameworks.

1. Knowledge Gaps and Misinformation

Across various Indian studies men and boys have consistently displayed limited and often inaccurate knowledge about menstruation. Mason et al. (2017) highlight that adolescent boys often perceive

menstruation as mysterious or "dirty," and rely on peers, sisters or fragmented conversations for information. Gundi and Subramanyam (2020) named these interactions as "curious eyes and awkward smiles," which reflects the tension between natural curiosity and societal restrictions.Rural adolescent boys' understanding is usually limited, which link menstruation to illness or weakness. Abraham and Saliha (2025) similarly noted that cultural narratives shape boys' perceptions, reinforce entrenched gendered misconceptions.

Urban studies disclose higher level of awareness but misinformation persists there too. Sri Varsha et al. (2025) and Karthikeyan et al. (2024) found that educated and urban males display better understanding, particularly regarding biological processes, yet they hold myths about hygiene, fertilityand social orthodoxy. Dubey et al. (2020) found that male awareness in cities is not because of deep engagement but more often superficial, gained from media, schooling or indirect exposure. This put light on the fact that knowledge acquisition is socially constructed, usually shaped by education, household communication, and cultural messaging (Dube, 1988).

2. Cultural Taboos and Social Silence

Across Indian studies the theme that is dominant is the pervasiveness of stigma. Households penetrate secrecy, limiting discussion and frame menstruation as personal and private or shameful. Baweja et al. (2020) stress that male discomfort is culturally a norm, where questioning or showing curiosity arenot incouraged. Goffman's (1963) stigma theory helps explain why boys internalize embarrassment and avoidance behaviours, forming intergenerational cycles of silence.

Global comparisons confirm these patterns. In Ghana, adolescent boys perceive menstruation as unclean despite school initiatives and interventions, though structured education improves awareness (Gbogbo et al., 2024). Patrick et al. (2025) in Uganda show that men recognize the importance of supporting menstruating women but remain restricted by community norms and peer expectations. In Nepal, Joshi (2019) reports that male involvement in MHM programs improves support and knowledge but must deal with with traditional stigma and secrecy. These findings indicate that stigma and silence are culturally reinforced barriers which is not limited to India.

3. Household and Peer Influences

Household environments play very important role in shaping male understanding. Srinivasan et al. (2019) found that boys with sisters or female relatives who openly discuss menstruation show higher knowledge and more supportive behaviour. Kumar et al. (2024) show that those males who cohabitwith menstruating women acquire experiential knowledge, which improve practical support and empathy. However, these benefits are context specific; in conservative households, exposure alone cannot overcome deep rooted silence (Rathod & Muneshwar, 2023; Ahmad et al., 2021).

Peer influence matters a lot. Mason et al. (2017) and Gundi & Subramanyam (2020) found how peer discussions reinforce myths or it can also normalize curiosity, depending on the social setting. Urban male groups, with more digital access and school-based programs, comparatively develop accurate knowledge and less stigmatizing attitudes, which emphasises the importance of social networks in shaping men's involvement with menstruation.

4. Education, Media, and Policy Interventions

Studieshighlights the importance of structured interventions. Media campaigns like "Pad Man" usually raise awareness but targetare generally women population and men areconsidered assecondary participants. Mahon et al. (2015) and Khan et al. (2023) emphasize that school-based male engagement programmes enhance knowledge and reduce stigma. Sharma et al. (2020) and Mane

et al. (2024) found that urban, educated men exposed to awareness programs display positive shifts in attitudes and willingness to participate in MHM.

Policy initiatives are becoming male-inclusive increasingly. The Menstrual Hygiene Scheme (MoHFW, 2011) and Swachh Bharat Mission guidelines (DDWS, 2014) now encourage community participation by men and indirectly involve them. NFHS-5 data (MoHFW, 2021; IIPS & ICF, 2022) found that male awareness is gradually improving, particularly in those households which have higher education and media exposure, demonstrate the potential for policy-driven cultural shift.

5. Emerging Positive Trends

Despite ingrained stigma, there are promising gradual progress. Urban men and adolescent boys show eagerness and openness (Dubey et al., 2020; Mane et al., 2024). Male-inclusive programme and campaigns, learning through experience and peer discussions inculcate supportive attitudes and practical indulgence (Patrick et al., 2025; Gbogbo et al., 2024). Social constructionism explains this as the restructuration of knowledge through interaction and stigma theory demonstrate the slow dismantling of secrecy as social norms adapt.

6. Sociological Interpretation

The integration of Social Constructionism and Stigma Theory highlights that men's knowledge is not solely a lack of information but it reflects social structures, cultural normsand gendered power relations. Silence, embarrassmentand incorrect information are products of patriarchal systems, reinforced by households, peersand societal expectations. However, education, media exposureand male-inclusive policies contradict these constructions, creating paths for normative transformation and inclusive engagement.

CONCLUSION

This study synthesizes Indian and global qualitative studies as evidence to examine men's knowledge, attitudes and involvement with menstruation, which highlights the interconnectedness of social construction, cultural norms and stigma. The reviewed evidencesreveal that men and boys in India, especiallybelonging to rural areas, experience apparent knowledge gaps, usuallystrengthened by household secrecy, peer dynamics and entrenched taboos (Mason et al., 2017; Gundi & Subramanyam, 2020; Abraham & Saliha, 2025). Misinformation, embarrassment feelings and avoidance behaviours remain widespread, which reflects the gendered construction of menstrual knowledge and persisting effects of stigma (Goffman, 1963).

Comparative evidence from Ghana, Uganda, and Nepal indicates that these patterns are not unique to India, it reflects broader sociocultural norms that restrict male engagement (Patrick et al., 2025; Gbogbo et al., 2024; Joshi, 2019). At the same time education initiatives, media campaignsand male-inclusive programs shows apparent shifts in awareness and supportive behaviours, especially among urban, educatedand young men (Sri Varsha et al., 2025; Mane et al., 2024; Dubey et al., 2020).

Sociologically, the findings reaffirm that men's knowledge of menstruation is constructed socially, shaped through interactions with family, peers, schooland media. Simultaneously, stigma theory further explains why this persisting silence, shame and restricted participation, continue to hinder maleinvolvement in menstrual health management (Dube, 1988; Goffman, 1963).

These findings have both practical and policy implications. Inclusion of male in menstrual health education, community awareness programmes and integration of menstruation related topics into school curriculum are right ways to reduce stigma and misinformation. Government initiatives like the Menstrual Hygiene Scheme (MoHFW, 2011) and Swachh Bharat Mission (DDWS, 2014) offer

frameworks for broader engagement, but they also require to be more explicitly gender-inclusive approachfor effective meaningful cultural change.

Overall, the study highlights necessity and importance of sociologically informed interventions, that recognizes that lack of knowledge are not merely informational but also culturally rooted. Future research should comprise primary qualitative studies, assessments of interventions and longitudinal study of male engagement in menstruation management to better understand and observe the effectiveness of policy and programme.

In conclusion, for holistic menstrual health management, gender equity and social inclusion men's silence, stigma and inadequate knowledge must be addressed. By positioning menstruation as a responsibility shared socially, Indian society can create environments where men willingly and actively participate, supportand contribute in destigmatizing menstruation simultaneously paving the way for broader cultural transformations.

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THE SCENARIO OF EXPORTS IN INDIA SINCE 2014

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ABSTRACT

Exports contribute to national income by enhancing the value of domestic consumption. The standard of living in a country depends not only on what is produced but also on the goods and services available for consumption. A country cannot sustain imports for long without exporting goods and services. Exports can therefore act as a leading sector in economic growth .

Export-led-growth has the potential to be a true engine of growth for India. In this context, the objective of this paper is to examine the scenario of exports in India since 2014.

Keywords: *Export-led-growth, Domestic Consumption, Leading- Sector, International Trade, Indian Republic.*

INTRODUCTION

Exports contribute to national income by augmenting the value of domestic consumption. Exports consist of goods produced domestically and consumed abroad, whereas imports are goods produced abroad and consumed domestically. The standard of living in a country depends on the availability of goods and services for consumption rather than solely on what is produced.

METHODOLOGY

The objective of this paper is to examine the scenario of exports in India since 2014. The year 2014 refers for a notable event in Indian

Republic . So that I have chosen the period of study is 2014 to 2024.

For the purpose of the present study, mainly secondary data have been used. The required data were collected from the various issues of Economic Survey (E.S.), published by Govt. of India. This study is a Temporal Macro Study to boost-up export- led- growth, a path towards building Atma Nirbhar Bharat.

ANALYSIS

A country cannot sustain imports over the long term without corresponding exports. Imports can only be financed by spending the importing country's currency, which can be acquired primarily through exporting goods and services or through borrowing. Consequently, imports(M) must, in the long run, be balanced by exports(X). International trade necessarily operates in two directions: a nation can purchase only if it can also sell. Thus, trade does not harm a country by compelling it to import without exporting; instead, it ensures reciprocity in economic exchange (Lipsey, R.G.,1992).

The global economy is gathering pace and expected to accelerate from 3.2 percent in 2016 to 3.7 percent in 2024 which reflects an upward revision of the earlier projections by the DGCI&S.

Commencing July 1991, the Government of India has initiated a number of measures to 'open up' the

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foreign trade sector and has announced massive import liberalization measures in recent years. The trade policy reforms initiated in 1991 have drastically changed the scenario and have resulted in a shift from inward- oriented policy of the past to an outward- oriented policy. India's trade has increased significantly in the post- reform period. In absolute terms, the trade volume rose from US$42.2 billion (18.1billion exports and $24.1 billion imports) in 1990-91 to US$ 1112 billion in 2023-24($ 437 billion exports and $675 billion imports).

VALUE OF EXPORTS AND IMPORTS

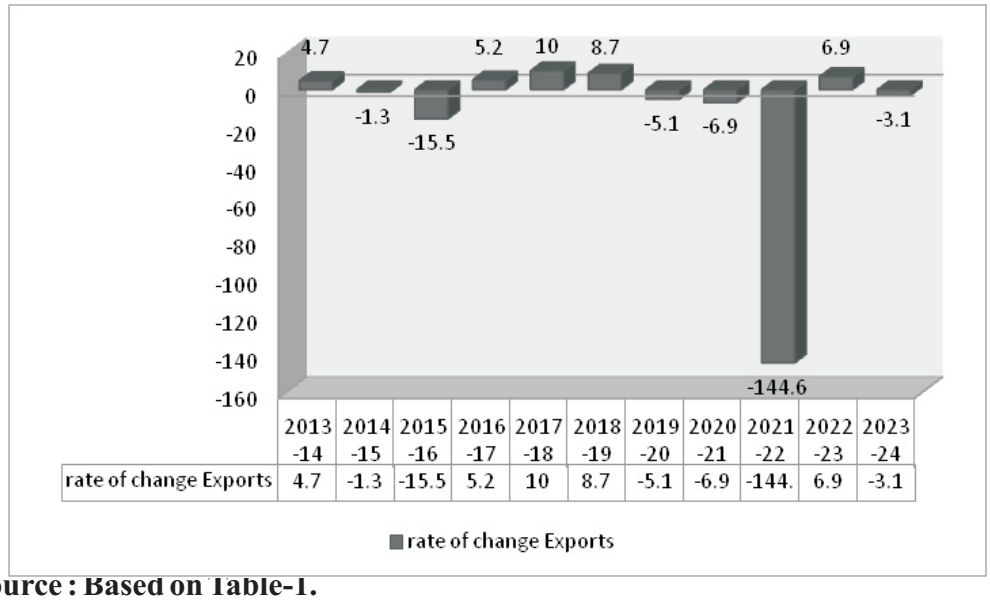
Table 1, presents information on the value of foreign trade in India over the period of planning in terms of US dollars. As is clear from this table, the value of India's exports and imports has increased considerably over the post-independence period. In 2014-15, the trade deficit was marginally higher at $137.7 billion. Trade deficit continued to be at a lower level due to decline in the value of POL(petroleum oil and lubricants) imports by 16.0 percent, caused by a fall in international oil prices by 20.2 percent. As is clear from table 1, both exports and imports fell significantly in 2015-16(exports by 15.5 percent and imports by 15.1percent). as far as exports are concerned, lower oil prices brought refined petroleum products to about half their level a year ago. Non- oil exports declined by 8.5percent, with exports of key products including engineering goods, electronics, leather and gems and jewellery contracting in terms of volume or value or both. Imports declined basically because of a sharp reduction in oil import bill. Trade deficit in 2015-16 was $118.35 billion –lowest level since 2010-11. After two years of negative growth, exports recorded a positive growth of 5.2 per cent in 2016-17. This was due to a substantial pick- up of exports in the second half of 2016-17 – the notable drivers being engineering goods, petroleum products, iron ore, cotton yarn, chemicals, marine products, gems and jewellary, and readymade garments. As far as imports are concerned, they increased only marginally. The net result of these trends was that the trade deficit fell in this year – from $118.7 billion in 2015-16 to $108.5 billion in 2016 – 17. However , because of massive increase in import expenditure by as much as 21 percent in 2017-18 as against as increase in export earnings of 10.0 percent, trade deficit rose to as high as $162 billion in 2017-18, this rose further to $184.0 billion in 2018-19 and stood at $161.3 billion in 2019-20. Exports declined by 6.9 percent to $2,91,808 billion in 2020-21 and imports by as much as 16.9 percent to $102.6 billion. Trade deficit rose to an unprecedented level of $264.9 billion in 2022-23 before cooling of to $189.7 billion in 2023-24.

Table – 1 : Value of exports and Imports

Year	Exports	Imports	Trade Balance	Rate of Change Exports	Imports in(US$Million)
2013-14	314405	450200	-135794	4.7	-8.3
2014-15	**310338**	**448033**	**-137695**	**-1.3**	**-0.5**
2015-16	**262291**	**381008**	**-118717**	**-15.5**	**-15.0**
2016-17	**275852**	**384357**	**-108505**	**5.2**	**0.9**
2017-18	**303526**	**465581**	**-162055**	**10.0**	**21.1**
2018-19	**330078**	**514078**	**-184000**	**8.7**	**10.4**
2019-2020	**313361**	**474709**	**-161348**	**-5.1**	**-7.7**
2020-21	**291808**	**394436**	**-102627**	**-6.9**	**-16.9**
2021-22	**422004**	**613052**	**-191048**	**-144.6**	**-155.4**
2022-23	**451070**	**715969**	**-264899**	**6.9**	**16.8**
2023-24	**437113**	**675430**	**-238317**	**-3.1**	**-5.7**

Source: Government of India, Economic Survey 2024-25(Delhi, 2025) Statistical Appendix, Table 6.1(B), pp. 116-7.

Figure : Rate of change of Exports



Source : Based on Table-1.

COMPOSITION OF EXPORTS

Composition of Indian exports is Presented in table – 2. A clear trend over the years has been a decline in the importance of agriculture and allied products and a substantial increase in the importance of manufactured products.

Important points that emerge from table- 2, table- 3 and table- 4 regarding different export items are as follow:

1. Export of Engineering good was $1,09,301 million in 2023- 24 which was 25.0 percent of total export earnings. Engineering goods occupied the first place in India's Export earnings in 2023-24.
2. During recent years, exports of petroleum products have increased significantly. In 2023-24, exports of petroleum products were $84,157 million which was 19.3 percent of total export earnings.
3. The exports of gems and jewellary rose to $32,707 million in 2023-24 which was 7.5 percent of total export earnings.
4. Export of electronic goods was $ 29, 123 million in 2023-24 which was 6.7 percent of total export earnings.
5. Export of readymade garments has emerged as an important foreign exchange earner in recent years. In 2023-24, this had risen to $14,532 million (3.3 percent) of total export earnings.
6. Export earnings from cotton yarn, fabrics, made-ups, etc. stood at $10,411 million in 2023-24, which was 2.4 percent of total export earnings.
7. Exports of iron ore in 2015- 16 were just $ 193 million but jumped to $1,534 million in 2016-17 due to rising demand from Chinese steel industry. Exports of iron ore 2023-24 were just $ 3,914 million 0.9 percent of total exports.
8. Exports of leather and leather manufactures was $4,283 million in 2023-24. Their share in export earnings stood at 1.0 percent in 2023-24.
9. The exports of 'fish and fish preparations' stood at $7372 million in 2023-24 which was 1.7 percent of export earnings.
10. In 2023-24, exports of rice rose to $10,417 million which was 2.4 percent of total export earnings.
11. Top 10 Commodities of India's Exports 2022-23 are: Engineering goods, petroleum products, gems and jewellary ,Organic and inorganic chemicals, drugs and pharmaceuticals, Readymade garments of all textiles, cotton yarn/ fabrics/made-ups, handloom, Rice, Plastics and linoleum. (see table-3).
12. Top 10 Commodities of Exports 2023-24 are Engineering goods, Chemicals and allied products, Gems and jewellary, Leather and leather products, Cotton yarn ,Fabrics, made-ups etc., Readymade Garments, Fish and fish preprations, Rice, Iron ore , Tea and Mate.(see Table -4).

Table- 2 : Composition of Exports

Commodities	2019-20 $ million	2020-21 $ million	2021-22 $ million
1. Agriculture and allied products	35,012	41,714	50,836
2. Ores and Minerals (excluding coal)	6816	9416	8559
3. Manufactured goods	223343	207712	285948
4. Petroleum Products	42671	26838	69006
5. Others 16	6137	8105	2.9%

Source : (i) Reserve Bank of India, Handbook of Statistics on Indian Economy 2023-24(Mumbai, 2022), Table119, p. 177

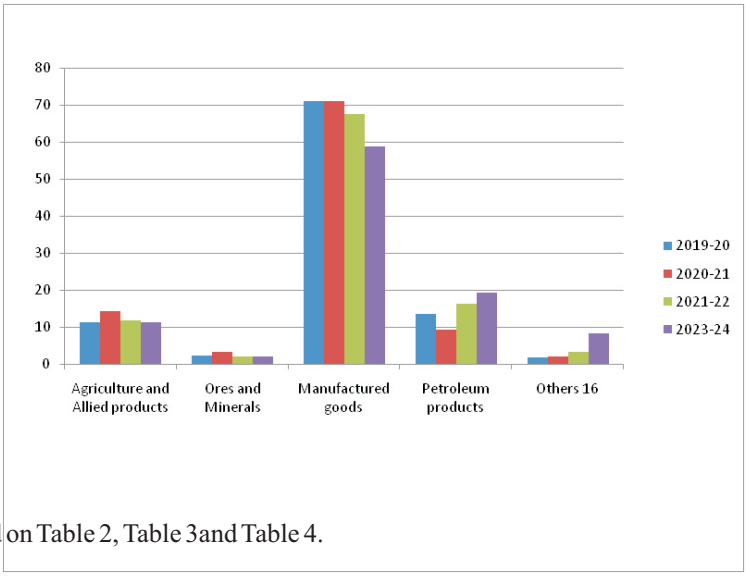
(ii) Government of India, Economic Survey 2024-25(Delhi, 2025), volume II, Statistical Appendix, table 6.3(A)

(iii) Agriculture and allied products: Tea and Mate, Cashew kernels, Rice , Fish and Fish preparations

(iv) Ores and Minerals (excluding coal) : Iron ore

(v) Manufactured goods : Cotton yarn, fabrics, made- ups etc., Readymade garments, Jute manufactures, Leather and Leather manufactures, Gems and jewellary, Chemicals and allied products, Engineering goods.

Figure : Composition of Exports



Source: Based on Table 2, Table 3and Table 4.

Table - 3 : Top 10 Commodities Composition of India's Exports in 2022-23

S.No.	Commodity	US$ million (in descending order)
1.	**Engineering goods**	**1,07036**
2.	**Petroleum products**	**97,400**
3.	**Gems and jewellery**	**37,957**
4.	**Organic and inorganic chemicals**	**30,341**
5.	**Drugs and pharmaceuticals**	**25,392**
6.	**Electronic goods**	**23,551**
7.	**Readymade garments of all textiles**	**16,191**
8.	**Cotton yarn/Fabrics/made-ups, handloom**	**10,946**
9.	**Rice**	**11,143**
10.	**Plastic and Linoleum**	**8,366**

Source: Reserve Bank of India, Handbook of Statistics on Indian Economy, 2022-23, Table 119; data rearranged in descending order.

Table – 4 : Composition of India's Export in 2023-24

S.No.	Commodities	$ million	% of total
1.	**Agriculture and Allied Products** of which	**49,501**	**11.3**
(a)	**Tea and mate**	**826**	**0.2**
(b)	**Cashew kernels**	**349**	**0.1**
(c)	**Rice**	**10,417**	**2.4**
(d)	**Fish and fish preparations**	**7,372**	**1.7**
2.	**Ores and Minerals (excluding coal)** of which	**8600**	**2.0**
	Iron Ore	**3914**	**0.9**
3.	**Manufactured goods** of which	**257720**	**59.0**
(a)	**Cotton yarn, fabrics, made-ups etc.**	**10411**	**2.4**
(b)	**Readymade garments**	**14532**	**3.3**
(c)	**Jute manufactures**	**339**	**0.1**
(d)	**Leather and Leather manufactures**	**4283**	**1.0**
(e)	**Gems and jewellery**	**32707**	**7.5**
(f)	**Chemicals and allied products**	**41046**	**9.4**
(g)	**Engineering goods**	**109301**	**25.0**
4.	**Petroleum Products**	**84157**	**19.3**
5.	**Others16**	**24223**	**5.5**
	Total Exports	**437072**	**100.0**

Source : (i) Reserve Bank of India, Handbook of Statistics on Indian Economy 2023-24(Mumbai, 2024), Table119, p. 177

(ii) Government of India, Economic Survey 2024-25(Delhi, 2025), volume II, Statistical Appendix, table 6.3(A)

DIRECTION OF EXPORTS

As is clear from table- 3 OECD group accounts for a major portion of India's exports. The share of this group in 1990-91 was 53.5 per cent and in 2023-24 was 47.7 per cent. EU in this group accounted for 14.7 per cent of total export earnings in 2023-24. This OPEC group accounted for 5.6 percent of exports in 1990-91 and its share in 2023-24 rose to 13.8 per cent. Most significant was the rapid increase in exports to the countries of Eastern Europe particularly USSR. Eastern Europe accounted for 17.9 percent of export earnings in 1990-91. In 2023-24, the share of Eastern Europe in total exports had slumped to mere 1.9 per cent. Most important in this group have been the countries of Asia. In fact, exports to Asian countries accounted for 23.7 percent of India's total export earnings in 2023-24. As is clear from table- 3 exports to Russia accounted for only 1.0 per cent of export earnings in 2023-24. In this year, USA with a share of 17.7 per cent occupied the top place. It was followed by UAE share 8.2 per cent, Netherlands share 5.1 per cent , China share 3.8 per cent, Singapore share 3.3 per cent , U.K. share 3.0 per cent, Saudi Arabia share 2.6 per cent, Bangladesh share 2.5 per cent, Germany share 2.3 per cent and Italy share 2.0 per cent in that order.

Table- 5 : Direction of India's Export Trade

Commodities	Exports	Exports	Exports	Exports
	1990-91	2019-20	2022-23	2023-24
1. OECD	53.5	39.6	47.6	47.7
2. OPEC	5.6	15.4	12.4	13.8
3. Eastern Europe	17.9	1.3	1.2	1.9
4. Asia of Which	14.4	30.6	24.6	23.7
5. Others	2.9	0.9	0.5	0.7
Total	100.0	100.0	100.0	100.0

Source: Computed from (i) Reserve Bank of India, Report on Currency and Finance, Various Issues, (ii) Reserve Bank of India, Handbook of Statistics on the Indian Economy, 2024-25 (Mumbai, 2025), Table 125, pp. 189-90

The post- reform period of India's economy reveals several significant trends in its trade performance: Reflecting the liberalization of trade regime and the increasing external openness of the economy, India's trade- GDP ratio showed substantial improvements in the post 1991 period as compared with the earlier decades. The import-GDP ratio also rose from 9.3 percent in 1990s. In 2023-24, the import-GDP ratio was 19.3 percent. These data indicate an increasing openness of the Indian economy in the period since 1991and given India's own economic past "represents significant change in its relationship with the world economy."

The export- import ratio, reflecting the capacity of export earnings to finance imports, rose markedly from 64.0% in the 1980s to 84.9% in the 1990s and remained at 81.7% in 2003-04. However, a downward trend set in thereafter, with the ratio declining to 75% in 2004-05 and further to 64.7% in 2023-24.

Both export and import growth rates recorded a notable increase in the post-reform period compared to the 1980s. for example, the average annual growth of exports increased from 8.1% in the 1980s to 8.6% in the 1990s and further to 11.3% during 2000-01 to 2020-21.

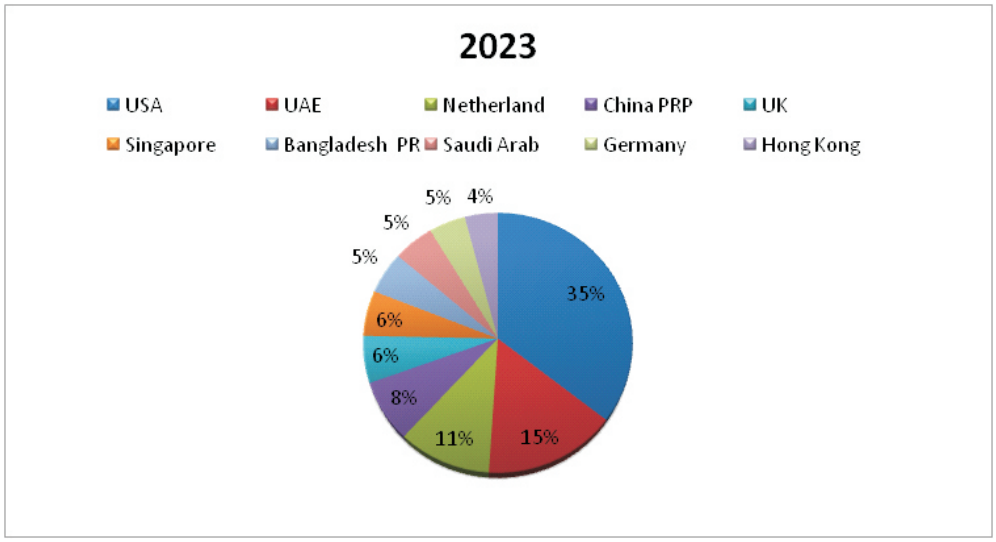
Foreign Trade contributes to global efficiency and it plays a crucial role in growth, employment generation and development of a nation. The March, 2025 edition of Global Trade Update states that global trade (combining both merchandise and services) has hit a record $33 trillion in 2024, growing by 3.7% ($1.2 trillion) over 2023 with most regions recording positive growth, except for Europe and Central Asia. India's share in global merchandise exports has risen from 0.6 percent in early 1990s to 1.8 percent in 2024 with exports worth USD 443 billion. On the import front India's share in global merchandise imports has risen from same 0.6 percent in early 1990s to 2.8 percent in 2024 with imports worth USD 702 billion recorded in 2024(EXIM bank and World Trade Outlook, April 2025). Globally, in 2024 India had occupied 18th rank on the export front and 9th rank on the import front. From merchandise trade, India has made notable and significant stride in services trade segment also, and in 2024 as per WTO's Trade Outlook, April 2025 Report, India ranked 8th with a 4.3% share of global commercial services exports worth USD 374 billion. Additionally, the report highlights that, out of the total commercial services, in digitally delivered services segment, India has ranked 5th with a share of 5.8% in global digitally delivered services exports. India's total exports of digitally delivered services in 2024 have been recorded at USD 269 billion.

Table - 6 : India's Top 20 Trade Country Partners of Export

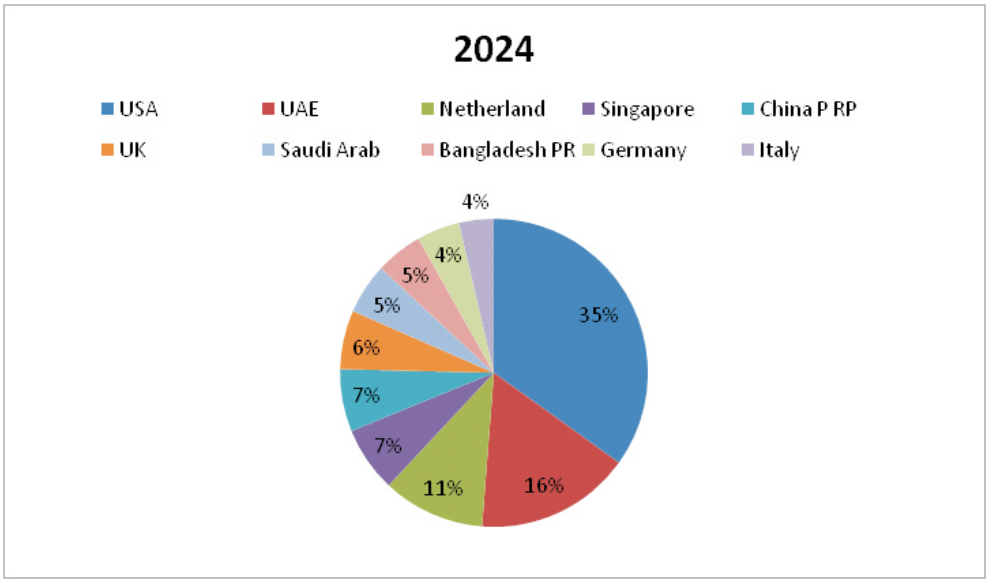
Sl. No.	Country	Total Export value of 2023($ Billion)	Total Export value of 2024($ Billion)	Share percentage in total Export value of 2024	YoY Growth (2024 over 2023)
1	USA	75.65	80.77	18.25	6.77
2	UAE	33.01	37.79	8.54	14.49
3	Netherland	23.11	24.84	5.61	7.47
4	Singapore	12.04	15.89	3.59	32.06
5	China PRP	16.23	15.14	3.42	-6.72
6	UK	12.42	14.30	3.23	15.09
7	Saudi Arab	10.83	12.29	2.77	13.40
8	Bangladesh PR	11.26	11.48	2.59	2.02
9	Germany	09.67	10.42	2.35	7.77
10	Italy	08.40	08.47	1.91	0.82
11	South Africa	08.02	08.26	1.87	2.99
12	Malaysia	06.67	08.14	1.84	21.97
13	France	07.12	07.91	1.79	11.11
14	Australia	07.73	07.86	1.78	1.79
15	Nepal	07.25	07.11	1.60	-2.01
16	Belgium	07.97	06.67	1.51	-16.33
17	Hong Kong	08.72	06.61	1.49	-24.22
18	Brazil	06.67	06.55	1.48	-1.82
19	Korea RP	06.29	05.97	1.35	-5.08
20	Japan	05.08	05.83	1.32	14.76
	Total Export Value Earned from Top 20 Countries	**284.14**	**302.30**	**68.29**	**6.39**
	All Other Countries Combined	**147.28**	**140.40**	**31.71**	**-4.67**
	Total Export Value	**431.42**	**442.71**	**100.00**	**2.62**

Source: DGCI&S August, 2025.

Ten Export Country Partners and their percentages in total Export for 2023 and 2024



Source: DGCI&S August, 2025.



Source:DGCI&S , August, 2025.

THE CONCLUSION

In financial year 2023-24, India's exports saw strong growth in sectors like Electronic Goods, Drugs and Pharmaceuticals, Engineering Goods and Agricultural products (Tobacco, Spices, Meat). Despite a slight dip in overall merchandise exports; services exports rose significantly, pushing total exports to a record high of around $778 billion, with key destinations being the US, UAE, Netherlands and China.

MAJOR FACTORS TO DRIVE EXPORTS

- **Electronic Goods**: Increased by over 23%
- **Drugs & Pharmaceuticals**: Grew by nearly 10%
- **Engineering Goods**: Showed positive growth, with capital goods making up a larger share.
- **Agricultural commodities**: Strong performance in Tobacco, Spices, Fruits & Vegetables and Meat products.
- **Petroleum Products & Chemicals**: Also contributed positively.

MAJOR EXPORT DESTINATIONS (FY 2023-24)

- **USA**(approx 17.9%)
- **UAE** (approx 8.23%)
- **Netherlands** (approx 5.16%)
- **China** (approx 3.85%)
- **Singapore** (approx 3.33%)
- **UK, Saudi Arabia, Bangladesh, Germany, Italy.**

➢ **Total Exports(Goods & Services):** Hit a record $778.2 billion in FY 2023-24, up from $776.3 billion in the previous year.

➢ **Merchandise Exports:** Saw a slight decline (around 3%) to $437.1 billion.

➢ **Services Exports:** Increased to $341.1 billion, offsetting the merchandise dip.

➢ **Shifting Composition:** The share of capital goods within engineering exports increased significantly, showing a structural shift towards more advanced manufacturing.

India's trade sector has demonstrated remarkable stability and growth, achieving milestone despite global economic headwinds. Following a dip in FY20 amid the global downturn and the pandemic, overall exports rebounded strongly in FY22, reaching a record high in FY23. This momentum continued into FY24. (ES 2024-25).

India's total exports (merchandise+ services) have shown positive momentum in the first nine months of FY25, reaching USD 602.6 billion, witnessing a YoY growth of 6 percent. This increase demonstrates the resilience of exports, which have been building on a steady upward trend in recent years despite global economic challenges.(ES2024-25).

ABBREVIATIONS

DGCI&S = Directorate General of Commercial Intelligence & Statistics
EU= European Union
EXIM= Export- Import Bank of India
GDP= Gross Domestic Product
OECD= Organisation for Economic Co-operation and Development
OPEC= Organization of the Petroleum Exporting Countries
POL= Petroleum, Oil and Lubricants
USD= United States Dollar
USSR= Union of Soviet Socialist Republics
USA= United States of America
UAE= United Arab Emirates
WTO= World Trade Organization.

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A THEORETICAL AND DESCRIPTIVE STUDY OF THE 3R MODEL'S EFFECTIVENESS IN ACCELERATING INDIA'S PROGRESS TOWARD THE 2030 AGENDA

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ABSTRACT

Reduce, Reuse, and Recycle, or the 3R Model, is a fundamental strategy for accomplishing Sustainable Development Goal 12 (Responsible Consumption and Production) in the 2030 Agenda for Sustainable Development. Supporting sustainable material flows, waste reduction, and effective resource use, the 3R framework is based on the theories of industrial ecology and the circular economy. Between 2015 and 2025, this study looks at India's progress in operationalizing the 3R principles and builds a theoretical framework that links them to the 2030 Agenda.

A mixed-method design was used to gather data from the Central Pollution Control Board (CPCB), NITI Aayog, Ministry of Housing and Urban Affairs (MoHUA), and UN SDG databases. This methodology combines statistical trend analysis, policy evaluation, and case-based assessment. India's waste processing capacity has increased dramatically, from 29% in 2015 to around 85% in 2025, according to the data. This is a result of improved institutional efforts made possible by the Swachh Bharat Mission (SBM 2.0), Plastic Waste Management Rules, and Extended Producer Responsibility (EPR) Guidelines. Innovative projects that show quantifiable gains in economic productivity, resource conservation, and carbon reduction include the GOBARdhan biogas program, Indore's zero-landfill approach, and Smart Cities' 3R trials.

Systemic issues still exist, nevertheless, such as poor institutional coordination, inadequate rural trash infrastructure, and a lack of awareness of the informal sector. The report suggests a Four-Tier 3R Integration Roadmap (2026–2030) that emphasizes blockchain-based waste traceability, regional innovation centers, green public procurement, and 3R education in order to close these gaps. According to the study's findings, including the 3R approach into India's developmental plan may turn waste into wealth, hasten the accomplishment of SDG 12, and establish India as a regional leader in sustainable and circular growth.

Keywords: *3R Model, Circular Economy, Sustainable Development Goals, SDG 12, Waste Management, Resource Efficiency, Green Innovation*

1. INTRODUCTION

The United Nations' 2015 adoption of the 2030 Agenda for Sustainable Development offers a revolutionary road map for attaining wealth while preserving the environment. Through the 17 interconnected Sustainable Development Goals (SDGs), it exhorts all countries to balance the economic, social, and environmental facets of sustainability (United Nations, 2015). The most

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important of these is SDG 12: Responsible Consumption and Production, which tackles the fundamental problem of waste reduction and resource efficiency that forms the basis of a number of other global goals, such as SDG 6 (Clean Water and Sanitation), SDG 13 (Climate Action), and SDG 15 (Life on Land) (United Nations, 2025).

A strategic framework for extending product lifecycles, recovering valuable materials from waste streams, and limiting resource extraction, the 3R Model—Reduce, Reuse, and Recycle—is at the core of SDG 12. The 3R method is a prime example of the circular economy, advocating for a change from the conventional linear "take-make-dispose" model to a regenerative system that puts efficiency and sustainability first (Ellen MacArthur Foundation, 2025; Stahel, 2016). By integrating the 3Rs into systems of production and consumption, nations may promote inclusive green development and disentangle economic progress from environmental deterioration.

1.1 Background and Rationale

The 2030 Agenda for Sustainable Development, which was unanimously endorsed by all 193 UN Member States, is acknowledged as a global call to action to end poverty and protect the environment through sustainable means (United Nations, 2015). Target 12.5 of this framework specifically calls for a significant decrease in waste generation by 2030 through prevention, reduction, recycling, and reuse (United Nations, 2025). By encouraging a hierarchy of waste management—putting emphasis on reducing at the source, optimizing reuse potential, and guaranteeing effective recycling for resource recovery—the 3R strategy operationalizes this goal.

Both a need and an opportunity are presented by the 3R model for quickly growing economies like India. With more than 1.44 billion people living there and a strong GDP growth rate of 7.2% in FY 2024–2025 (Reserve Bank of India [RBI], 2025), India's natural resources and waste management systems are under increasing strain. Approximately 60% of the 190 million tons of municipal solid waste (MSW) produced nationwide each year is treated in urban areas (Ministry of Housing and Urban Affairs [MoHUA], 2025). With only 22% of waste being formally collected, rural areas fall behind, indicating a pervasive urban–rural divide in waste administration and infrastructure (Central Pollution Control Board [CPCB], 2025).

1.2 India's Progress in implementing the 3R Approach

India's environmental policies are becoming more in line with the ideas of the circular economy. To encourage 3R integration, frameworks like the Solid Waste Management Rules (2016), the National Resource Efficiency Policy (Government of India, 2019), and the Extended Producer Responsibility (EPR) Guidelines (2022) provide a legal basis. 3R techniques are further institutionalized by the NamamiGangeProgramme, the Swachh Bharat Mission – Urban (SBM 2.0), and the Smart Cities Mission, which connect trash management with initiatives for river restoration and urban redevelopment.

AI-driven trash segregation technologies, recycling companies, and waste-to-energy facilities are all growing in India's industrial and technological landscape, updating collection and processing systems (Ellen MacArthur Foundation, 2025; NITI Aayog, 2025). Waste value chains are starting to become more transparent thanks to digital solutions like smart bins and blockchain-based tracking. Additionally, local engagement and knowledge have been bolstered by grassroots efforts, like garbage banks and community-led recycling networks (Triana&Sembiring, 2019).

However, institutional fragmentation, low public participation, financial obstacles, and inadequate recycling infrastructure continue to hinder the 3R model's adoption in India. The efficiency and

inclusivity of the system are further compromised by the absence of the informal sector, which is essential to garbage recovery. A multi-level governance strategy backed by financial incentives, educational changes, and digital innovation is needed to address these problems.

2. LITERATURE REVIEW

Reducing trash at its source, reducing excess waste production, reducing environmental pollution, benefiting the community, and altering people's waste-related behavior are the goals of community-based waste management using the 3R approach (Reduce, Reuse, Repeat). The 3Rs (Reduce, Reuse, Recycle) are simple and easy to implement, but they are also challenging because their success depends on the government and the community's involvement in behavior change, which is typically influenced by the sociocultural and socioeconomic traits that define people's lives (Triana&Sembiring, 2019).

The substantial quantity of construction waste produced at the sites is addressed via reuse and recycling techniques, which help to achieve sustainable development goals and frequently result in the creation of new products (Schroeder et al., 2018).

The 3Rs principle, which ranks WM methods as preferable, states that reducing, reusing, and recycling should be done in a hierarchical sequence. The 3Rs are designed to be a hierarchy that ranks the negative environmental impacts from low to high (Nduneseokwuet al., 2017).

A cost-effective redistribution of available capital over time during waste management planning, along with a specific investment of implementation planning's benefits and costs, make up sustainability (Babashamsiet al., 2016).

The amount of municipal waste produced in OECD nations increased by 22.5% between 1990 and 2012, from over 537 million tonnes to around 658 million tonnes; per capita, municipal waste increased by 6%, from 500 kg to 530 kg. However, this growth was accompanied by a significant decrease in the percentage of waste that was landfilled (from 60% to 45%) and a significant increase in the percentage of waste recovered through recycling and composting (from 19% in 1990 to 34% in 2012), while the percentage of waste that was incinerated increased marginally from 20% to 22% (OECD 2014).

In addition to the 3R notions of "reduction, reuse, and recycling," the concept of waste management should incorporate re-imagination and re-design in order to maximize resource efficiency through reconsideration (Migilinskas et al., 2013).

This study attempts to assess The 3Rs—reduce, reuse, and recycle—are maximized in Malaysia's sustainable construction waste management review. This reduces the amount of construction waste that is disposed of by recognizing and implementing a comprehensive, sustainable strategy throughout the entire lifecycle of construction projects, from start to finish (Lu and Yuan, 2011).

The construction and demolition industries in the UK are the biggest generators of hazardous trash and produce more waste overall. Over 36 million tonnes of landfill garbage are produced annually by these industries. About 35% of all garbage is produced in this way, with the remaining 10% coming from domestic residential waste. There is growing pressure on the demolition and construction industries to boost recycling opportunities, minimize, reuse, and improve performance (Defra, 2007).

Urban authorities in Asia spend between 50 and 70 percent of their income on trash management, and the average cost of ignoring the environment is equivalent to 5 percent of GDP, according to World Bank estimates. Regarding pollution control, it is estimated that India loses between 5 and 6 percent of its national income (Alan, 2002).

The inability to come up with a suitable strategy for minimizing and/or preventing waste is one of the biggest obstacles to waste minimization on many construction sites. McGrath presented the Site Methodology to Audit Reduced Target Waste (SMART Waste) in 2001 as a novel waste minimization approach to bridge this gap. This instrument is intended to serve as a standard for auditing, minimizing, and focusing on building waste in order to improve material recovery for waste recycling and reuse (McGrath, 2001).

OBJECTIVES

1.To provide a theoretical framework that connects the 2030 Agenda and 3R.
2. To measure India's 3R performance with data from 2025.
3. To apply the 3R to the analysis of high-impact case studies in India.
4. To suggest a roadmap for the integration of the 3R Policy for 2026–2030.

3. METHODOLOGY

3.1 Research Design and Data Sources

Using a mixed-method research design, this study examines India's progress in adopting the 3R (Reduce, Reuse, Recycle) model in light of Sustainable Development Goal 12 by combining descriptive and case-based methodologies. In accordance with the 2030 Agenda's baseline year and extending to the most recent data available, the analysis spans the years 2015–2025. To guarantee validity and triangulation, the study incorporates primary and secondary data sources. The Ministry of Housing and Urban Affairs (MoHUA) Swachh Bharat Mission Dashboard (2025), the Central Pollution Control Board (CPCB) Waste Management Annual Report (2025), and NITI Aayog's Voluntary National Review (VNR) 2025 are among the official government repositories from which primary data is gathered. These sources offer current information on waste management, recycling performance, and policy implementation.The World Bank, the Council on Energy, Environment, and Water (CEEW), the United Nations SDG Indicators Database, and other reliable international and institutional databases are the sources of secondary data. These sources, taken as a whole, provide a strong factual and analytical basis for assessing India's 3R transition and its conformity to both domestic and international sustainability goals.

4. RESULTS AND DISCUSSION

4.1 Theoretical Framework Linking 3R to the 2030 Agenda

Following the G8 Summit in 2004, the UN's 10-Year Framework on Sustainable Consumption and Production codified the 3R paradigm, which stands for Reduce, Reuse, Recycle (UNEP, 2011). Based on the ideas of the circular economy and industrial ecology, it encourages closed-loop systems in which waste from one process is used as input for another. The concept focuses on lowering material intensity, recycling trash into secondary resources, and reusing items to prolong their lifecycles in order to lessen the strain on ecosystems and promote green innovation.

Additionally, the 3R model promotes clean water (SDG 6), clean energy (SDG 7), sustainable cities (SDG 11), and climate action (SDG 13), all of which are in line with SDG 12 (Responsible Consumption and Production). Globally, nations like Germany and Japan have effectively incorporated the 3Rs through robust industrial and regulatory frameworks, while India does the same through the Plastic Waste Management Rules, the Swachh Bharat Mission, and EPR laws. The theoretical underpinning of the approach is ecological modernization, which shows how innovation, policy integration, and group engagement may support both economic growth and environmental sustainability.

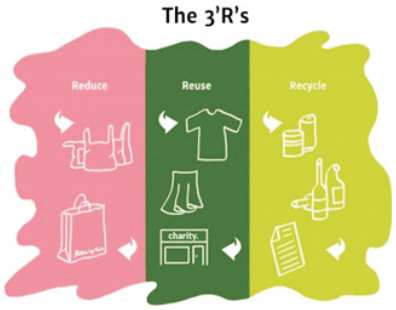

Table 1. Conceptual Framework Linking 3R Model to SDGs (Summarized)

Level	Action	Mechanism	Example	SDG Link
1	Reduce	Minimize resource input and waste output	Digitalization, Lean Manufacturing	12.2, 12.3
2	Reuse	Extend product lifespan	Refill systems, Repair networks	12.5
3	Recycle	Recover materials into secondary use	Plastic ? rPET, Organic ? Compost	12.5.1

Table 2. Global 3R Policy Performance (Comparative Snapshot)

Country/Region	Policy Instrument	Recycling Rate (2025)	Circular GDP Contribution
Japan	Sound Material-Cycle Society Law (2000)	98% (industrial)	4.2%
Germany	Circular Economy Act (2012)	67% (municipal solid waste)	□400B
EU-27	Circular Economy Action Plan (2020)	50% (packaging waste)	2.1% of GDP

4.2 India's 3R Performance (2015–2025)

Figure1. National Waste Generation and Processing Trends

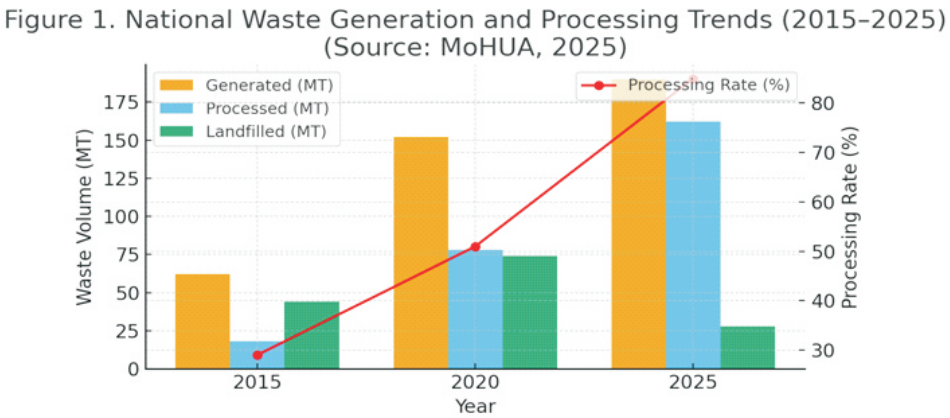

Table 3. National Waste Generation and Processing Trends

Year	Generated (MT)	Processed (MT)	Landfilled (MT)	Processing Rate (%)
2015	62	18	44	29%
2020	152	78	74	51%
2025	190	162	28	85%

Figure 2. Recycling Rate by Waste Stream (2025)

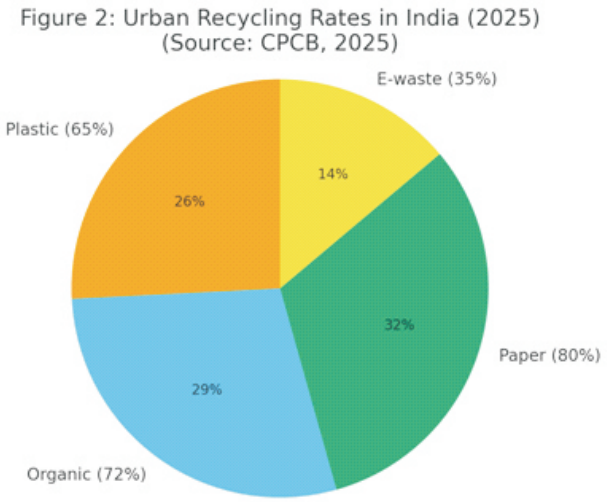

Fig. 2. Urban recycling rates: Plastic (65%), Organic (72%), Paper (80%), E-waste (35%) (Source: CPCB, 2025)

4.3. Case Studies: 3R in Practice

4.3.1 Indore: The Cleanest City Model

As the cleanest city in India according to the SwachhSurvekshan rankings since 2017, Indore is a prime example of circular waste management using efficient 3R techniques. The city's plan places a strong emphasis on door-to-door collection, total source segregation, and ward-level decentralized composting facilities. The combined effect of these initiatives has made it possible to produce around 550 tons of high-quality compost per day (TPD) for use in peri-urban agriculture and urban landscaping. The city has also reached 0% landfill dependency, which is a significant milestone that shows how it is moving toward a near-closed material loop. With an annual carbon reduction of almost 120,000 tCO_2e, the system demonstrates Indore's substantial commitment to climate mitigation and its alignment with SDGs 13 (Climate Action) and 11 (Sustainable Cities).

4.3.2 GOBARdhan: The Revolution in National Biogas

A prime example of large-scale resource recovery under India's bio-circular economy concept is the Galvanizing Organic Bio-Agro Resources Dhan (GOBARdhan) program. The program, which has 1,008 operational plants spread throughout 678 districts, combines the production of renewable energy with rural sanitation. Every year, it has effectively processed more than 10 million tons of organic waste, producing over 2.5 million tons of compressed biogas (CBG). For rural stakeholders,

this conversion has increased yearly revenue by an estimated ₹18,000 crore, boosting farmer incomes and decreasing reliance on synthetic fertilizers. The program advances environmental and socioeconomic sustainability by operationalizing the "waste-to-wealth" concept under SDGs 7 (Affordable and Clean Energy) and 12 (Responsible Consumption and Production).

4.3.3 Reusable: The Ecosystem of Urban Reuse

Piloted in large cities like Bengaluru and Mumbai, the Refillable program has become a cutting-edge illustration of the 3R framework's reuse component. Through a digital logistics system that connects customers with refill stations, the platform, which serves more than 5 million households, makes it easier to replenish products and reuse containers. This concept has reduced the usage of single-use plastic by 70%, increased customer retention by 55%, and helped urban households save an estimated ₹120 crore a year. Beyond its financial benefits, the program shows how consumer behavior and private sector involvement have changed, supporting SDG 9 (Industry, Innovation, and Infrastructure) and SDG 12 objectives.

Table 4. Comparative Impact Matrix of Case Studies

Case	Waste Diverted (Tons/Year)	Jobs Created	CO? Saved (tCO? e)	Revenue (?Cr)
Indore	200,000	1,200	120,000	85
GOBARdhan	10,000,000	85,000	8,500,000	18,000

4.4.1 Current Policy The ecosystem

The foundation of India's shift to a circular economy is the Solid Waste Management Rules (2016), the Extended Producer Responsibility Guidelines (2022), and the Swachh Bharat Mission 2.0, all of which represent significant regulatory advancements. But there are still significant gaps:

- The national 3R education mandate is not included in school curricula.
- The formal waste value chain does not include stakeholders from the informal sector;

state boards, central agencies, and urban local bodies continue to have fragmented data. Because of these constraints, incorporating 3R concepts into India's institutional and policy framework requires a well-thought-out, multi-tiered plan.

Table 5. Proposed 3R Policy Integration Roadmap (2026–2030)

Tier	Instrument	Target	Expected Timeline
1	Integration of 3R Education into NCERT Curriculum	100% of schools	2026
2	Green Public Procurement (GPP) Act	30% recycled content in public procurement	2027
3	Establishment of 10 State 3R Innovation Hubs	? 500 crore national innovation fund	2028
4	Launch of National Waste Ledger (Blockchain-based)	100% traceability of waste streams	2030

"The roadmap shown in Table 5 is based on the strategic directions described in the **India Plastics Pact Roadmap to 2030 and the Jaipur Declaration (2025)**, contextualized to India's 3R integration framework."

IMPLEMENTATION PRIORITIES

1. Develop environmental literacy by introducing 3R education modules in schools.
2. Require green public procurement to generate demand for circular products and recyclable materials.
3. Create innovation hubs at the state level that support regional recycling solutions and foster start-ups.
4. Use blockchain technology to implement digital waste tracking systems for accountability and transparency.

By working together, these projects can improve the ecology of the circular economy and hasten the achievement of SDG 12 (Responsible Consumption and Production) and other interconnected 2030 Agenda targets.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The 3R model—Reduce, Reuse, and Recycle—is a very effective tool for promoting environmentally conscious behavior and sustainable economic growth in India, according to the study's findings. Empirical evidence highlights the economic potential of circularity, showing that even a small 1% increase in the country's recycling rate might result in an estimated 0.8% rise in GDP by 2030. Although India has made significant strides in reaching SDG 12.5, which aims to significantly reduce waste creation through prevention and recycling, the gap in waste management infrastructure between rural and urban areas remains a significant obstacle. Furthermore, the 3R-based initiatives' anticipated return on investment (ROI) of 1:7 illustrates the compelling developmental and budgetary justification for integrating circular ideas into India's economic strategy.

These findings have clear policy implications: technology innovation, behavioral change, and multi-level governance must all be combined in an integrated way to move toward a circular and resource-efficient economy. To guarantee alignment among programs and institutions, policymakers should establish a multi-stakeholder governance framework incorporating the public and commercial sectors as well as academics and civil society. Priority initiatives include developing programs to increase the ability of community-based groups and urban local authorities, promoting green entrepreneurship, and broadening financing instruments and tax incentives for the recycling sector. Accountability and performance tracking will be further improved by bolstering public-private partnerships (PPPs) in waste management infrastructure and incorporating circularity indicators into national accounts and sustainability reporting systems.

Future studies must concentrate on creating a 3R Sustainability Index (3RSI) to assess progress at the state level, simulating the climate co-benefits of 3R interventions using standardized IPCC methodologies, and carrying out long-term impact analyses of flagship initiatives like Swachh Bharat Mission 2.0 and GOBARdhan. In order to scale up sustainable practices, these studies will assist in identifying policy gaps, innovation paths, and regional strengths.

After all, the 3R framework is a paradigm shift that connects sustainability, innovation, and social justice, and it is much more than just a waste management approach. India can turn its resource problems into catalysts for equitable green growth by fusing traditional resource-conscious practices with cutting-edge digital technologies and well-thought-out policy tools. India's commitment to the larger 2030 Sustainable Development Agenda will be strengthened by the broad and universal adoption of 3R principles across industries, institutions, and households, which will be crucial to achieving the goal of a circular, zero-waste economy by 2030.

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DEFINING DIS-ABILITY: CONCEPT, MODELS AND CHALLENGES

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ABSTRACT

Dis-ability is generally considered as lack of ability or functionating of body or/and mind. It is complex and multidimensional concept which cannot be understood as a homogeneous or purely biomedical condition. This paper attempts of analysing the concept of disability, evolving definitions and shift of from charity modal to welfare modal and challenges of disability through intersectional lens emphasizing how Disability intersects with Gender and class. Historically, disability was viewed as a sin of past lives or as a curse in ancient and medieval societies. With social change, conceptual frameworks shifted from charity and medical models to social and human rights models, redefining disability as a product of structural barriers, discriminatory attitudes, and unequal access to resources rather than individual impairment alone. Drawing upon national and international definitions, including WHO, UNCRPD, and the Rights of Persons with Disabilities Act, 2016, the paper highlights persistent gaps between rights-based policies and everyday realities of persons with disabilities. Empirical data from India and global reports reveal disproportionate marginalization of disabled women and economically disadvantaged groups, underscoring the role of intersectionality in deepening exclusion. The paper argues that without integrating cultural, social, and structural dimensions into disability discourse, policies remain inadequate, and inclusive development goals remain unmet.

Keywords: *Disability, Intersectionality, Modals, Gender, Class.*

INTRODUCTION

In the human society different kind of inequalities lies which restrict individual to enjoy their fundamental human rights. In this vulnerable category we can see persons with disability creates most marginalized community in society after women. Generally, Disability is considered as a homogeneous category but disability is a complex phenomenon embracing intersectional identities and defying rigid boundaries. (Srinivasan,2025).In the concept of intersectionality, Kimball Crenshaw (1989) stated that different intersecting identities such as gender, caste, class etc. shapes one's experience of vulnerability and oppression and due to different types, prevalence of disability, caste, class, gender and many more marginalizing social, economic and cultural factors, disabled persons create strong intersectional identity.

In last few decades many international and national agencies tried to conceptualizing dis-ability but major barrier in analysis of disability lies in its intersectionality. So, the central argument of the paper is that how a single model, concept or approach is sufficient for understanding the condition of disables in Society? and, as disabled identity intersects with other social, cultural and economic oppressing identities how laws and policies ensure inclusion of disabled population?

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In ancient society, disability was regarded as a divine curse. During ancient times disabled population treated differently by state, religion and culture. In some places, persons with disabilities were considered inauspicious and were rejected, while in other contexts they were viewed as weak and were provided with certain special facilities. In writings of Manu, Charaka, Markandeya and the Matsya Purana, the birth and even the sight of persons with disabilities were considered inauspicious. Along with this, they were excluded from Vedic rituals, sacrificial ceremonies, marriage, and activities related to consultation, advice, and counsel. Not only in Hinduism, but also in Buddhism and Jainism, persons with disabilities were denied the right to initiation and renunciation, inheritance of ancestral property, and succession to the royal throne.

On this basis, it can be said that according to ancient beliefs, traditions, and conventions, disability was considered as sin of previous lives and this group was regarded as neglected within society. However, with social change, awareness toward this group gradually increased and people's attitudes also began to change. As a result, efforts were made to include such children in the mainstream of society.

Reports of World Bank states that disabled population is facing social and economic challenges in inclusion due to discrimination in society and the condition of disabled in India not at all different from any other developing country. Inaccessibility of physical and infrastructural environment, economic opportunity and most importantly discriminatory approach of society creates berries in their inclusion.As per WHO the worldwide population of disabled person is 1.3 billion which constitute 16% of world population It is estimated that that over 650 million people live with disabilities worldwide and 80% live in low-income countries with inadequate access to health & rehabilitation services. (WHO,2023)

As per census of India 2011disabled population is estimated 2.21% (2.68cr.) of the total population where 1.18cr female and 1.5 cr. are having different types of disability. (Census of India, 2011). In the total population, the male and female population are 51% and 49% respectively. Majority (69%) of the disabled population resided in rural areas (1.86 Cr.) disabled persons in rural areas and 0.81 Cr in urban areas). In the case of total population also, 69% are from rural areas while the remaining 31% resided in urban areas. The number of disabled persons is highest in the age group 10-19 years (46.2 lakhs). 17% of the disabled population is in the age group 10-19 years and 16% of them are in the age group 20-29 years. Elderly (60+ years) disabled constituted 21% of the total disabled at all India level.

Disabled Population by Type of Disability (%) India: 2011

Type of Disability	Persons	Males	Females
In Seeing	18.8	17.6	20.2
In Hearing	18.9	17.9	20.2
In Speech	7.5	7.5	7.4
In Movement	20.3	22.5	17.5
Mental Retardation	5.6	5.8	5.4
Mental Illness	2.7	2.8	2.6
Any Other	18.4	18.2	18.6
Multiple Disability	7.9	7.8	8.1
Total	100.0	100.0	100.0

Source: C-Series, Table C-20, Census of India 2011

DEFINING DISABILITY

Defining disability is still a critical question. There is no universally accepted definition of "disability", although various attempts have been made to produce one. Historically, Disability term has been used as “inability” or as a reference to legally imposed limitations on rights and power. (Ghosh, 2023). There is no universally accepted definition of "disability", although various attempts have been made to produce one.

Einar Helander has given simplest definition of disability as *“People who are considered disabled in society due to differences in appearance and behavior are classified as having a disability. Disabled individuals have functional impairments.”*

Disability is a universal human condition and has been present through history, across cultures and communities. Disabilities may be physical (eg. orthopaedic disabilities, limb deformities) sensory (eg. blindness, deafness) cognitive (eg. intellectual disabilities) and psycho-social (mental illness). They may be congenital (present since birth) or acquired later in life.

According toAmerican Disability Act (1990) "*Individual with a physical or Mental impairment that substantially limits at least one major life activity, individuals with a history of such impairment and people who are regarded by others or perceived such impairment. In ADA Disability is divided in Physical and Mental disability.*

PHYSICAL DISABILITY

"It included Having any Physiological disease, disorder, condition, cosmetic disfigurement or anatomical loss that affects one or more of the following body systems neurological, immunological, musicale- skeletal, special sense organs, respiratory, including speech organ, cardiovascular, reproductive, digestive, genitourinary, hemic and lymphatic, skin and endocrine and limits a major life activity. Having a record or history of a disease, disorder, condition, cosmetic disfigurement anatomical loss or health impairment, which the employer knows. Being regarded or treated, as having or having had any physical condition that makes achievement of a major life activity difficult.

MENTAL DISABILITY

"It includes having any mental or psychological disorder or condition, such as mental retardation, organic brain syndrome, emotional or mental illnesses or specific learning disabilities that limits a major life activity, having a record or history of a mental or psychological disorder or conditions, which is known to employer. Being regarded or treated by the employer or other entity covered by this part as having or having had, and mental condition that makes achievement of a major lifeactivity difficult.

Disability or different ability is considered as limitation or lack of ability affecting an individual. The **World Health Organisation (WHO)** define disability as an umbrella term covering Impairment, Activity Limitation and Participation Restrictions. *“Impairment is a problem of body function or structure and Activity Limitation is a difficulty and countered by an individual in executing a task correction, while a Participation Restriction is a problem experienced by an individual in involvement in life situations.”*

The definition given by WHO can be considered as a major shift in conceptualising disability as it reflectdisability a interaction between person'sbodily function and how society perceive them?

As per the United Nations Convention on the Rights of Persons with Disabilities (CRPD), “*People with disability (PWD) include those who have long-term physical, mental, intellectual, or sensory*

impairments which, in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others."

According to The Rights of Persons with Disabilities Act, 2016

"Person with disability" *means a person with long term physical, mental, intellectual or sensory impairment which, in interaction with barriers, hinders his full and effective participation in society equally with others.*

"Person with benchmark disability" *means a person with not less than forty per cent. of a specified disability where specified disability has not been defined in measurable terms and includes a person with disability where specified disability has been defined in measurable terms, as certified by the certifying authority.*

The 21 disabilities covered are as follows.

1. *Blindness*
2. *Low-vision*
3. *Leprosy Cured persons*
4. *Hearing Impairment*
5. *Locomotor Disability*
6. *Dwarfism*
7. *Intellectual Disability*
8. *Mental Illness*
9. *Autism Spectrum Disorder*
10. *Cerebral Palsy*
11. *Muscular Dystrophy*
12. *Chronic Neurological conditions*
13. *Specific Learning Disabilities*
14. *Multiple Sclerosis*
15. *Speech and Language disability*
16. *Thalassemia*
17. *Hemophilia*
18. *Sickle cell disease*
19. *Multiple Disabilities including deaf-blindness*
20. *Acid Attack victims*
21. *Parkinson's disease*

Basically, Disability is not just a physical mental restriction but could be also defined as socially constructed condition. Universal definition of Disability is matter of argument and it is critical due to the difference in cultural and social believes.

MODELS OF DISABILITY

In ancient and Medieval period disability was considered as sin or reflection of *Karma* of the past lives but 1960 - 70's civil right movements were turning point in concept of Disability. Some models of disability and how they shift in with time, are presented here.

THE CHARITY MODEL OF DISABILITY

Simply, charity is understood as providing private or public assistance to unfortunate or helpless individuals. The charity model of disability views persons with disabilities as helpless and

unfortunate individuals who are in constant need of care and protection. Duyan argues that people with disabilities are perceived as sufferers because of their impairments; their condition is considered tragic, and therefore able-bodied individuals are expected to assist them in every possible way. According to this perspective, persons with disabilities require special services and institutions because they are considered fundamentally different from others (Duyan, 2007).Rather than emphasizing inclusion in mainstream education and employment, the charity model places greater emphasis on special education and segregated services. It relies heavily on charity and philanthropy rather than principles of justice and equality. The model advocates for social support mechanisms for the benefit of persons with disabilities. Consequently, early governmental and institutional interventions were largely based on this approach. Governments allocated substantial funds for the welfare of persons with disabilities either through direct benefits or by supporting special educational institutions. Similarly, non-governmental organizations working for this population have traditionally depended on charitable donations and government grants (Bhanushali, 2007).

THE MEDICAL MODEL OF DISABILITY

The medical model of disability emerged in the mid-nineteenth century as a result of advances in medical science, gradually replacing moral and charity-based models. This model conceptualizes disability as an individual problem caused by disease, trauma, or other health conditions, requiring continuous medical care and professional intervention in the form of treatment and rehabilitation.In this regard, the sociologist Anthony Giddens states that the individual model regards persons with disabilities as unfortunate victims of accidental events, placing medical experts at the centre of intervention. Their primary role is to diagnose, treat, and rehabilitate the problems experienced by disabled individuals (Giddens, 2009). Similarly, Talcott Parsons explains disability through the concept of the sick role, wherein society exempts the disabled individual from normal social responsibilities due to physical impairment. In return, society legitimizes their dependence on family members, friends, and healthcare professionals (Richard, 1989).The medical model is also referred to as the personal tragedy model because it defines disability predominantly in negative terms (Thomas & Wood, 2003). It emphasizes the individual's adjustment to their condition and environment rather than transforming social structures. From this perspective, integrated education is rooted in the medical model, as it focuses on adjusting children with disabilities to the existing education system rather than modifying the system itself to accommodate diversity.

THE SOCIAL MODEL OF DISABILITY

The social model of disability was developed in the 1970s by a small group of disabled activists associated with the Union of the Physically Impaired Against Segregation (UPIAS). *The Fundamental Principles of Disability* has been published by the Unionof the Physically Impaired Against Segregation (UPIAS) in1976. It stated that:

In our view it is society which disables physically impaired people. Disability is something imposed on top of our impairments by the way we are unnecessarily isolated and excluded from full participation in society (UPIAS 1976:14).

It emerged as a critical response to the medical model and was first articulated by Michael Oliver. Oliver defined disability not as a consequence of impairment but as a result of barriers present within the social environment (Oliver, 1976).The social model identifies structural barriers, negative social attitudes, and exclusionary practices as primary contributors to disability, thereby asserting that

society itself plays a central role in disabling individuals. Although physical, sensory, or psychological characteristics may lead to functional limitations, they do not constitute disability unless society fails to accommodate individual differences (Budjena, 2014). Thus, disability is understood as a social construct that reflects how physical or mental characteristics interact with environmental expectations (Brown, 2008).This model is grounded in the principle of equality and argues that sending students with disabilities exclusively to special schools is not a solution. Instead, all students should be provided equal opportunities within mainstream educational institutions. If a student experiences learning difficulties, the problem lies not within the student but within an educational system that is not designed to be inclusive. Accordingly, the social model emphasizes that persons with disabilities can achieve equal status only through positive changes in the attitudes of teachers, students, and society at large.

THE HUMAN RIGHTS MODEL OF DISABILITY

Closely related to the social model is the human rights model of disability, which conceptualizes disability as an integral aspect of human diversity and culture. This model emphasizes that persons with disabilities are entitled to the same rights as others. It is rooted in the spirit of the 1948 Universal Declaration of Human Rights, which affirms that all human beings are born free and equal in dignity and rights.The human rights model frames disability not merely as a medical or social issue but as a matter of human rights. It asserts that every person with a disability has the right to equality, dignity, autonomy, and full participation in society. These rights are not granted out of charity or benevolence but are inherent by virtue of being human. Accordingly, persons with disabilities are entitled to full participation in social institutions and equal access to public services.

Historically, persons with disabilities have been denied fundamental rights such as education, employment, healthcare, and rehabilitation. However, contemporary perspectives recognize disability as a normal aspect of human life and stress the need to provide individuals with disabilities full opportunities and rights for personal development. In this context, several legal frameworks have been established, most notably the Rights of Persons with Disabilities Act, 2016, which explicitly recognizes and protects the rights of persons with disabilities in India.While the social model helps in understanding the underlying social factors that shape disability, the human rights model goes a step further by providing a normative and theoretical framework for disability policy. It emphasizes human dignity and places disability rights firmly within the broader discourse of social justice and equality (Degener, 2017).

Basically, these modals were the base of changing definition of disability and the shift was not only creating new understanding but also play vital role in policy making worldwide.

DIS-ABILITY AS INTERSECTIONAL IDENTITY

Disability is not homogeneous concept. Disabled identity often intersects many other biological, cultural and social components as caste, class, Gender, cultural norms, types and prevalence of disability, sexuality and many more.These intersectional identities make them more oppressed and vulnerable.Morris (1991) defined that *Contemporary definitions emphasise the distinction between impairment (an individual's particular type of difference or difficulty: physical, sensory, cognitive, psychosocial and others or combinations) and disability (the way that they are responded to by society) (Morris,1991)*. Disability is socially constructed as other identities are (Wickenden,2023).

So, it is important to discuss that how disability intersects with different identities?

DISABILITY AND GENDER

As per UN report One in five women live with a disability globally. Even Global prevalence is greater for women than men, standing at 19 per cent compared with 12 per cent respectively.In the patriarchal society where women are struggling for their rights, disabled women are rarely recognized as person. Within this broader frame work feminist disability studies pointed out about the gendered form of disability and emphasis on significant marginalisation of disabled women (Garland & Thomson,2005). Michelle Fine and Adrienne Asch (1988) also point out in their work "sexism without the pedestal" that *women with disabilities are doubly Discriminated not only because of their disability but they also considered unfit for the specific gender roles i.e. as wife and mother.*

Different academic writings and Feminist Disability scholars suggests that women with disabilities are doubly discriminated but fact is they are endlessly oppressed due to their different social and cultural identities or we can say there are women with disabilities experience different intersectional barriers along with their gender. In feminist approach the most relevant and burning issue is sexual objectification of women's body, but in the case of differently able women the condition is completely different and opposite. Differently able women are considered as completely asexual being and that restrict their rights of sexuality, marriage, family and reproduction. Women and girls with disabilities experience higher rates of gender-based violence, sexual abuse, neglect, maltreatment and exploitation than women and girls without disabilities. Women and girls with disabilities are three times more likely to experience gender-based violence compared to non-disabled women. (UN Women)

Disability, gender and discrimination are inextricably interlinked. One in five women globally live with a disability. Women are often at increased risk of developing a disability for reasons, including discrimination in health care and violence against women. Women with disabilities are also three times more likely to be illiterate, and two times less likely to be employed or use the internet (Kabir,2020)

It is clear with all arguments that condition of disability creates huge difference in one's life whether they are of any gender but for women it is more oppressive and two times discriminatory due to cultural norms. Even they are denied from their basic rights of sexuality, marriage, family and reproductive rights.

DISABILITY AND CLASS

Analysing interconnection between disability and class is very crucial to understand that how disability intersect with socioeconomic conditions? The ways in which these identities shape their lived experiences, their participation in production, position in labour market and how they earn the livelihood? Major international efforts, such as the UN's Disability and Development Report (DDR), highlight persistent gaps in achieving the Sustainable Development Goals (SDGs) for people with disabilities, including in poverty reduction and employment access. According to international research, around 80 % of persons with disabilities live in poverty globally, illustrating the strong connection between disability and low socioeconomic status—an essential point for intersectional analysis of disability and class. (Berie,2024)

Class and disability, these two identities not just interconnected but somehow related to each other. class itself can be disabling, as poverty, exploitative labour conditions and inadequate welfare systems can contribute to impairment and restrict participation in social life. At the same time, disability can lead to downward class mobility due to exclusion from the labour market, medical expenses, and

dependence on informal care. Disability-related disadvantage cannot be fully understood without examining class relations, just as class inequality cannot be fully understood without recognizing disability as a key axis of stratification (Barnes & Mercer, 2010)People with disabilities from lower socioeconomic classes disproportionately experience poverty, unemployment, limited education, inadequate healthcare, and social exclusion, while poverty itself increases exposure to disabling conditions such as hazardous work, malnutrition, and poor living environments (Groce et al., 2011)

DISABILITY AND CULTURAL NORMS

Cultural norms of any society lies in every part of social and individuals lives.Similarly, it creates perception and experience of disability. Cultural norms not just define disability but create a specific meaning of it through language and the terminologies like handicapped, metaphors like a" lame excuse" not just used to characterise disability but creates categories of normalcy and abnormality.(Foucault, 1977). Language also impacts lived experience and determines access to resources, as demonstrated by institutional classifications in policy, healthcare, and education.

DISCUSSION

Disability is not homogeneous concept. In ancient and medieval world disability was considered as result of *karma*or curse due to sin. It was moral duty of state to give them space and basic livelihood on the basis of charity Model. With the development of scientific knowledge and medical science, concept of Disability have changed and it stated understanding as physical and mental state which need medical help and with it Medical Modal of disability has been emerged in 1800s. (Williams,2001). Medical modal of disability believes that disability is physical, mental and sensory disfunction which need to be cured but this model was unable to address the marginal identity of disabled population. After civil rights movement in 1960s,Social Model of Disability came in discussion which was based on analysing the concept of disability as socially constructed concept rather than physical and mental condition. Disability definition given by WHO was also based on that model.All these modals and concept of disability considered role of society in creating the meaning of disability and stigma which lead institutional and societal barriers for them. In 2006 UN passed The UN Convention on the Rights of Persons with Disabilities (CRPD)which was based on Right based Model. So, the central argument was that how these models, concept or approach are sufficient for understanding the condition of disables in Society? and, as disabled identity intersects with other social, cultural and economic oppressing identities how laws and policies ensure inclusion of disabled population and the answer is that it could be understood through intersectional lens only.

CONCLUSION

Overall, as conclusion we can say most of the time Institutional conceptualisation ignores the structural aspect of disability which create paradoxes in defining concept of disability like social v/s medical model, legal v/s cultural identity, gendered and class-based perspective, rural v/s urban etc.

Apart from these paradoxes many more challenges are there, not only in defining disability but understanding the culturally institutionalized norms which are constructing meanings of disability which is beyond their physical, mental and sensory conditions. Though, numerous nation and international policies have been initiated to address all challenges of disabled persons and ensure their inclusion in society like, UN Convention on rights of persons with disability (UNCRPD) act 2007 was adopted and as being a signatory Indian government passed "The rights of persons with disability act 2016" in replacement of Persons with disability act 2005. RPwD act 2016 was based on right based

modal rather than welfare-based or charity modal, still data shows the different picture. Lack of Health care, accessibility, education, employment, Problem of isolation, stigma and poverty, denial of their rights of sexuality, marriage and family, and many more challenges are clearly the result of unclear understanding of intersecting conditions with disability.

So, for better understanding and to ensure inclusion of disabled population, it is necessary to analyse concept of disability and the challenges faced by them through cultural norms, social conditions and right based approach rather than instrumental definition. Without such a shift in perspective, policies and interventions will continue to fall short of transforming the lived realities of persons with disabilities.

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GENDER DISPARITIES IN ENGINEERING EDUCATION IN INDIA: EVIDENCE FROM PLFS AND NSS DATA

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ABSTRACT

To get women-led growth, the equitable participation of female students in engineering subjects is necessary.Educational disparity is found in India, and it is found on different grounds—disparity based on gender, region, and religion. The present research aims to examine educational disparities by gender across various states in the country among engineering students. Women are less represented in Engineering Disciplines in India. In mechanical engineering,femalestudent participation is very low. The findings of the previous research revealed that there are many reasons for the low participation of female students. They include family reasons, social perceptions, the instructor's gender, the subject's nature, and so on. The present study aims to identify the existing educational disparities in the engineering discipline, where women have historically been underrepresented. The main objective of this research paper is to identify the existing educational disparities for female students in the engineering discipline in India. This article finds that thereare differences in the representation of female students. This paper has analysed the prevailing trend in the representation of females in engineering courses. Some states are performing better atrepresenting female students in engineering, while others are not

The present study has focused on engineering education, which is aconsistently underperforming discipline forfemalestudentsacross almostall states. The present study has used PLFS data for 2020-21 and NSS data from the 71st round. The results of the present study show that most states lag in the performance of female students in engineering education. Kerala is the state that is comparatively performing better in engineering education. Bihar is among the worst-performing states in engineering education. Northeastern states are showing better performance in engineering education.

Keywords: *Educational disparity, Engineering education, regionaldisparity, PLFS*

1. INTRODUCTION

According to the World Bank Report, 43 per cent of Indian Women are participating in STEM disciplines (Ferguson et al., 2023). Although the participation of women in STEM has increased, it needs to be improved in the field of engineering in most states, as engineering is considered a masculine subject because of the patriarchal mindset. It affects their role and limits their capability. Women are participating less in engineering subjects and technical jobs.

Sustainable Goal 5 is about gender equality (The Global Goals, n.d.). The Constitution of India prohibits discrimination based on birthplace, gender, caste, and religion (Equality and Human

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RightsCommission, n.d.).So,gender equality in technical education, where women's representation is very low, is the need of the hour. Without proper representation of female students in engineering subjects, we cannot establish a just society where everyone has equal opportunity. The present structure of society is modern and highly technology-driven.

Azam and Blom(2008) found that students from higher social strata are more represented in engineering education than those from lower strata. Educational disparity based on economic condition is more prevalent in engineering education than in any other level of education. Gender disparity in engineering education is more prevalent in some of the disciplines,such as mechanical engineering. It is more in favour of male students in biotechnology. The main factors responsible for the low representation of female students in engineering education are students' income levels, the distance of the institution from home, and the gender-sensitive attitudes of college staff, teachers, and students.

There is no direct relationship between gender and technical education in India. Socialnorms essentially decide it. As in the present scenario, the ratio of female students in STEM subjects and participation in technical courses is increasing. But it needs further improvement. In mechanical and civil engineering, the involvement of female students is relativelylow (Gupta, 2015).

The performance of female students in math-intensive courses,such as engineering, is very low. The role of female students is predefined: caring and housekeeping. So, women in India outperform men in the medical field, but their representation in engineering courses is not that much (Singhal and Das, 2023).

2. THEORETICAL FRAMEWORK

Traditional epistemology addresses four types of entities. They are knowers; methods of knowing; subjects to learn about, and knowledge as output. These concepts can be categorised into two sections: stance and agency. Agencyrefers tothe knower who produces knowledge and an entity that decides which domain of knowledge should be inquired into. Stance concerns the relationshipbetween knowers and other entities of expertise. It establishes the relationshipsamong the knower, the knowing method, the subject matter to be studied, and the knowledge as output.

3. CONCEPTUAL BACKGROUND

Swami Vivekanand said, “Education is the manifestation of the perfection already in a man” (Vivekvani, 2020).We live in a knowledge economy. Rare skills like engineering and medicine affect society in two ways: first, they empower people and increase their ability to participate in the economy.

Human Capital theory focuses on an individual's skill set, which makes them valuable in the market place. Human capital is nothing but a person's ability to produce useful things in the market. They can contribute to society by getting training. Advancements in technology are what make a country go from developing to developed. A country cannot become a developed nation without reaping half of its population, which is female. The female workforce in technology can only increase if women have technical education. They can become highly skilled labour. In this way, women can be empowered; otherwise, they will be deprived of education. Education is a tool through which a person can build their identity, earn money, and achieve upward mobility, both in society and within the family. Only education can break the cycle of stagnation in women's decision-making. India is a multilingual and multicultural nation. Education can empower women in society and break social biases and gender prejudice.

4. OBJECTIVE AND RESEARCH QUESTION

This paper examines educational disparities in the engineering discipline between male and female students in India.The research question is whether educational inequality in the engineering discipline exists among male and female students in India.

5. RESEARCH METHODOLOGY AND DATA SOURCES

The Attendance Ratio of malesand females in the engineering discipline in Indiahas been used as the variable in the study. Secondary data fromPLFS-2020-21 and the 71st round of the National Sample Survey are used to examine educational disparities at the state level in India regarding students' participation in engineering courses.Analytical and descriptive research methods are used in the study. The percentage method, mean, median and difference have been used for the analysis.

6. OPERATIONAL DEFINITION OF THE VARIABLES

Educational disparity refers to differences in educational attainment, such as attendance and enrollment ratios.The attendance ratio in this paper is based on 100 students, comprising both male and female students. Here, disparity is measured using differences among male and female students.

The tertile distribution is usedto classify states by performance. The entiredataset is divided into high-, medium-, and low-performing states. The percentage analysis is used for this purpose. The differences in male and female participation are divided into three categories, with 33.33% in each,up to 33.33%: the lower-performing states, 33.34% to 66.67%: the medium-performing states, and 66.68% to 100%: the higher-performing states. This is a relative division of states based on their performance.The ratio method is applied to determine the male-to-female representation in terms of the Attendance Ratioacross different states of India.

7. DATA ANALYSIS AND RESULTS

The data is divided into three sections based on performance:high-performing, medium-performing, and low-performing states.Table 1 shows relatively high-performing states. High-performing states include most Union Territories, except Kerala, a southern state. Kerala is a highlyperforming state across most social indicators,including education for female students (Tripathi, 2019). As shown in this result, the performance of female students is better than that of any other state in India, except for two UTs; this is highly favourable to female students. The result shows that most North-Eastern states are performing significantly in favour of female students in technical courses, such as engineering. Lakshadweep and Mizoram are examples of this, which is highly favourable toward female students. The mean performance for male students in high-performing states is 35%, and for female students, 65%. If we exclude two outlier states, Mizoram and Lakshadweep, the mean of the high-performing states will differ between male and female students. It will be 58.46 per cent for male and 41.54 per cent for female students after excluding outliers. This is why the median value for male students is greater than that for female students.

Table 3 shows low-performing states where female participation ranges from 0% to 15.29%. Bihar, Chandigarh, Odisha, Jammu & Kashmir, and Jharkhand are low-performing states. In the North-Eastern states, Manipur and Sikkim are the lowest performing. The mean female participation rate is 8%, which is very low. Even Delhi and Gujarat are low-performing states in female engineering degree attainment. Seven states are performing below 10% in engineering courses, which is in the single digits.

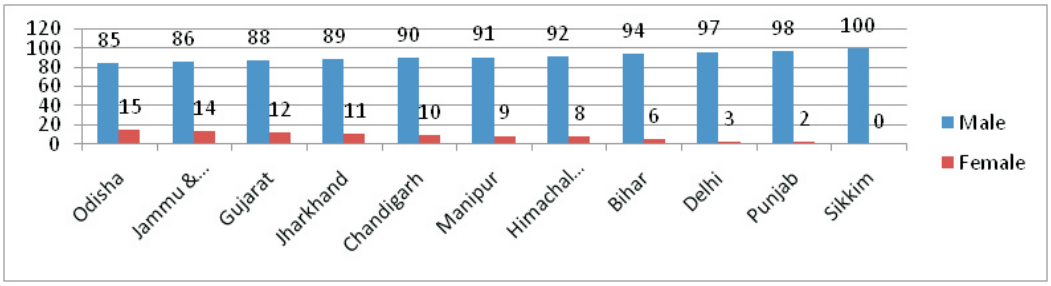
Table 1: Percentage of attendance ratio of engineering students in Low-Performing States

Serial Number/Rank	State	Male	Female	Difference
1	Odisha	84.71	15.29	69.42
2	Jammu & Kashmir	86	14	72
3	Gujarat	87.56	12.44	75.12
4	Jharkhand	89.17	10.83	78.34
5	Chandigarh	90.08	9.92	80.16
6	Manipur	90.99	9.01	81.98
7	Himachal Pradesh	92.2	7.8	84.4
8	Bihar	94.23	5.77	88.46
9	Delhi	96.96	3.04	93.92
10	Punjab	97.63	2.37	95.26
11	Sikkim	100	0	100
	Mean Value	91.72	8.22	
	Median Value	90.99	9.01	

Source: PLFS, 2020-21, author's calculation

The Attendance Ratio for female students in engineering is 0 per cent, and for males, it is 100 per cent in the state of Sikkim. Again, this is happening because there are no female engineering students in the PLFS sample. The mean value for females in this category is very low at 8.2 per cent.

Figure1: Showing relatively low-performing states for the attendance ratio in engineering students



Source: PLFS, 2020-21, author's calculation

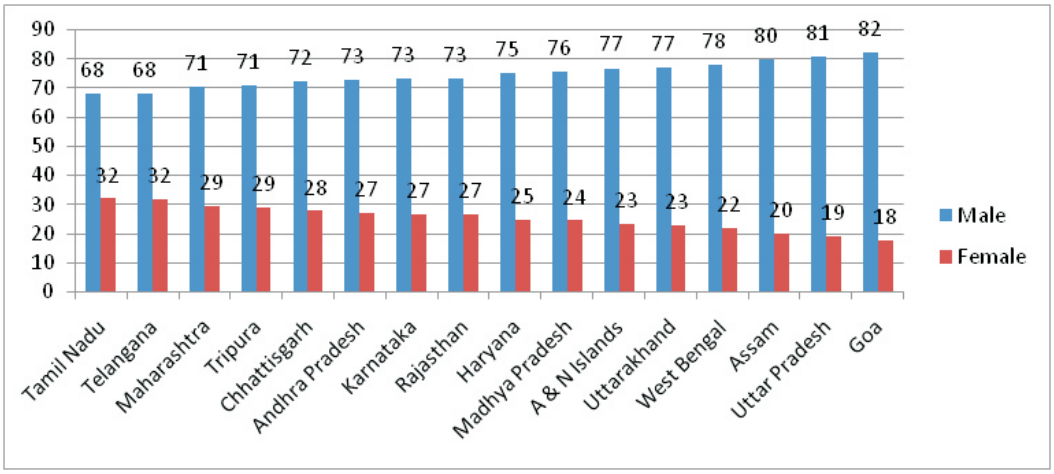
Table 2 shows medium-performing states. In this list, most southern states,such as Tamil Nadu, Telangana, Andhra Pradesh, and Karnataka, are medium-performing. Northern States are lagging behind southern states in female participation in education (Tripathi, 2019), especially in mathematics (Singhal and Das, 2023) and engineering education (Das and Singhal, 2022).

Table 2: The percentage of Attendance Ratio of engineering students in Medium Performing States

Serial Number/Rank	State	Male	Female	Difference
1	Tamil Nadu	67.99	32.01	35.98
2	Telangana	68.09	31.91	36.18
3	Maharashtra	70.52	29.48	41.04
4	Tripura	70.93	29.07	41.86
5	Chhattisgarh	72.25	27.75	44.5
6	Andhra Pradesh	72.78	27.22	45.56
7	Karnataka	73.28	26.72	46.56
8	Rajasthan	73.4	26.6	46.8
9	Haryana	75.33	24.67	50.66
10	Madhya Pradesh	75.56	24.44	51.12
11	A & N Islands	76.88	23.12	53.76
12	Uttarakhand	77.34	22.66	54.68
13	West Bengal	78.16	21.84	56.32
14	Assam	79.87	20.13	59.74
15	Uttar Pradesh	80.89	19.11	61.78
16	Goa	82.37	17.63	64.74
	Mean Value	74.73	25.27	
	Median Value	74.37	25.64	

Source: PLFS, 2020-21, author's calculation

Figure 2: Showing relatively Medium-performing states for the Attendance Ratio in engineering students



Source: PLFS, 2020-21, author's calculation

Despite these facts, the performance of female students in these states ranges from 13% to 32%. Therefore, medium-performing states are less effective in engineering education for female students. The mean representation of male students is 74.73%, and that of female students is 25.27%. It shows that the mean performance of the female students is half (25%) of what it should be (50%) in total participation.

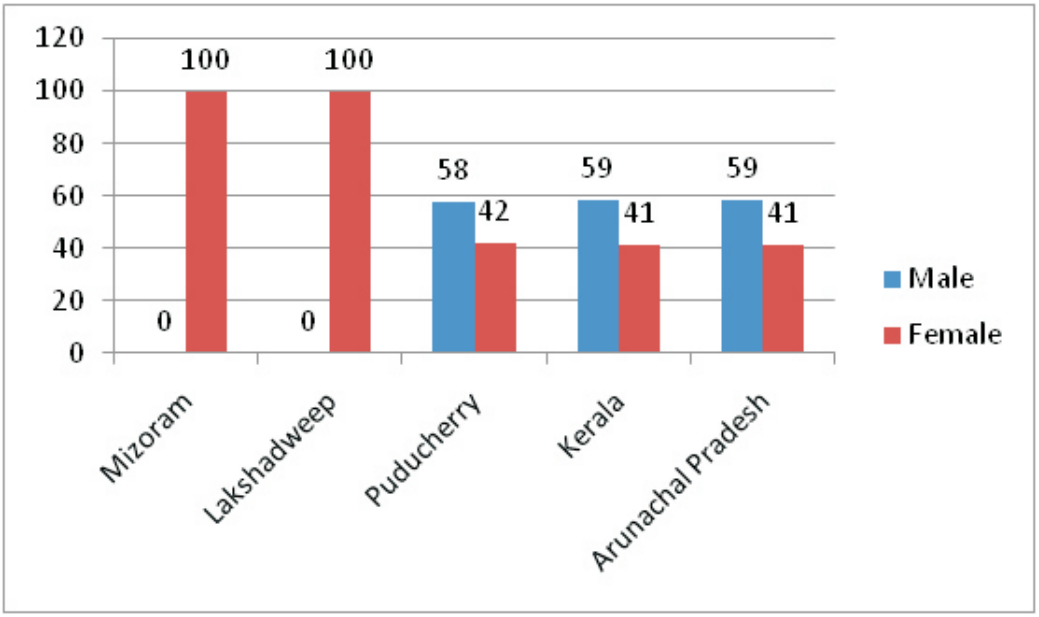
Table 3: The percentage of Attendance Ratio of engineering students in High-Performing States

Serial Number/ Rank	State	Male	Female	Difference
1	Mizoram	0	100	-100
2	Lakshadweep	0	100	-100
3	Puducherry	57.96	42.04	15.92
4	Kerala	58.69	41.31	17.38
5	Arunachal Pradesh	58.73	41.27	17.46
	Mean Value	35.08	64.92	
	Median Value	57.96	42.04	

Source: PLFS, 2020-21, author's calculation

The zero percentage Attendance Ratio in engineering courses for males and 100 per cent for females will certainly not be the case. This result is due to the absence of male engineering students in the PLFS sample.

Figure 3: Showing relatively High-performing states for the Attendance Ratio inengineering students



Source: PLFS, 2020-21, author's calculation

Table 4 shows educational disparity in engineering education, with relatively lower attendance ratios in states

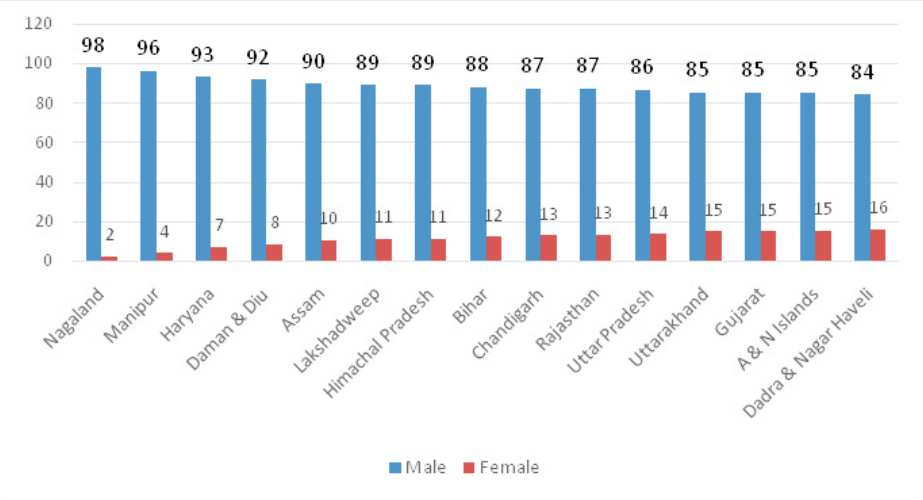
Serial No.	State/UT name	Male	Female	Difference
1.	Nagaland	98.02	1.98	96.04
2.	Manipur	96.02	3.98	92.04
3.	Haryana	93	7	86
4.	Daman & Diu	91.72	8.28	83.44
5.	Assam	89.7	10.3	79.4
6.	Lakshadweep	88.85	11.15	77.7
7.	Himachal Pradesh	88.84	11.16	77.68
8.	Bihar	87.83	12.17	75.66
9.	Chandigarh	87.16	12.84	74.32
10.	Rajasthan	87.05	12.95	74.1
11.	Uttar Pradesh	86.44	13.56	72.88
12.	Uttarakhand	85.25	14.75	70.5
13.	Gujarat	85.22	14.78	70.44
14.	A & N Islands	84.99	15.01	69.98
15.	Dadra & Nagar Haveli	84.13	15.87	68.26
	Mean Value	88.95	11.05	
	Median Value	87.83	12.17	

Source: National Sample Survey 71st round and the author's own calculation

Table 4 shows that Nagaland and Manipur are extremely educationally backward in terms of femalestudentattendance in engineering. Haryana hasthe worst gender ratio in India, as reflected in the attendance rate of female students. Bihar, an educationally backward state in the eastern region, also performed poorly in 2014. Other states performing less than 15 per cent are Daman and Diu, Assam, Lakshadweep, Himachal Pradesh, Chandigarh, Rajasthan, Uttarakhand, Uttar Pradesh, and Gujarat. Although Gujarat and Uttar Pradesh are among the top ten states byGDP (Indian states by GDP, n.d.), their female attendance is among the lowest. The mean value in relatively low-performing states is approximately 88 for male students and 12 per cent for female students.

Figure 5 depicts the attendance ratio of females in engineering. The red bar shows female students' attendance, and the blue bar shows male students' attendance.

Figure 4: Showing relatively low-performing states for the Attendance Ratio in engineering students



Source: National Sample Survey 71st round and the author's own calculation

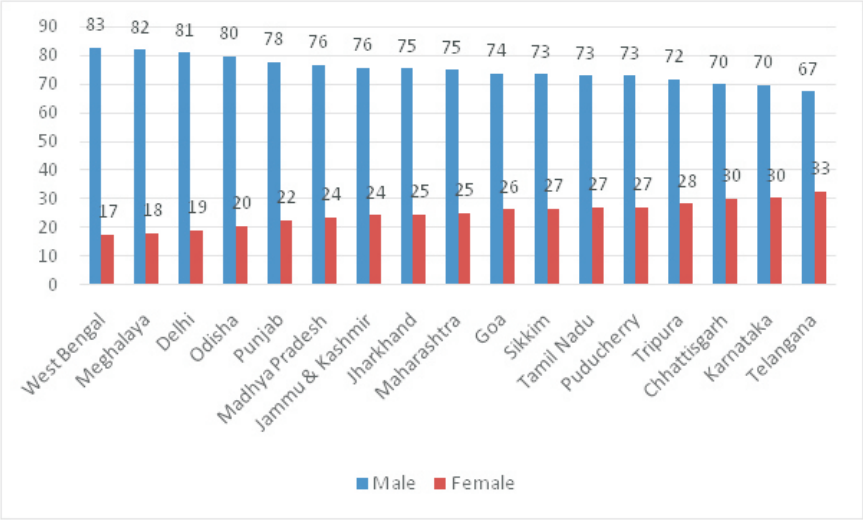
Table 5 : showing educational disparity in engineering education in relatively medium-performing attendance ratios of states

Serial No.	State/UT name	Male	Female	Difference
1.	West Bengal	82.63	17.37	65.26
2.	Meghalaya	81.91	18.09	63.82
3.	Delhi	80.96	19.04	61.92
4.	Odisha	79.55	20.45	59.1
5.	Punjab	77.65	22.35	55.3
6.	Madhya Pradesh	76.48	23.52	52.96
7.	Jammu & Kashmir	75.66	24.34	51.32
8.	Jharkhand	75.36	24.64	50.72
9.	Maharashtra	74.84	25.16	49.68
10.	Goa	73.67	26.33	47.34
11.	Sikkim	73.44	26.56	46.88
12.	Tamil Nadu	72.91	27.09	45.82
13.	Puducherry	72.78	27.22	45.56
14.	Tripura	71.64	28.36	43.28
15.	Chhattisgarh	69.89	30.11	39.78
16.	Karnataka	69.69	30.31	39.38
17.	Telangana	67.41	32.59	34.82
	Mean	75.09	24.91	
	Median	74.84	25.16	

Source: National Sample Survey 71st round and the author's own calculation

The above table indicates that the states with a female attendance ratio of more than 30 per cent are Chhattisgarh (central state) and Karnataka and Telangana (southern states).The states with attendance ratios between 20 per cent and 30 per cent are Odisha, Punjab, Madhya Pradesh, Jammu and Kashmir, Jharkhand, Maharashtra, Goa, Sikkim, Tamil Nadu, Puducherry, and Tripura. Western and southern states are comparatively better in the table above, while northern and eastern states are not performing well in engineering. The mean attendance ratio of relatively medium-performing states is75 per cent for males and 25 per cent for females.

Figure 5 : Showing relatively Medium-performing states for the Attendance Ratio in engineering



Source: National Sample Survey 71st round and the author's own calculation

Table 6 : showing educational disparity in engineering education in relatively high attendance ratios of states

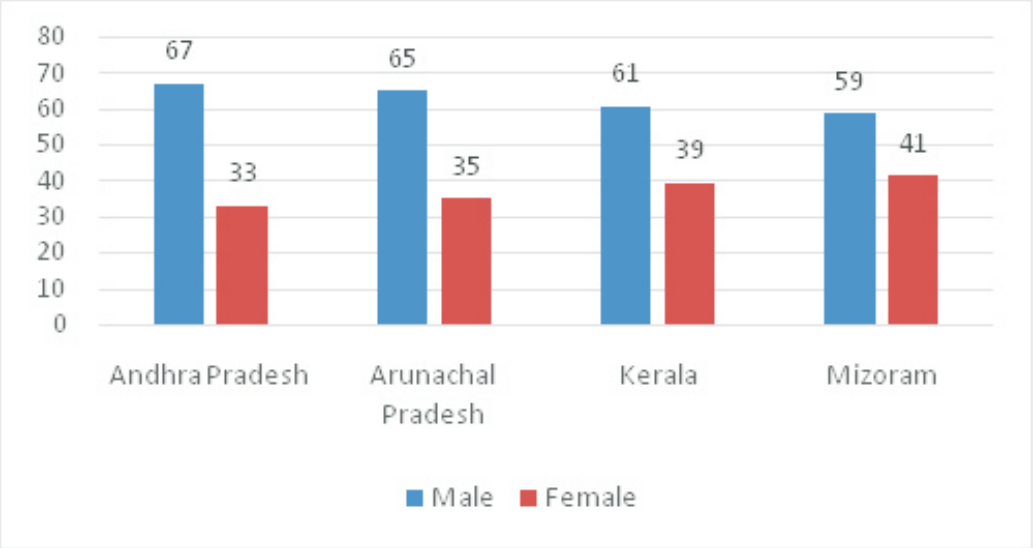
Serial No.	State/UT name	Male	Female	Difference
1.	Andhra Pradesh	66.96	33.04	33.92
2.	Arunachal Pradesh	65.02	34.98	30.04
3.	Kerala	60.59	39.41	21.18
4.	Mizoram	58.69	41.31	17.38
	Mean	62.82	37.19	
	Median	62.81	37.20	

Source: National Sample Survey 71st round and the author's own calculation

North-eastern states like Arunachal Pradesh and Mizoram, and southern states like Andhra Pradesh and Kerala, are performing better in engineering in terms of attendance ratio. The mean attendance

ratio for females in high-performing states is 63 per cent, and for male students, it is 37 per cent.

Figure 6: Showing relatively high-performing states for the Attendance Ratio in engineering



Source: National Sample Survey 71st round and the author's own calculation

8. DISCUSSION

From the above analysis, it is evident that female students' participation is not 50% in most engineering institutions. In 25 states, the involvement of female students is less than 30%, according to PLFS data. So, we can understand the severity of low Attendance for female students in engineering courses. Sikkim is the least-performing state. Most of the low-performing states are the worst performers, withverylow women's participation, even below 10 per cent. It shows the massive gender disparity inengineeringattendanceamongfemalestudents in India, as per PLFS data.

Accordingto NSS data, across 32 states, female attendance is below 30 per cent. The attendance of female students has increased from 2014 to 2020-21, but not significantly. Equitable education is a need forgrowth. Among the high-performing states, two are from the northeastern region and two from the southern region, where the attendance ratio is more than 33 per cent. The number of high-performing states is relatively low. It increased from 4 in 2014 to 5 in 2020-21. But it is, although very low.

Although the Bihar government has increased women's reservation in engineering, this was introduced very late, in 2021. It is 33 per cent for females in all medical and engineering institutes. This analysis has been done for 2014 and 2020-21(India Today, 2021). The situation for females in medical and engineering education in Bihar has changed due to policy interventions. But the same type of intervention is needed in other educationally backward states. Some social and family factors may be responsible for the low femaleattendance in engineering education.

The first woman in India to get a graduate degree in engineering was A. Lalitha. She earned her degree in electrical engineering from the University of Madras in 1943 (Mohan, 2017). The performance of women in technical education is still huge, but a disparity exists.

9. CONCLUSION AND POLICY IMPLICATIONS

Overall, we can see that performance is better in Kerala and the southern regions, as evidenced by both the Periodic Labour Force and the National Sample Survey datasets.Generally, the northern and eastern regions are not performing well in engineering education. Most states have female attendance ratios below 50 per cent, which is a matter of concern.

The government should focus on reducing regional disparities,especially in eastern and northern states. Some western states, like Gujarat, are also not performing well in engineering education, with performance between 12 and 14 per cent. The central government should adopta decentralised growth policy. It means providing policy interventions based on states' performance. The government should offer special incentives to increase female students' attendance in engineering education.

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THEATRE OF THE DIVINE: INTANGIBLE HERITAGE, CULTURAL IDENTITY, AND THE CREATIVE ECONOMY OF RAMNAGAR RAMLILA IN VARANASI

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ABSTRACT

Ramnagar Ramlila, the 31-day ritual performance of the Ramayana inscribed by UNESCO as Intangible Cultural Heritage in 2008, stands at a critical juncture. Over the past five years, Varanasi's tourism sector has expanded dramatically-international visitor arrivals increased 120-fold since 2021-intensifying pressures on living cultural traditions. This paper examines three interconnected tensions arising from simultaneous imperatives: to preserve sacred cultural identity, to enable creative economy livelihood opportunities, and to ensure equitable distribution of benefits across gender, caste and class boundaries.

Drawing on performance studies (Schechner's dramaturgical analysis), postcolonial heritage criticism (Kapur's sensory-embodied approach), ethnographic gender-caste analysis (Pandya's dialectical Lila-mela framework), and creative economy theory (UNCTAD frameworks), the paper argues that sustainable development of Ramlila is possible only when bearer communities maintain agency over how economic opportunities are structured and benefits are distributed. The analysis reveals that past scholarship has treated heritage preservation and economic development as opposites; instead, they are mutually dependent when rooted in community control and cultural integrity. The paper contributes to understanding how living folk traditions navigate contemporary pressures, and offers insights for heritage policy and inclusive creative economy development in India's sacred heritage cities.

Keywords: *Ramnagar Ramlila, intangible heritage, creative economy, Varanasi tourism, sacred performance, Lila-mela dialectic, community governance, gender-caste equity, cultural commodification, UNESCO safeguarding.*

INTRODUCTION

Every autumn, as the monsoon recedes and the Hindu calendar turns toward Dussehra, the town of Ramnagar near Varanasi transforms into a vast open-air theatre. For thirty-one consecutive nights, thousands of people gather to witness the Ramlila-a ritual performance of the Ramayana that has unfolded in this sacred landscape for over two hundred years (Schechner, 1977). The spectacle is remarkable: child actors representing the gods move through five designated zones (Ayodhya, Janakpuri, Lanka, Ashok Vatika, and Cheer Sagar) distributed across the town, reciting Sanskrit verses and enacting the epic narrative by kerosene lamplight, with no microphones, no electric

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amplification, no modern stage technology (Schechner, 1985). Over one million participants attend annually-pilgrims seeking spiritual merit (*punya*), families perpetuating generational ritual, cultural tourists drawn by international heritage recognition, and vendors, musicians, cooks and informal service providers whose livelihoods depend on the month-long season (Varanasi Guru, 2025; Kashitaxi.in, 2025).

In 2008, UNESCO inscribed "Ramlila, the traditional performance of the Ramayana" on the Representative List of the Intangible Cultural Heritage of Humanity, recognizing it as a "living tradition" rooted in bearer communities and worthy of international safeguarding support (UNESCO, 2008). This designation affirmed what generations of scholars, pilgrims and practitioners have long understood: that Ramnagar Ramlila is not merely entertainment, but a sacred practice deeply woven into Kashi's religious identity and into the cultural memory of North Indian Hindu communities (Kapur, 1990).

This convergence-between UNESCO's heritage safeguarding frameworks, the state's tourism and creative-city branding agenda, and the reality of exponential visitor growthcreates a new and complex context for understanding Ramlila. The tradition can no longer be studied as an isolated religious practice, or even purely through the lens of cultural performance and identity. Today, Ramnagar Ramlila functions simultaneously as sacred ritual, as a gathering space that reproduces Kashi's spiritual centrality, as a spectacle attracting cultural tourism, and as a seasonal creative-economy ecosystem generating employment and income across multiple sectors: performance labour, artisanal production (costumes, masks, decorative effigies), food vending, hospitality and informal services (Pandya, 2021; Singh & Rana, 2022).

The Analytical Gap: Why Integration Matters

literatures, conversely, tend to treat culture as an economic asset and focus on measurable employment and income generation, sometimes at the risk of instrumentalizing tradition or overlooking community agency and cultural integrity (UNCTAD, 2024). What is missing is an integrated analytical framework that treats Ramnagar Ramlila simultaneously as an expression of sacred cultural identity, as a vehicle for intergenerational knowledge transmission, and as a creative-economy site where benefits and burdens are unevenly distributed, and where the future sustainability of the tradition depends on how these dimensions are balanced.

Three Tensions, One Framework

This paper addresses this gap by examining three interconnected tensions that arise when heritage traditions encounter tourism-driven development in the context of rapid urbanization and policy reorientation toward creative industries.

Tension 1: Sacred Identity vs. Economic Commodification. Performance studies and heritage scholarship emphasize that Ramlila's power lies in its capacity to make present the sacred geography and spiritual efficacy of Kashi-to transform ritual action into spiritual transformation for participants (Schechner, 1985; Kapur, 1990). Yet, when tourism development frames the tradition primarily as a cultural "product" to be packaged, marketed and consumed by visitors, there is risk that the non-commodifiable dimensions of sacredness-the quiet devotion, the embodied pilgrimage, the family ritual-become eroded (Pandya, 2021). How can creative-economy development expand livelihood opportunities without hollowing out the spiritual and cultural meanings that make Ramlila valuable in the first place?

Tension 2: Ritual Structure vs. Playful Leisure. Pandya's (2021) critical reframing of the *Lila-mela*

relationship-showing that sacred ritual structure and egalitarian leisure are dialectically co-constitutive rather than hierarchically ordered-opens new understanding of how Ramlila generates social attachment and cultural continuity. Yet, contemporary tourism intensification threatens this dialectic: when *mela* spaces (food,play, informal entertainment) are standardized, professionalized and packaged as "tourist experience," they may lose their autonomous cultural logic and egalitarian character, becoming instead organized spectacle for external consumption (Travel and Tour World, 2025; Pandya, 2021).

Tension 3: Equitable vs. Concentrated Benefit Distribution. Pandya's (2021) ethnographic documentation reveals that access to, and benefit from, Ramlila is structured by gender, caste and class: regular devoted attendees are predominantly men from particular castes; women participate more in fair spaces but achieve lesser ritual status; participation requires time, health and wealth that exclude poorer and more marginalized community members. As tourism and creative-economy opportunities expand around the festival, there is risk that economic benefits accrue disproportionately to already-privileged groups (men, upper castes, wealthy entrepreneurs with capital to invest in hospitality or retail), while women, lower-caste artisans and poor vendors continue to occupy precarious, low-wage positions (Pandya, 2021; Singh & Rana, 2022).

This paper argues that these three tensions can be productively managed, but only when bearer communities-the performers, families, local participants who constitute Ramlila-retain meaningful agency over representation, governance and benefit-distribution (UNESCO, 2008; Pandya, 2021). Rather than treating heritage preservation and creative-economy development as opposites, the paper proposes that they are mutually reinforcing when grounded in community control and cultural integrity (UNESCO, 2008).

2. LITERATURE REVIEW

2.1 Schechner: Performance Studies Foundation

Schechner's seminal analysis established Ramlila as "restored behavior"cyclical actions accumulating meaning through repetition rather than mere ritual or theatre (Schechner, 1977, 1985). The tradition's spatial organization disperses performance across five sacred zones (Ayodhya, Janakpuri, Lanka, Ashok Vatika, Cheer Sagar), transforming Ramnagar into mytho-theatrical geography where audiences enact pilgrimage while witnessing narrative progression (Schechner, 1985). Rejection of amplification creates immersive sacred conditions, positioning Ramlila between efficacy (spiritual transformation) and entertainment on Schechner's spectrum, with child *svarups* believed to embody divinity through theatrical means (Schechner, 1985).?

2.2 Kapur: Postcolonial Sensory Critique

Kapur challenged Western frameworks by privileging practitioners' embodied experiences over structural analysis (Kapur, 1990). Multisensory immersion-incense, Sanskrit recitation, crowded sacred movement, *prashad* distribution-constitutes Ramlila's spiritual texture (Kapur, 1990). She reframed authenticity as continuity of sensory-spiritual experience rather than temporal preservation, establishing that performances manifest divine presence rather than merely represent it (Kapur, 1990).?

2.3 Pandya: Social Structure and Lila-Mela Dialectic

Pandya's ethnography revealed *Lila* (ritual) and *mela* (fair) as dialectically co-constitutive, with *mela* spaces generating *Banarasipan*egalitarian leisure sustaining cultural attachment (Pandya, 2021). Gender-caste hierarchies structure participation: male merchant castes dominate ritual attendance;

women engage *mela* activities but lack authority; hereditary families control principal roles (Pandya, 2021). The night before Bhor Arti exemplifies this dialectic as all-night feasting dissolves formal hierarchies (Pandya, 2021).?

2.4 Policy Frameworks:

UNESCO's 2008 inscription positioned bearer communities as primary stewards, emphasizing intergenerational transmission against modernization threats (UNESCO, 2008). UNCTAD frameworks document creative economy multiplier effects but highlight equity gaps: Varanasi tourism surged 120-fold (2021-2024), yet crafts employment remains low-income and female-dominated (UNCTAD, 2024).?

2.5 Analytical Synthesis:

Performance theory illuminates form; postcolonial critique centers lived meaning; ethnography reveals stratification; policy frameworks measure impact. This paper integrates these siloed perspectives into a cultural ecosystem model where the three tensions—sacred vs. commodification, ritual vs. leisure, concentrated vs. equitable benefits—diagnose development sustainability. Bearer community authority over representation, spatial organization, and resource allocation emerges as the structural precondition enabling heritage preservation and creative economy growth to mutually reinforce (Schechner, 1985; Kapur, 1990; Pandya, 2021; UNCTAD, 2024).?

3: VARANASI IN TRANSITION-CONTEXT AND THE THREE TENSIONS:

3.1 The Tourism Boom: Context for Contemporary Change

Understanding Ramlila's contemporary situation requires situating the tradition within Varanasi's dramatic transformation as a global heritage and spiritual tourism destination. Between 2021 and 2024, the city's tourism profile changed dramatically. International visitor arrivals increased 120-fold in just three years, reaching 309,932 in 2024 alone, while domestic visitation surpassed 11 crore (110 million) annually (Ministry of Tourism, Government of India, 2024; Travel and Tour World, 2025). This extraordinary growth follows two major catalysts. First, the 2021 completion of the Kashi Vishwanath Corridor-a ₹339-crore state infrastructure project-fundamentally reshaped access to the city's most sacred temple, replacing narrow medieval lanes with a broad pedestrian corridor, new shops, and visitor facilities (Ministry of Tourism, Government of India, 2024). Second, Varanasi's 2015 designation as a UNESCO Creative City of Music positioned the city within an international network of cities integrating culture into development strategy (UNESCO, 2015).

Simultaneously, state and national governments have elevated Varanasi's symbolic and policy importance. The city features prominently in the Viksit Bharat 2047 (Developed India 2047) vision, where heritage and spiritual tourism are positioned as drivers of inclusive, sustainable development (Government of India, 2024). State policy explicitly frames Varanasi as the "spiritual capital of India" and as a creative economy hub, attracting investment in hospitality infrastructure, cultural promotion, and heritage site development (Ministry of Tourism, Government of India, 2024). Within this context, Ramlila-a living tradition drawing one million participants annually-has become a significant asset in the city's cultural branding and tourism economy, yet also faces unprecedented pressures from visitor influx, commercialization and standardization.

3.2 Tension 1: Sacred Identity vs. Economic Commodification

The first major tension Ramlila confronts is between the imperative to preserve and honour its sacred, non-commodifiable spiritual significance and the pressures from tourism development to package,

market and commercialize the tradition as a cultural product for consumption. This tension is not entirely new; as Schechner (1993) documented, Ramlila has always been deployed for political and collective purposes. However, the scale and velocity of contemporary tourism growth introduce qualitatively different pressures.

The Sacred Dimension. For practitioners, participants and devotees, Ramlila's primary significance lies in its capacity to make present the sacred geography and spiritual efficacy of Kashi (Schechner, 1985; Kapur, 1990). Attending Ramlila confers punya (spiritual merit), and the performance's power rests on the belief that child svarups actually embody divinity, not merely represent it (Schechner, 1985). This is an ontological claim-a statement about the presence of the sacred-that cannot be reduced to entertainment or spectacle without losing something essential (Kapur, 1990). The sensory immersion, the embodied pilgrimage through sacred zones, the quiet devotion, the family ritual transmitted across generations-all these dimensions carry meaning that exceeds commercial value.

The Commodification Pressure. Yet, when state tourism authorities and private tourism companies frame Ramlila primarily as a cultural "product" to be packaged, marketed to international tourists and measured by visitor numbers, there emerges a risk that non-commodifiable dimensions become subordinated (Travel and Tour World, 2025). Ramlila is increasingly promoted through social media, travel blogs, and tourism websites as "India's most authentic festival," "a 200-year-old UNESCO heritage," or "an immersive spiritual experience"-framings that reduce sacred practice to marketable experience (UNESCO, 2008; Travel and Tour World, 2025). Infrastructure development (better roads, hotels, restaurants, shops) makes Ramlila more accessible to tourists, but may also transform the embodied pilgrimage into a more casual visit or photo opportunity (Travel and Tour World, 2025). When tourism authority representatives decide performance schedules, charge visitor fees, or negotiate with local communities about "crowd management," the locus of control shifts from community to external actors (UNESCO, 2008; Pandya, 2021).

The Dilemma. This tension is not resolvable by choosing one side. Communities need livelihoods; vendors, performers and service providers depend on seasonal income that tourism expansion can support. Yet, if economic development undermines the sacred meanings that attract visitors in the first place-if Ramlila becomes merely a "product" rather than a living spiritual practice-the tradition risks hollow authenticity that ultimately erodes the very distinctiveness that made it valuable to tourism markets (Kapur, 1990; UNESCO, 2008). The question is not whether to develop economically, but how to do so while preserving spiritual integrity and community agency.

3.3 Tension 2: Ritual Structure vs. Playful Leisure-The Lila-Mela Dialectic Under Pressure

Pandya's (2021) critical reframing of the Lila-mela relationship-showing that formal ritual and playful leisure are dialectically co-constitutive-provides essential insight into a second tension that contemporary tourism pressures intensify. For decades, following Schechner's framework, scholars treated mela as peripheral noise interrupting sacred performance. Pandya's ethnography revealed instead that the fair spaces-food, play, music, informal socializing-create their own egalitarian social world rooted in Banarasipan (Banarasi leisure culture) that is integral to how Ramlila generates social attachment and cultural continuity (Pandya, 2021).

The Sacred Structure. The formal Lila itself-the 31-day sequence of scenes, the child svarups in costume, the recitation of samvads, the kerosene-lamp lighting-provides narrative coherence, spiritual significance and structural discipline (Schechner, 1977, 1985). This element is what Schechner emphasized: the dramaturgical brilliance of transforming a town into sacred geography over one month.

The Autonomous Play. Equally essential is what Pandya documented: the sandhya breaks and mela spaces where formal hierarchy temporarily recedes, where people smoke chillums, share bhang, cook feasts, listen to folk music, joke and socialize without the rigid discipline required for ritual participation (Pandya, 2021). This playful, egalitarian space has its own cultural logic and creates what Pandya calls Banarasipan-a form of shared leisure and collective pleasure that feels qualitatively different from the formal ritual but is indispensable to the tradition's meaning for communities (Pandya, 2021).

The Pressure of Commercialization. Contemporary tourism intensification threatens this dialectic. When tourism authorities seek to "optimize" the visitor experience, they may standardize and formalize the mela spaces-designating food stalls, controlling music volume, organizing activities for tourist consumption (Travel and Tour World, 2025; Pandya, 2021). What was autonomous leisure becomes packaged spectacle. Professional guides point out "authentic" activities. Vendors cater explicitly to tourist preferences. Photography becomes encouraged and organized. In this process, the mela may retain the form of a fair but lose the lived autonomy and egalitarian social logic that made it meaningful to participants (Pandya, 2021).

The Risk. When the lila-mela dialectic breaks-when formal structure remains but playful leisure becomes commodified-the tradition risks losing what Pandya identified as essential to its contemporary vitality: the coexistence of sacred discipline and egalitarian pleasure, structure and spontaneity, formal authority and vernacular autonomy (Pandya, 2021). The result would be a "heritage" that looks authentic from outside but feels hollowed from within-a lived contradiction rather than a productive dialectic.

3.4 Tension 3: Unequal Benefit Distribution by Gender, Caste and Class

A third tension concerns equity and inclusion. Pandya's (2021) ethnographic documentation reveals that participation in and benefit from Ramlila are structured by gender, caste and class hierarchies. Regular Lilapremise (devoted daily attendees) are predominantly male, drawn from merchant and middle-peasant castes (particularly Yadavs); women attend but rarely achieve Nemi status (rigorous daily attendance); participation requires time, health and wealth that exclude poorer and more marginalized community members (Pandya, 2021). The ritual narrative itself encodes patriarchal values: Sita's obedience, Rama's supreme authority (Pandya, 2021).

Gender Dimensions. While women participate more freely in mela spaces (feasting, shopping, socializing), they occupy ambiguous positionspresent but lacking recognized authority in ritual decision-making or governance (Pandya, 2021). As creative economy opportunities expandfood vending, craft production, hospitality employmentthese roles are likely to remain gendered: women concentrated in low-wage, informal, service-oriented work (food preparation, cleaning, serving) while men dominate higher-status, higher-income positions (performance, craft mastery, business ownership) (Pandya, 2021; ASEF, 2023).

Caste and Class. Access to full ritual participation and to high-status roles is concentrated among hereditary performer families and certain castes. Lower-caste and poor community members participate as vendors, audience members or informal labourers but rarely as decision-makers or high-status performers (Pandya, 2021). As tourism expands economic opportunities, these patterns are likely to be reproduced: actors who already possess capital, education, networks and social status (often upper-caste, male, urban-educated) are better positioned to capture high-value opportunities in hospitality, tour guiding, craft-based enterprise; while lower-caste, poorer, less-educated community

members remain concentrated in precarious, informal, low-wage work (ASEF, 2023; Singh & Rana, 2022).

The Policy Failure. Much development discourse uses language of "community participation" and "inclusive development," yet without explicit attention to gender-caste-class dynamics, such language can mask persistent inequalities (ASEF, 2023). If creative economy development is pursued without deliberate mechanisms to ensure women, lower-caste groups and poorer community members benefit equitably-if development is simply "opened up" to market forces-existing hierarchies are likely to intensify rather than attenuate (ASEF, 2023; Singh & Rana, 2022).

3.5 How the Tensions Interact

These three tensions do not exist independently; they interact and reinforce one another. Tension 1 (sacred vs. commodification) intensifies Tension 2 (structure vs. leisure): as commercialization pressures grow, mela spaces become increasingly formalized and packaged, losing the autonomous leisure character that Pandya identified. Tension 2 intensifies Tension 3 (equity): when playful leisure becomes commodified spectacle, it loses its egalitarian social function and becomes instead a space where capital, connections and status determine who can afford, access and benefit from the "experience." Tension 3 intersects both: gender, caste and class hierarchies ensure that women, lower-caste and poor community members have less voice in decisions about how Ramlila's economic development unfolds, and thus are less able to shape development in ways that honour sacred meanings or preserve the dialectic between structure and leisure.

3.6 Why This Framework Matters

These three tensions are not problems to be "solved" by choosing one alternative over another. Rather, they are productive tensions that define the space in which sustainable, equitable development becomes possible. The challenge is to manage these tensions such that:

Sacred meanings are preserved and honoured within creative economy frameworks (not erased or subordinated to commercial logic);

The Lila-mela dialectic is maintained-structure and play, formal and informal, discipline and pleasure coexist rather than one subordinating the other;

Benefits and decision-making are distributed equitably across gender, caste and class lines (not concentrated among already-privileged groups).

This is possible only when bearer communities retain meaningful agency over how Ramlila is represented, how tourism is organized, and how livelihood benefits are shared (UNESCO, 2008; Pandya, 2021). The sections that follow develop this argument further and propose concrete principles for community-cantered creative economy development.

4. ANALYSIS AND POLICYIMPLICATIONS

4.1 What the three tensions mean:

The three tensions outlined earlier(1) sacred identity versus commodification, (2) ritual structure versus playful leisure, and (3) unequal benefit distributioncan be read as a single problem of governance: *who* gets to define the meaning of Ramlila, *who* controls access and representation, and *who* captures value. (UNESCO, 2008; Pandya, 2021). In the classical performance-studies account, Ramnagar Ramlila is powerful precisely because it turns the town into a moving sacred geography, where the audience becomes a pilgrim body and the “stage” becomes lived space (Schechner, 1977, 1985). When tourism treats this living geography as a consumable “experience,” the risk is not simply commercialization; it is a shift in authority from community practice to external markets, which can

change what counts as "good" or "authentic" performance (Kapur, 1990; UNESCO, 2008).?

Pandya's reframing of *Lila* and *mela* is crucial here because it shows that sustainability is not only about protecting the formal ritual script, but about protecting the dialectic between discipline and leisure that makes the tradition socially attractive and culturally renewable (Pandya, 2021). If the fair space becomes over-managed, standardized, or curated mainly for visitors, the tradition may appear intact to outsiders while losing the internal social logic that keeps people emotionally invested (Pandya, 2021). Finally, the creative-economy lens warns that value creation does not automatically produce inclusion: cultural economies often grow while benefits remain concentrated unless deliberate rules and supports change who can enter, own, and earn (UNCTAD, 2024).?

4.2 A community-centred creative-economy model:

A useful way to connect heritage and creative economy, in simple terms, is to treat Ramnagar Ramlila as a "cultural ecosystem" with three layers: (a) sacred meaning and community authority, (b) cultural production and labour, and (c) markets and visitor spending (UNESCO, 2008; UNCTAD, 2024). The first layer-sacred meaningincludes the belief in divine presence, the moral universe of the Ramayana, and the embodied practices of devotion that Kapur insists must remain central to interpretation (Kapur, 1990). The second layer-cultural production-includes performer labour, rehearsal, costumes, staging materials, music, and the organizing work done by families and local institutions that reproduce the tradition annually (Schechner, 1977, 1985). The third layer-markets-includes food vending, transport, accommodation, guiding, photography, souvenirs, and the informal fair economy that Pandya shows is intertwined with the ritual rather than merely adjacent to it (Pandya, 2021).?

In this model, "development" is not maximising tourist numbers; it is strengthening the ecosystem without breaking its inner logic. (UNESCO, 2008). That requires two guiding principles. First, heritage integrity is maintained when bearer communities keep authority over representation and rules of participation, rather than becoming service providers in someone else's tourism industry (UNESCO, 2008). Second, creative-economy benefits become socially legitimate only when they are distributed in ways that reduce-rather than reproduce-gender, caste, and class inequalities already documented in participation and status (Pandya, 2021).?

4.3 Policy implications and practical recommendations:

Recommendation 1: Create a "Ramlila community governance" mechanism. A practical safeguarding step is a formal, locally anchored governance body that includes hereditary performer families, vendor representatives, women participants, and local civic stakeholders, because UNESCO safeguarding emphasizes bearer communities as central actors (UNESCO, 2008). This body should set rules for visitor conduct, photography norms, commercialization limits in sacred moments, and dispute resolution, so that control does not quietly shift to external tour operators. (UNESCO, 2008).?

Recommendation 2: Protect the Lila-mela balance, not only the script.Policy often protects "the performance" narrowly, but Pandya's work shows sustainability also depends on protecting the fair-life and leisure rhythms that keep people attached to the tradition (Pandya, 2021). This means crowd management and vendor regulation should aim to keep the *mela* accessible to locals and not curate it into a paid, gated "festival zone" designed only for visitors (Pandya, 2021).?

Recommendation 3: Make inclusion measurable (gender–caste–class).Creative economy frameworks stress measurementjobs, enterprises, value chainsbut a heritage city needs measurement that also captures equity (UNCTAD, 2024). A minimal monitoring system can record who gets

vending licenses, who receives performance-related contracts, who benefits from training programs, and who participates in decision-makingdisaggregated by gender and social location, reflecting the inequalities Pandya documents (Pandya, 2021).?

Recommendation 4: Link Varanasi's cultural branding to local livelihoods.

Varanasi's cultural-city branding, including its City of Music recognition, strengthens global visibility and tourism narratives (Times of India, 2015). That visibility should be tied to concrete local upgradingskills training, microcredit access, safety standards, and market access for local vendors and artisansso that "branding" does not become symbolic while value is extracted elsewhere (UNCTAD, 2024).?

5. CONCLUSION

Ramnagar Ramlila confronts simultaneous heritage recognition and tourism pressures. UNESCO's 2008 inscription positioned the tradition within global safeguarding frameworks, yet Varanasi's international visitors surged 120-fold (2021-2024), intensifying commercialization (UNESCO, 2008; Ministry of Tourism, Government of India, 2024). This paper integrates performance studies (Schechner, 1977, 1985), postcolonial critique (Kapur, 1990), ethnographic analysis (Pandya, 2021), and creative economy frameworks (UNCTAD, 2024) to manage three diagnostic tensions: sacred identity vs. commodification, ritual structure vs. playful leisure, concentrated vs. equitable benefits.

Core Contribution: Heritage preservation and creative-economy development mutually reinforce through community-cantered governance rather than opposing each other (UNESCO, 2008). Schechner illuminated Ramlila's spatial dramaturgy transforming Ramnagar into sacred geography; Kapur canteredpractitioners' embodied spiritual claims; Pandya revealed *Lila-mela* dialectic and gender-caste hierarchies as central to social sustainability; UNCTAD frameworks documented economic multipliers while cautioning against equity failure absent deliberate mechanisms.

Integrated Analysis: Single-domain approaches fail. Heritage preservation ignoring livelihoods becomes exclusionary; market-driven development erodes sacred meanings constituting value. The tensions constitute diagnostic indicators: state visitor control signals commodification excess; standardized *mela* reveals social attachment erosion; concentrated benefits expose equity failure (Pandya, 2021; Kapur, 1990).

Four Policy Mechanisms:

1. Statutory Community Council with authority over representation and visitor protocols
2. Dual-zone mela policy preserving organic local leisure alongside tourist infrastructure.
3. Disaggregated equity monitoring (40% women/SC-ST vending licenses, 20% non-hereditary roles).
4. Livelihood integration linking Creative City branding to local skills training/microcredit.

Theoretical Innovation: The cultural ecosystem model synthesizes disconnected literatures into diagnostic framework treating sacred meaning, social organization, economic activity as interdependent domains requiring simultaneous strengthening. Community governance emerges as structural precondition enabling tension navigation (Schechner, 1985; UNCTAD, 2024).

Scalability: Identical dynamics confront Ayodhya's Ram Mandir tourism, Vrindavan's Krishna festivals, Puri's Jagannath Yatra. The framework transfers directly: bearer community councils, spatial zoning, equity audits constitute universal mechanisms for sacred heritage cities.

Global Significance: Ramnagar's 200-year evolutionfrom royal patronage through UNESCO recognition to tourism economydemonstrates living traditions' adaptive capacity. Contemporary

success requires structuralizing bearer community authority as development precondition, enabling sacred continuity, social vitality, economic opportunity coexistence.

Heritage and livelihood constitute complementary rather than zero-sum imperatives when bearer communities retain agency over representation, spatial organization, and resource allocation. Ramlila reveals sacred performance traditions can function as inclusive development engines when structured around community governance (Schechner, 1977; Kapur, 1990; Pandya, 2021; UNCTAD, 2024)

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CASTE-BASED LABOUR MARKET INEQUALITY IN INDIA: A MULTI-LAYERED THEORETICAL FRAMEWORK OF INSTITUTIONAL DISCRIMINATION, SEGMENTATION, AND SOCIO-ECONOMIC EXCLUSION

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ABSTRACT

Caste-based inequality persists in India's labour market despite constitutional protections and affirmative action. Existing theories treat discrimination, segmentation, and socio-economic exclusion as separate phenomena. This paper develops an integrated theoretical framework showing how these three mechanisms interact dynamically. Drawing on systematic synthesis of 322 studies, the framework identifies three interrelated layers: institutional discrimination in hiring and wage-setting; caste-based occupational segregation into low-return employment; and socio-psychological processes that mediate responses to structural constraint. The framework theorises these layers as mutually reinforcing through feedback loops: discrimination channels workers into secondary segments; segmentation restricts income and networks; constrained psychology perpetuates segmentation and discrimination. Six testable propositions link mechanisms to outcomes. The model explains why affirmative action achieves partial successit targets only institutional discrimination without disrupting segmentation or psychological domains. Intersectional analysis shows caste disadvantage amplifies when combined with gender, rural residence, and low education. The framework reconciles contradictory findings by demonstrating how policy changes in one layer are offset by reinforcement in others. This synthesis provides foundations for comprehensive, intersectional policy intervention to disrupt the self-reinforcing inequality regime.

Keywords: *caste discrimination, labour market segmentation, socio-economic exclusion, institutional mechanisms, socio-psychological processes, intersectionality, affirmative action, India*

1. INTRODUCTION

Caste-based inequality remains central to India's labour market structure. Systematic disparities exist in employment, earnings, and occupational outcomes between upper castes and marginalised groups-Scheduled Castes, Scheduled Tribes, Other Backward Classes-across formal and informal sectors. Despite constitutional protections and decades of affirmative action, wage gaps persist. Employment discrimination continues. Occupational segregation concentrates marginalised castes in low-income, precarious work (Madheswaran & Singhari, 2016; Thorat et al., 2023).The scholarly literature has expanded significantly. Quantitative studies document wage and employment discrimination using decomposition techniques (Thorat et al., 2023; Bera et al., 2024). Labour market segmentation

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analyses reveal occupational concentration and sticky-floor effects (Bairwa & Sofi, 2025; Pattayat, 2024). Poverty research links discrimination to income deficits and intergenerational transmission (Thorat et al., 2023; Singh & Mishra, 2019). Policy evaluations show reservations improve public sector employment but private sectors remain untouched (Behera & Kumar, 2024; Madheswaran & Singhari, 2016). Intersectional analyses demonstrate gender, geography, and education compound caste disadvantage (Ajax, 2024; Bairwa & Sofi, 2025). Behavioural research shows discrimination shapes aspirations and economic agency (Dasgupta et al., 2022, 2023).

Yet theoretical fragmentation persists. Discrimination literature emphasises individual bias. Segmentation theory highlights job market divisions. Poverty research focuses on income outcomes. Psychological research examines subjective states. Policy studies assess intervention effectiveness. These strands rarely engage theoretically. The result is piecemeal understanding that cannot answer critical questions: How do discrimination, segmentation, and psychology interact to sustain inequality? Why do single-mechanism policies fail? How do intersectional dimensions modify caste mechanisms? What explains wage convergence in some sectors but persistence in others?This paper addresses these gaps by developing an integrated theoretical framework. The framework articulates three interrelated layers: institutional discrimination in hiring, wage-setting, occupational gatekeeping, and reservation design; labour market segmentation where caste-based sorting into low-return sectors limits income and mobility; socio-psychological processes through which discrimination and segmentation shape aspirations, networks, and agency. These layers interact dynamically: discrimination channels workers into secondary segments → segmentation restricts income and networks → constrained psychology reduces mobility investment → this perpetuates discrimination and segmentation. The framework generates testable propositions. It explains policy ineffectiveness. It shows how intersectional dimensions amplify caste mechanisms.The theoretical contribution is threefold. First: integration-synthesising fragmented literatures into coherent explanatory model treating discrimination, segmentation, exclusion as interdependent. Second: mechanismarticulating how three layers interact through feedback loops to sustain inequality. Third: policy realismexplaining why single-mechanism interventions have limited success. The framework grounds in systematic synthesis of over 300 studies across quantitative, qualitative, and policy methodologies. It spans rural and urban, formal and informal sectors in contemporary India.

2. RESEARCH QUESTION AND THEORETICAL OBJECTIVES

2.1 Core Research Question

How do institutional discrimination, labour market segmentation, and socio-psychological mechanisms interact dynamically to generate, sustain, and reproduce caste-based labour market inequality in India?This question departs from single-mechanism framings. It rejects asking only "How much discrimination exists?" or "Which sectors trap lower castes?" or "How does poverty persist?" Insteadit foregrounds interaction: inequality results from mutual reinforcement of mechanisms over time. Understanding one mechanism requires understanding its relation to others.

2.2 Theoretical Objectives

Objective 1: Identify and synthesise empirical evidence on three mechanisms. Review evidence on (a) institutional discrimination in hiring, wage-setting, occupational access; (b) labour market segmentation-division into primary and secondary sectors with unequal returns; (c) socio-psychological processes-aspirations, networks, barriers, agency shaping labour market behaviour.

Objective 2: Theorise mechanism interaction. Articulate how mechanisms interact through feedback

loops: discrimination → segmentation → psychological constraint → reproductive cycle. This interaction constitutes core theoretical innovation.

Objective 3: Generate testable propositions. Framework produces explicit propositions empirically testable and evaluable against alternative accounts.

Objective 4: Explain policy effectiveness and limitations. Use framework to explain why affirmative action achieves partial successaddressing certain mechanisms while leaving others reinforced. Derive implications for comprehensive, intersectional policy design.

2.3 Theoretical Gap Addressed

Existing theories compartmentalise mechanisms. Labour economics emphasises discrimination but struggles explaining policy failure. Labour market segmentation explains occupational immobility but rarely engages psychological or institutional dimensions. Poverty research documents outcomes but offers limited mechanism explanation. Behavioural economics examines psychological constraints but abstracts them from institutional contexts. This paper integrates these perspectives. It treats labour market as system where institutional, structural, psychological layers are co-constitutive rather than independent.

3. METHODOLOGY: SYSTEMATIC LITERATURE SYNTHESIS

3.1 Literature Identification

Systematic synthesis of peer-reviewed empirical research on caste and labour markets in India. Literature search employed multiple strategies for comprehensive coverage. Broad keyword searches across databases (Scopus, JSTOR, Google Scholar) identified approximately 270 studies. Forward and backward citation tracking from key papers added 53 additional studies. Total pool: 323 studies. Relevance screening classified 322 as relevant; 72 as highly relevant.

3.2 Methodological Coverage

Quantitative decomposition studies (30+ papers) use Blinder-Oaxaca, quantile regression, Theil decomposition to isolate caste discrimination from productivity differences (Thorat et al., 2023; Bera et al., 2024).

Labour market segmentation analyses (40+ papers) document occupational concentration, sectoral patterns, mobility constraints across rural-urban and formal-informal divides (Bairwa & Sofi, 2025; Pattayat, 2024).

Poverty studies (15 papers) link employment discrimination to household income, poverty incidence, intergenerational mobility (Thorat et al., 2023; Singh & Mishra, 2019).

Policy evaluation (20 papers) assess effectiveness of reservations, anti-discrimination laws, labour regulations (Behera & Kumar, 2024; Madheswaran & Singhari, 2016).

Behavioural and psychological studies (10 papers) examine confidence, aspirations, networks, psychological responses (Dasgupta et al., 2022, 2023).

Intersectional analyses (10 papers) examine compounding effects of caste with gender, geography, education (Ajax, 2024; Bairwa & Sofi, 2025).

4. EMPIRICAL PATTERNS: EVIDENCE FOUNDATIONS

4.1 Layer 1: Institutional Discrimination

Institutional discrimination operates through formal and informal rules determining labour market access, job assignment, wage-setting based on caste identity.

Evidence: Over 30 quantitative studies document caste discrimination. Blinder-Oaxaca

decomposition shows caste accounts for 10-25 percent of wage gaps between upper castes and Scheduled Castes. Wage gaps persist after controlling for education, experience, sector, occupation (Thorat et al., 2023; Bera et al., 2024). Quantile regression reveals discrimination largest at earnings bottom (sticky floor effect). Experimental studies show upper-caste names receive 20-50 percent more callbacks than Scheduled Caste names (Thorat et al., 2023). Occupational segregation persists despite legal prohibition. Sanitation, tanning, sweeping remain concentrated among Dalits. Upper castes concentrate in administration, professions, business (Pandya, 2021; Gang et al., 2012). Affirmative action through public sector reservations expanded Scheduled Caste employment in government, railways, public enterprises. However reservations remain limited to public sector. Private sector discrimination faces minimal enforcement. Within public sector, reserved positions cluster in lower grades, limiting senior access (Deshpande & Ramachandran, 2016).

Mechanism: Institutional discrimination sets initial access boundary. It determines who gets considered, hired, baseline wage offers. It operates through subtle barriers: resume screening, network-based recruitment excluding outsiders, credential devaluation, occupational gatekeeping (Soundararajan et al., 2024).

4.2 Layer 2: Labour Market Segmentation

Labour market segmentation divides employment into primary sector (formal, protected, high-return) and secondary sector (informal, unprotected, low-return, precarious). Caste-based sorting confines lower castes to secondary segments from which mobility is structurally constrained.

Evidence: Over 40 studies document that Scheduled Castes and Tribes concentrate in agriculture, informal manufacturing, unprotected services. They are underrepresented in high-return services, IT, finance, professions (Bairwa & Sofi, 2025; Pattayat, 2024; Hnatkovska et al., 2010, 2021). Wage gaps largest at earnings bottom indicating sticky floors (Bera et al., 2024; Thorat et al., 2023). Occupational intergenerational correlation higher for lower castes (Majumder, 2010; Hnatkovska et al., 2021). Approximately 90% of lower-caste workers labour in informal employment-petty trade, casual labour, seasonal work-lacking contracts, security, benefits (Mamgain, 2020; Neog & Sahoo, 2016). Services sector shows wage convergence by caste. Agriculture, manufacturing show persistent gaps. Informal sectors show largest gaps (Hnatkovska et al., 2010, 2021).

Mechanism: Labour market segmentation restricts income and opportunity. It confines lower castes to low-return sectors with limited exposure to high-return employment forms. Even absent within-segment discrimination, segmentation itself generates inequality because primary and secondary segments offer unequal returns.

4.3 Layer 3: Socio-Psychological Processes

Discrimination and segmentation reshape subjective states, aspirations, networks, decision-making in ways that reproduce constraint intergenerationally.

Evidence: Behavioural studies show discrimination experiences reduce confidence, risk-taking, aspiration levels among lower castes (Dasgupta et al., 2022, 2023). Social identity theory predicts stigmatisation reduces performance. Experiments confirm this for caste-stigmatised groups (Dasgupta et al., 2020). Lower-caste workers have weaker, less diverse networks confined to co-ethnics and low-income occupations providing limited bridging capital (Cassan et al., 2021; Soundararajan et al., 2024). Job search through networks dominates India; exclusion from high-income networks structurally disadvantages access to quality jobs (Mamgain, 2020). Poverty and social exclusion persist across generations. Children of marginalised-caste parents have lower

educational attainment, face discrimination, concentrate in same occupations as parents (Majumder, 2010; Deshpande & Sharma, 2015). Dalit women face amplified discrimination, occupy lowest-wage positions, minimal labour force participation. Patriarchal norms restrict occupational choice (Jha & Kaur, 2025; Ajax, 2024). Rural labour markets thinner, more segmented, less regulated; rural Dalit workers face higher discrimination, lower mobility (Bera et al., 2024; Mamgain & Tiwari, 2016).

Mechanism: Socio-psychological processes mediate individual agency within structural constraint. They translate external barriers into internalised constraints-lower aspirations, reduced confidence, weak networks-shaping choices and investment in mobility strategies. Over generations, these processes generate intergenerational persistence.

4.4 Feedback Loops and Interconnections

Discrimination → Segmentation: Excluded from primary sectors, workers pushed into secondary segments.

Segmentation → Psychology: Low income and precarity reduce savings, social capital, perceived mobility possibility. Aspiration sets narrow. Education investment declines.

Psychology → Segmentation: Reduced aspirations, confidence, networks limit job search intensity. Occupational ambition falls. Segmentation reproduces.

Segmentation → Discrimination: Concentration in informal, low-status occupations reinforces stereotypes. Lower castes "suited" to stigmatised work. Discrimination legitimised and occupational gatekeeping justified.

These feedback loops generate self-reinforcing inequality regime where each layer sustains others. Single-layer interventions achieve partial success because they cannot disrupt segmentation or psychological constraint.

4.5 Intersectional Amplification

Caste mechanisms do not operate uniformly. Gender, geography, education systematically amplify mechanism intensity.

Gender: Women face compounded barriers from caste discrimination and patriarchal norms. Dalit women have lowest labour force participation and wages (Jha & Kaur, 2025; Ajax, 2024).

Geography: Rural labour markets thinner, more segmented, less regulated, more discrimination-prone. Returns to education lower in rural areas. Rural Dalit workers face higher discrimination and lower mobility (Bera et al., 2024; Mamgain & Tiwari, 2016).

Education: Paradoxically, higher education can amplify discrimination. Educated lower-caste workers encounter discrimination in high-return occupations and professional networks. Returns to education lower for lower castes than upper castes (Deshpande & Ramachandran, 2016; Hnatkovska et al., 2021).

Intersectional amplifications are not additive. They are multiplicative and qualitatively transformative. Rural Dalit women face distinct constraint regime where options fewer, networks more homogeneous, agency more restricted, outcome probabilities substantially worse.

5. MULTI-LAYERED THEORETICAL FRAMEWORK

5.1 Framework Conceptualisation

Caste-based labour market inequality generated and sustained through three interrelated mechanisms operating simultaneously and reinforcing one another over time. These are not separate causes competing for primacy. Rather, they are co-constitutive layers of unified inequality regime. Institutional discrimination creates segmentation. Segmentation shapes psychological states.

Constrained psychology reproduces discrimination and segmentation in future periods.

Layer 1: Institutional Discrimination

Definition: Systematic rule-based or norm-based differential treatment in labour market access, job assignment, wage-setting based on caste identity independent of productivity.

Operations: (a) Hiring discrimination-employer bias, network-based recruitment excluding outsiders, credential devaluation; (b) Wage-setting discrimination-wage penalties applied to lower-caste workers in same occupation; (c) Occupational gatekeeping-exclusion from high-status occupations through professional standards, credentialing; (d) Reservation designaffirmative action concentrated in public sector and lower grades.

Function: Sets initial access boundary determining who gets considered, hired, baseline wage offers. Primary gateway through which caste status becomes material labour market disadvantage.

Layer 2: Labour Market Segmentation

Definition: Division of labour market into primary sector (formal, protected, high-return, stable) and secondary sector (informal, unprotected, low-return, precarious). Caste-based sorting confines lower castes to secondary segments from which mobility structurally constrained.

Operations: (a) Sectoral sorting-exclusion from high-return sectors; concentration in low-return sectors; (b) Occupational concentration-confinement to low-grade, low-return occupations; (c) Employment form segregation-overwhelming concentration in informal employment lacking contracts, security, benefits; (d) Mobility constraints-sticky floors at earnings bottom; low intergenerational occupational mobility; blocked formal transitions.

Function: Restricts income and opportunity confining workers to low-return segments. Even absent within-segment discrimination, segmentation itself generates inequality because primary and secondary segments offer unequal returns by design.

Layer 3: Socio-Psychological Processes

Definition: Subjective states, aspirations, network structures, decision-making patterns shaped by discrimination experience and segmented labour market exposure. These mediate individual responses to structural constraint and reproduce inequality intergenerationally.

Operations: (a) Aspiration effects-discrimination experiences reduce educational and occupational aspirations; lower-caste students invest less in schooling perceived to offer low returns; (b) Confidence effects-stereotype threat and social identity effects reduce confidence, effort, performance; discrimination impairs cognitive function and risk-taking; (c) Network effects-exclusion from high-income networks; reliance on within-caste networks providing bridging capital only to low-return occupations; (d) Intergenerational transmission-lower investment in children's education; socialisation into constrained aspiration sets; occupational segregation reproduction through network inheritance.

Function: Mediates individual agency within structural constraint. Translates external barriers into internalised constraints-lower aspirations, reduced confidence, weak networks-shaping choices and mobility-enhancing investment. Over generations, generates intergenerational persistence.

5.2 Dynamic Interactions and Feedback Loops

Three layers mutually reinforcing through feedback mechanisms generating self-sustaining inequality regime:

Institutional Discrimination → channels workers into secondary segments → Labour Market Segmentation → restricts income, networks, exposure → Socio-Psychological Constraint → reduces

aspiration, confidence, mobility investment → Reproduces Segmentation → Reinforces Stereotypes & Discrimination →(closes loop back to Layer 1).

Discrimination pushes lower-caste workers from primary into secondary, informal, low-return employment. This employment truncates income, restricts network access, limits opportunity signal exposure. Over time, workers and families adapt: aspirations narrow (education seems pointless), confidence erodes (repeated rejection impairs self-efficacy), networks remain bound to low-return occupations. Adapted psychology reduces mobility-enhancing investment (education, risk-taking, network-building), reproducing segmentation next period. Simultaneously, concentration in stigmatised low-status occupations reinforces stereotypes that lower castes suited only to such work, legitimising discrimination and occupational gatekeeping. Result: cycle where discrimination generates segmentation, segmentation generates psychological constraint, psychology reproduces both segmentation and discrimination.

The inequality regime is not temporary disequilibrium but self-reinforcing equilibrium. Even if external discrimination eliminated, segmentation would persist because psychological constraint and network effects reproduce occupational segregation. Even if segmentation eliminated, discrimination might persist because stereotypes based on historical segregation remain institutionalised in norms and practices. Intergenerational persistence results from this equilibrium.

5.3 Intersectional Amplification

Caste mechanisms do not operate uniformly. Gender, geography, education systematically amplify intensity and consequence of each mechanism. Amplifications not additive but multiplicative and qualitatively transformative. Rural Dalit woman faces not three independent constraints but qualitatively distinct constraint regime where options fewer, networks more homogeneous, agency more restricted, outcome probabilities substantially worse.

5.4 Propositions: Testable Theoretical Claims

P1: Persistence of Caste-Based Discrimination

Institutional discrimination in hiring, wage-setting, occupational access persists and generates measurable gaps even after controlling for human capital differences. Labour market disparities result from differential treatment rather than productivity differences alone.

P2: Sticky Floors and Constrained Mobility

Caste-based labour market segmentation produces sticky-floor effects with wage gaps and occupational immobility concentrated at earnings bottom. Low-caste workers trapped in secondary segments experience both lower income within segments and blocked mobility into primary segments.

P3: Socio-Psychological Mediation

Socio-psychological mechanisms-aspirations, confidence, network access-partially mediate relationship between structural discrimination and observed labour market outcomes.

Discrimination and segmentation operate partly through effects on subjective states and decision-making.

P4: Intersectional Amplification

Caste-based disadvantage is amplified, not merely compounded, when combined with gender, rural residence, low education. Combined effect of multiple marginalised statuses exceeds sum of individual effects.

P5: Partial Policy Effectiveness

Affirmative action policies targeting institutional discrimination alone achieve partial success but cannot disrupt self-reinforcing inequality cycle without simultaneous intervention in segmentation and psychological domains. Policy-induced changes in one layer offset by reinforcement in others.

P6: Intergenerational Reproduction

Caste-based labour market inequality reproduces across generations through feedback mechanisms linking discrimination, segmentation, psychological constraint. Intergenerational persistence results from inheritance of constrained networks and aspirations combined with continued discrimination and segmentation.

6. POLICY IMPLICATIONS

Multi-layered framework generates clear implications: single-mechanism interventions insufficient. Comprehensive, intersectional strategies targeting all three layers simultaneously necessary to disrupt self-reinforcing inequality regime.

6.1 Targeting Layer 1: Institutional Discrimination

Strengthen anti-discrimination law enforcement in private and informal sectors where 90% of lower-caste workers labour. Require accessible complaint mechanisms, meaningful penalties, proactive monitoring, whistleblower protection.

Mandate diversity audits requiring employers report workforce composition by caste, salary, occupation. Deviation from population representation triggers investigation and remediation.

Extend reservations beyond public sector to private sector firms above certain size and contracting chains.

Redesign reservation mechanisms including grade-based targets ensuring representation at all levels with specified upward mobility timelines.

Combat occupational gatekeeping through professional association monitoring for discriminatory practices.

6.2 Targeting Layer 2: Labour Market Segmentation

Formalise informal employment expanding contractual protection and social security. Requires sectoral minimum wages, contract law enforcement, universal social insurance access.

Facilitate sectoral mobility through sector-specific skills training, placement support, wage subsidies during transition, mentoring in high-return sectors.

Strengthen labour protections in secondary segments through minimum wage enforcement, collective bargaining rights, workplace safety standards.

Support occupational diversification through microfinance, business training, procurement preferences for marginalised-caste-owned enterprises.

Develop rural labour markets through industrial policy, infrastructure, skill centres, employment guarantee schemes.

6.3 Targeting Layer 3: Socio-Psychological Constraint

Improve educational quality in lower-caste communities. Implement aspiration-raising programs showing occupational pathways and role models. Provide mentoring and career counselling countering stereotype threat.

Build networks across caste boundaries connecting lower-caste workers to upper-caste networks in high-return occupations. Design alumni associations and professional networks for caste diversity.

Support psychological empowerment through community education on caste discrimination, support groups, negotiation training, role models demonstrating mobility.

Counter internalised stigma through cultural pride programs celebrating lower-caste history and achievements, affirming identity.

6.4 Intersectional Policy Design

All interventions must address gender, geography, education dimensions. Gender-intersectional policies address occupational choice constraints, patriarchal gatekeeping, sexual harassment, work-life balance especially for Dalit women. Rural interventions address thinner labour markets, lower formal employment, stronger gatekeeping. Education-specific support addresses primary education quality, competitive exam coaching, professional education mentoring.

7. CONCLUSION

This paper develops integrated theoretical framework transcending fragmentation of existing literatures. Core contribution: articulation of three interrelated mechanisms—institutional discrimination, labour market segmentation, socio-psychological constraint—as mutually reinforcing layers of self-sustaining inequality regime. Single-mechanism interventions cannot disrupt inequality because three layers sustain one another. Framework generates six testable propositions empirically evaluable. It explains puzzling empirical patterns: why wage convergence occurs in some sectors but not others (segmentation); why affirmative action achieves partial success (addresses only one layer); why educational expansion does not eliminate inequality (intersectional amplification). It reconciles contradictory findings by showing policy changes in one dimension offset by reinforcement in others. Theoretically, framework advances understanding by: (1) integrating multiple literatures into coherent model; (2) emphasising dynamics and feedback rather than static causation; (3) centring intersectionality as fundamental to mechanism operation; (4) grounding theory in systematic empirical synthesis of 300+ peer-reviewed studies.

Future research must prioritise: longitudinal panel studies tracking individuals over 10+ years; experimental and quasi-experimental policy interventions; mechanism-specific quantitative research disaggregated by context; ethnographic and qualitative studies of constraint cycles; intersectional quantitative analysis identifying distinct constraint regimes; rigorous policy impact evaluation; secondary data innovation coding major labour surveys for caste.

Caste-based labour market inequality is self-sustaining system where institutional discrimination, labour market segmentation, and socio-psychological constraint are mutually reinforcing. Understanding inequality requires understanding how layers interact. Addressing inequality requires disrupting all three simultaneously. Only through integrated theoretical understanding and comprehensive policy action can India's deeply rooted caste-based labour market inequality be disrupted and equitable labour market inclusion achieved.

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BIHAR'S GRAIN-BASED ETHANOL SECTOR: ECONOMIC VIABILITY, ENVIRONMENTAL SUSTAINABILITY, AND SUSTAINABLE DEVELOPMENT PATHWAY

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ABSTRACT

Bihar has emerged as India's premier grain-based bioethanol production hub, leveraging substantial maize production surpluses to establish approximately 31.9 percent of national ethanol manufacturing capacity across 47 authorized distilleries. This comprehensive analysis evaluates the economic, environmental, and social sustainability dimensions of grain-derived ethanol manufacturing through integrated assessment of financial performance, carbon mitigation potential, and resource management implications across a representative 10 million-liter-daily-capacity facility. Financial modeling demonstrates base-case annual returns of 15-18 percent on invested equity, with net annual profits of ₹1.4-1.6 crore supported by government incentives (15 percent capital subsidy, 10 percentage-point interest subvention), coupled with resilience to commodity price stress (8-10 percent returns under pessimistic scenarios). Lifecycle assessment employing hybrid Process-based and Economic Input-Output LCA methodologies demonstrates net carbon reduction of -0.19 kg CO_2 -equivalent per liter, enabling 10 million tonnes annual CO_2 mitigation potential at projected E20 blending scale. The sector generates 22,000-37,000 employment positions across direct, indirect, and induced categories while enhancing farmer incomes by ₹35,000-70,000 per hectare annually through commodity price appreciation. However, sector expansion confronts five critical constraints requiring integrated policy management: (1) hydrological sustainability in groundwater-stressed districts (Khagaria, Purnia, Darbhanga), (2) food-feed-fuel balance ensuring maize production growth ≥3.5 percent annually, (3) farmer equity through Farmer-Producer Organization expansion from 5-8 percent to 25-30 percent coverage by 2030, (4) environmental compliance standardization targeting 80 percent+ compliance across all parameters, and (5) transparent benefit-sharing governance mechanisms. The proposed 10-year development pathway (2025-2035) envisions capacity expansion from 2,500 MLPD to 7,500+ MLPD, cumulative investment of ₹19,000-27,000 crore, and 25,000-35,000 additional employment positions, contingent upon disciplined constraint management. With careful calibration balancing economic viability, environmental stewardship, and social inclusivity, Bihar can establish itself as a model for convergent sustainable development where agricultural processing simultaneously advances energy independence, agricultural income enhancement, environmental protection, and regional development.

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Keywords: *Grain-based bioethanol, Maize-derived ethanol, Agricultural sustainability, Food-energy-water nexus, Water resource management, Lifecycle carbon assessment, Rural development, Sustainable biofuels, Energy security, India*

1. INTRODUCTION

1.1 Global Context and Strategic Imperative:

Global energy transition imperatives increasingly position renewable fuels as critical mechanisms for simultaneous climate change mitigation and energy security. India, as the world's third-largest energy consumer with transportation sector emissions representing approximately 23 percent of total national greenhouse gas releases, has undertaken ambitious ethanol blending programs designed to integrate agricultural production surpluses with energy system decarbonization objectives. Grain-derived bioethanol presents distinctive development advantages: utilization of agricultural byproducts otherwise subject to wastage, generation of distributed rural employment, reduction of petroleum import dependence (estimated annual foreign exchange commitment of $120-150 billion for crude oil imports), and quantifiable contribution to nationally determined contributions (NDCs) and net-zero emissions aspirations.The Government of India has established explicit biofuel expansion targets through the National Biofuel Policy 2018 and subsequent refinements, with E10 (10 percent ethanol blending) achieving national implementation by June 2022 and E20 (20 percent ethanol blending) projected rollout by 2025-26. These mandates necessitate 22-28 million tonnes maize-equivalent feedstock by 2035—representing substantial expansion from current 8-12 million tonnes utilization—while simultaneously maintaining food security, protecting water resources, and ensuring equitable benefit distribution across value chains.

1.2 Bihar's Strategic Positioning:

Bihar's emergence as India's leading grain-based ethanol production state reflects deliberate policy architecture combined with exceptionally favorable agricultural endowments and geographic positioning. The state's pioneering Ethanol Production Promotion Policy 2021—representing India's first comprehensive dedicated biofuel promotion framework—catalyzed rapid institutional development through systematic reduction of capital barriers (15 percent capital subsidy, 10 percentage-point interest subvention) and administrative streamlining (tax elimination, fee waivers).Bihar bioethanol sector characteristics include: (1) 47 authorized distilleries with grain-based operations comprising 32 units; (2) 15 currently operational facilities with aggregate capacity of 2,500 MLPD, generating approximately 400-450 crore liters annual production; (3) annual maize production of 46-48 million tonnes across 7.92 million hectares (primarily Rabi/winter season cultivation), representing 11-13 percent of India's aggregate maize output; (4) 32 pipeline projects proposing 3,500-4,500 MLPD additional capacity across high-maize-production districts; and (5) substantial marketable surplus of 13-15 million tonnes annually after accounting for domestic food and feed requirements.This rapid development simultaneously creates opportunities (energy security contribution, farmer income enhancement, rural employment generation) and challenges (hydrological sustainability, food system resilience, distributional equity) requiring careful evidence-based assessment.

1.3 Research Gap and Significance:

While substantial literature addresses US corn ethanol (typically generating +0.35 to +0.85 kg CO_2 /liter net emissions due to fossil-fuel intensive production) and Brazilian sugarcane ethanol (achieving superior environmental performance but limited employment multiplier effects), limited peer-reviewed research exists on integrated assessment of South Asian grain-based ethanol systems. Specifically, comprehensive analysis addressing simultaneous evaluation of economic viability, environmental sustainability across food-water-energy nexus, and rural development outcomes within India's specific agricultural context (smallholder dominance, groundwater stress, institutional heterogeneity) remains substantially underdeveloped.This research addresses that gap through comprehensive mixed-methods assessment providing evidence base for policy decisions regarding sector expansion trajectory and sustainability parameters.

2. RESEARCH OBJECTIVES AND QUESTIONS

2.1. Objectives

This research pursues three integrated objectives:

Objective 1: Establish Financial Viability

To comprehensively evaluate the economic sustainability of Bihar's grain-based bioethanol sector through financial modeling of representative facilities, scenario analysis under varying commodity conditions, sensitivity assessment of key financial drivers, and comparison with alternative agricultural processing investments.

Objective 2: Assess Environmental Sustainability

To rigorously evaluate environmental performance across carbon accounting, water footprint analysis, and resource management implications through lifecycle assessment methodology, district-level hydrological sustainability evaluation, and identification of mitigation pathways.

Objective 3: Evaluate Social-Institutional Sustainability

To examine distributional implications across food security, rural employment generation, farmer equity, environmental compliance, and transparent governance mechanisms through value-chain analysis, benefit distribution assessment, and institutional framework evaluation.

2.2 Research Questions

1.Economic Viability:

Do representative grain-based ethanol manufacturing facilities in Bihar achieve financial returns sufficient to attract institutional capital and justify continued sector expansion, and what commodity price conditions represent critical vulnerability thresholds for sector viability?

2.Environmental Performance:

Can grain-based bioethanol production achieve net carbon reduction when incorporating comprehensive lifecycle accounting and agricultural carbon sequestration, and what are the critical hydrological constraints limiting sustainable sector expansion?

3.Food Security:

Is E20 blending implementation (requiring 22-28 MMT maize feedstock by 2035) compatible with maintaining human nutritional security, livestock feed availability, and export commitments through integrated supply-side strategies?

4. Distributional Equity:

What mechanisms ensure equitable benefit distribution across value chains, particularly protecting farmer interests against commodity price volatility and monopsony market structures?

5. Policy Framework:

What policy interventions are necessary to address identified constraints while enabling sustainable sector expansion aligned with multiple development objectives (energy independence, agricultural income enhancement, environmental protection, rural development)?

3. RESEARCH METHODOLOGY

This research employs mixed-methods design integrating quantitative financial modeling, lifecycle assessment, and qualitative policy analysis. The approach triangulates multiple data sources across economic, environmental, and social dimensions to establish convergent validity.

3.1 Research Design and Data Sources:

Research Design: Mixed-methods approach combining:

- Quantitative: Financial modelling with scenario analysis, lifecycle assessment (hybrid PLCA + EIO-LCA), hydrological footprint assessment (CROPWAT 8.0), employment multiplier analysis, value-chain quantification
- Qualitative: Policy framework analysis, constraint identification through literature synthesis, governance mechanism evaluation

Data Sources (2020-2024 baseline; 2014-2020 historical context):

- Agricultural production: Department of Agriculture & Cooperation (state and district-level, FY 2023-24); Bihar Agricultural Department (cultivation area, yields); Market intelligence centers (Purnia, Katihar, Darbhanga, Kishanganj)
- Bioethanol sector: Ministry of Petroleum & Natural Gas National Biofuel Program database; Bihar Biofuel Association surveys; Facility-level data from 15 operational distilleries (Patel Agro Industries 5 LAKH KLPD; Est India Biofuel 65 KLPD)
- Financial data: Plant-level operational records (15 facilities); Government policies (Bihar Ethanol Production Promotion Policy 2021, 2023 amendments); Ministry of Finance project appraisal guidelines
- Environmental data: Central Groundwater Board pre-monsoon reports (2023-24); IWMI water footprint methodology; Peer-reviewed LCA literature

3.2 Financial Modelling Methodology:

Analytical Unit: Representative 10 MLPD facility (average operational/pipeline scale)

Key Assumptions:

- Operational days: 330-350 annually (maintenance downtime accounted)
- Feedstock conversion: 2.85-2.9 kg maize per liter ethanol (dry-milling)
- Prices: ₹65.60/liter ethanol (government MSP FY 2024-25); ₹2,300-2,400/quintal maize (current market)
- Financing: 65percent debt, 35percent equity; 10-year tenor at 10-11percent interest rate
- Discount rate: 12percent (Ministry of Finance standard for industrial projects)
- Depreciation: Straight-line over 25 years (plant/machinery)
- Inflation: 5percent feedstock costs (commodity-driven), 3percent other operating expenses, 0percent government price support

Model Calculations: Project IRR (unlevered), NPV at 12percent, equity IRR (accounting for government subsidy/interest subvention), DSCR, investment payback period

3.3 Lifecycle Assessment Methodology:

Approach: Hybrid LCA integrating Process-based LCA (direct emissions) and Economic Input-Output LCA (indirect supply-chain emissions) following Wang et al. (2023) and Mekonnen & Hoekstra (2010) best practices.

System Boundary (Cradle-to-Gate):

- Agricultural phase: Maize cultivation (soil prep → harvest) including N_2O fertilizer emissions, machinery fuel, irrigation energy
- Manufacturing phase: Fermentation, distillation, cooling, steam generation, byproduct processing
- Exclusions: Combustion-phase emissions (calculated separately as -30percent to -50percent reduction for E10/E20 vs. pure petroleum)

Carbon Sequestration: Above-ground biomass fixation during 120-140 day maize cycle = 9.2 Mg C/hectare (Feng et al. 2017 measurements, similar agro-climate)→ Translates to 5.27 kg CO_2 offset per liter ethanol

3.4 Water Footprint Assessment:

Methodology: Water Footprint Assessment Manual (Hoekstra 2002) + CROPWAT 8.0 agro-hydrological modelling.

Components:

- Green water: Rainfall during crop growth (400-600 mm annual for maize)
- Blue water: Groundwater/surface extraction for irrigation (150-300 mm supplemental in rain-fed zones)
- Grey water: Freshwater for pollution dilution (N-surplus + manufacturing process water)

District-level Variations: Mapped using Central Groundwater Board pre-monsoon aquifer levels and extraction cost trajectories (critical districts: Khagaria, Purnia, Darbhanga).

3.5 Food Security and Demand-Supply Analysis:

Methodology: NITI Aayog Working Group on Demand & Supply (2024) with three income-growth scenarios (4.1percent low, 5.1percent base, 6.1percent high per capita consumption)

Analysis: E20 requirement (22-28 MMT maize-equivalent by 2035) assessed against: (1) national production trajectory; (2) competing demand categories (food consumption, livestock feed, industrial uses, strategic reserves, exports); (3) feedstock diversification (damaged grains 5-8 MMT from FCI stocks; broken rice 3-5 MMT from milling byproducts)

4. AGRICULTURAL PRODUCTION BASE AND FEEDSTOCK AVAILABILITY

Bihar's maize production reached 46.13 MMT in FY 2023-24 (11-13percent of India's 410-420 MMT), nearly doubling from 23.4 MMT in FY 2020-21. Winter (Rabi) season dominates with 7.92 million hectares versus 2.95 million hectares Kharif (summer). High-productivity districts (Purnia, Katihar, Darbhanga, Kishanganj) achieve 6+ tonnes/hectare—exceeding the national average of 5.47 tonnes/hectare—reflecting favorable climate conditions (15-25°C), hybrid variety adoption (45-50percent), and precision farming deployment.

Marketable Surplus: Annual surplus of 13-15 MMT (after 8-10 MMT domestic consumption) currently supplies ethanol sector demand of 8-10 MMT, leaving 3-5 MMT headroom for expansion. Purnia wholesale hub handles 50-60 lakh tonnes annually with peak daily arrivals of 7,500-10,000 tonnes (April-July).

Price Dynamics: Maize prices appreciated 40-50percent from ₹1,600-1,700/quintal (FY 2020-21) to ₹2,300-2,400/quintal (FY 2024-25), generating farmer income improvements from ₹80,000-170,000 per hectare to ₹115,000-240,000 per hectare—a ₹35,000-70,000 annual enhancement per household—driving substantial farmer participation in maize cultivation and substitution from lower-value crops.

5. BIOETHANOL SECTOR DEVELOPMENT AND OPERATIONAL STATUS:

Policy Framework: Bihar's Ethanol Production Promotion Policy 2021 (India's first dedicated biofuel framework) reduces entry barriers through: 15percent capital subsidy (₹5 Cr max), 10 percentage-point interest subvention (reducing effective borrowing cost to 0-1percent), and complete tax elimination. The 2023/2025 expansion includes compressed biogas (CBG) and bio-CNG production.Manufacturing Capacity: 15 operational plants across 9 districts (9 producing, 6 constructing) and 47 authorized facilities (32 grain-based) represent 31.9percent of India's 7,800 MLPD nationalcapacity. Patel Agro Industries operates 5 LAKH KLPD with 500+ workers; Est India Biofuel (Purnia) operates 65 KLPD.

National Scale: India's FY 2023-24 ethanol production reached 672.49 crore liters (grain-based 59.8percent, maize 42.6percent). Current E10 blending averages 19.5percent (June 2025); E20 targets for 2025 -26 require 1,050 crore Liters (687 crore grain-based). Bihar supplies 25-30percent of national grain ethanol.

6. FINANCIAL VIABILITY AND ECONOMIC ANALYSIS:

Project Economics (10 MLPD facility):

- Capex: ₹14.2 crore (Plant/machinery 59.9percent, Thermal 9.2percent, Infrastructure 17.6percent, Contingencies 13.4percent)
- Government subsidy: ₹2.13 crore; Financing: 65percent debt (₹8-9 Cr), 35percent equity (₹3.5-4 Cr)
- Operational days: 330-350 annually; Feedstock conversion: 2.85-2.9 kg maize/L ethanol
- Annual cost: ₹3.3-3.7 crore (Feedstock ₹1.92-2.16 Cr, Energy ₹0.5-0.8 Cr, Personnel ₹0.23-0.30 Cr, Other ₹0.65-0.92 Cr)
- Annual revenue: ₹2.69-2.89 crore (Ethanol ₹2.29 Cr @ ₹65.60/L; DDGS ₹0.40-0.60 Cr)
- Net profit: ₹1.4-1.6 crore →15-18percent ROE, 6-8 year payback, 14-17percent IRR

Scenario Analysis:

- Base Case: ₹2,400/quintal maize, $65/barrel crude →15-18percent ROE, 1.65x DSCR
- Pessimistic: ₹2,700/quintal maize (+12.5percent), $50/barrel crude → 8-10percent ROE, 1.2x DSCR
- Optimistic: ₹2,100/quintal maize (-12.5percent), $80/barrel crude → 20-22percent ROE, 2.1x DSCR

Risk Factors: Feedstock costs (60-70percent of opex) create sensitivity: 10percent price rise → 16percent profit decline, 20percent rise → 32percent decline. Government price floor (₹65.60/L) protects downside below $35/barrel crude. Mitigation: forward contracts (40-50percent volatility reduction), government minimum guarantee, energy efficiency upgrades.

7. EMPLOYMENT AND RURAL ECONOMIC STIMULATION

Employment Generation:

- Direct: 150-250 per 10 MLPD facility; Total across 15 facilities: 2,000-3,000

- Multiplier effects (2.5-3.0x): 5,000-9,000 indirect positions
- Induced: 4,000-6,000 positions
- Agricultural value chain: 15,000-25,000 (cultivation, harvesting, input supply)
- Total: 22,000-37,000 positions

Value-Chain Distribution (₹3,000-8,000 Cr annual, median ₹5,500 Cr):

- Farmer income: ₹2,100-5,600 Cr (70-75percent) — ₹35,000-70,000/hectare premium to 110,000-120,000 households.
- Manufacturing wages: ₹60-180 Cr (2-3percent).
- Supply chain: ₹400-800 Cr (10-15percent).
- Operator profit: ₹200-400 Cr (3-8percent).
- Government revenue: ₹240-500 Cr (3-5percent).

Significance: 70-75percent farmer benefit concentration substantially exceeds typical 30-40percent farm-level capture in conventional commodities.

8. ENVIRONMENTAL PERFORMANCE AND CARBON ASSESSMENT:

Lifecycle Carbon Accounting: Hybrid LCA (PLCA + EIO-LCA) demonstrates -0.19 kg CO_2 eq/liter net reduction:

- Agricultural sequestration: 9.2 Mg C/ha →5.27 kg CO_2 offset per Liter.
- Manufacturing efficiency: Modern fermentation + advanced distillation.
- Biomass cogeneration: 0.12-0.18 kg CO_2 eq/L offset.
- Blending reduction: E10 achieves 30percent reduction vs. pure petrol; E20 achieves 50 percent.
- Current E10: 2.5 million tonnes annual CO_2 reduction; Projected E20: 10 million tonnes (0.4 percent of India's emissions).

Hydrological Footprint: 1,700-1,900 liters per liter ethanol (20-30percent advantage over rice, vs. sorghum's ~9,800 L/L). Manufacturing (dry-milling): 3.45 L/L; with recycling: 2.4-2.8 L/L (47percent of facilities). Agricultural: 400-600 mm annual (150-300 mm irrigation supplemental).Water Stress Concerns: Critical districts (Khagaria, Purnia, Darbhanga, Bhagalpur) exhibit groundwater depletion (depths: 50-80m vs. historic 10-20m). National research projects 20percent cropping intensity decline by 2050 under continued extraction. Mitigation: Solar irrigation (500+ MW), precision agriculture (20-30percent water reduction), aquifer recharge (5-8percent annual increase).

9. FOOD SECURITY AND FEEDSTOCK SUSTAINABILITY:

Grain Balance: India's consumption (200-210 MMT human + 60-70 MMT livestock + 15-20 MMT industrial + 8-12 MMT biofuel + 20-30 MMT export + 20-30 MMT strategic reserves) vs. production 43.41 MMT leaves 13-15 MMT surplus. Current ethanol demand (8-10 MMT) consumes 50-70 percent of surplus; E20 requirement (22-28 MMT by 2035) needs 14-18 MMT additional supply.

Supply Feasibility (Three Strategies):

1. Yield improvement (3-4 percent annually): Hybrid adoption +2-3 MMT, precision agriculture +1-2 MMT, climate-resilient varieties +0.5-1 MMT →8-12 MMT cumulative.
2. Area expansion (0.5-1.0M hectares): Marginal/fallow +2-3 MMT, upland rice substitution +1-2 MMT, rotation intensification +0.5-1 MMT →4-8 MMT cumulative.
3. Feedstock diversification: Damaged grains (FCI) 5-8 MMT, broken rice (milling

byproducts) 3-5 MMT →8-13 MMT displaced supply.

Conclusion: E20 feasible WITHOUT food security compromise with ≥2.5-3 percent yield growth, area expansion, and feedstock diversification.

10. SUSTAINABILITY INTEGRATION AND POLICY FRAMEWORK:

Green Economy Alignment: Bihar's 44 percent renewable electricity target by 2030 aligns with bioethanol through: solar co-location (500+ MW reducing carbon intensity by 0.12-0.18 kg CO_2 eq/L), green hydrogen production potential, and National Green Hydrogen Mission integration (5M MT by 2030).

Governance: Environmental compliance via Pollution Control Board oversight and environmental audits (currently 47 percent transparency). Social safeguards include fair feedstock compensation, formal grievance resolution (45-60 days), community consultation, and transparent benefit-sharing. Market governance through government minimum pricing and FPO development (5-8 percent current →25-30 percent target).

11. CRITICAL CHALLENGES AND DEVELOPMENT PATHWAYS:

Five Constraint Management Framework:

Constraint	Problem	Solution	Investment	Outcome
Hydrological	Groundwater depletion	Solar irrigation (500+ MW) + precision farming + aquifer recharge	? 50-100 Cr	Sustainable water use
Food Security	E20 needs 22-28 MMT	Feedstock diversification (damaged grains + broken rice) + ? 3.5 percent growth	Policy focus	No compromise
Farmer Equity	92-95 percent unorganized	FPO expansion 5-8 percent ? 25-30percent + ? 500-1,000/member credit	? 200-300 Cr	Price transmission 65percent ? 75-80percent
Environmental	40 percent compliance gap (? 50-80 Cr)	Mandatory audits + 10percent subsidy + compliance bonds	? 100-150 Cr	80 percent+ compliance by 2030
Governance	47 percentaudit transparency	Mandatory disclosure + independent commissions (45-day resolution)	Policy	100 percent public disclosure

10-Year Pathway (2025-2035):

- Capacity: 2,500 →7,500+ MLPD

- Maize production: 46 →60-65 MMT
- Infrastructure: 93 →150-200 units
- Investment: ₹19,000-27,000 crore
- Employment: +25,000-35,000 positions
- Solar integration: 500+ MW

12. CONCLUSION

Bihar possesses foundation for sustainable bioethanol leadership contingent on constraint management. The sector demonstrates:

- Economic viability: 15-18 percent base-case ROE, resilience at 8-10 percent under stress.
- Climate benefits: -0.19 kg CO_2 /L enabling 10 million tonnes annual reduction at E20 scale.
- Rural development: ₹3,000-8,000 Cr impact, 22,000-37,000 jobs, 70-75 percent farmer benefit.

Critical success factors: (1) Hydrological sustainability (₹50-100 Cr renewable irrigation), (2) Food security (feedstock diversification + ≥3.5 percent growth), (3) Farmer equity (FPO 25-30percentby 2030), (4) Environmental compliance (80percent+), (5) Transparent governance (100percent disclosure).With disciplined, environmentally conscious, socially inclusive development, Bihar can establish itself as a model demonstrating convergent sustainable development whereagricultural processing simultaneously advances energy independence, agricultural income, environmental stewardship, and regional development.

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THE IMPACT OF AUTOMATION AND AI ON THE FUTURE LABOUR MARKET

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ABSTRACT

Automation and artificial intelligence (AI) are developing at a rapid pace, which has sparked fresh discussions about the nature of work in the future, job patterns, and skill requirements in various countries. The potential effects of automation and artificial intelligence (AI) on India's labour market are examined in this study.The purpose of this study is to investigate how automation and artificial intelligence may affect employment trends, the labour market, and the general socioeconomic environment. In order to comprehend the current state and future direction of automation and artificial intelligence in industrialized economies, the study conducts a literature survey and analysis of current research, policy documents, and expert perspectives. It incorporates institutional, demographic, and sectoral characteristics unique to India with well-known labour-economic theories (Skill-Biased and Routine-Biased Technological Change, Schumpeterian creative destruction, and Human Capital theory). Mechanisms for job displacement and creation, skill transformation, sectoral restructuring (particularly IT/BPO, manufacturing, and services), and distributional consequences are all mapped out in this study. In order to facilitate an inclusive transition, it also describes governmental measures, including social protection, education and skill development, and AI governance. Recent national reports and international analysis bolster important assertions regarding India's capacity for job creation, sectoral hazards, and macroeconomic opportunities.

Keywords: *Artificial intelligence ,Automation , labour market .*

1. INTRODUCTION

Automation and AI technologies are altering manufacturing systems, service industries, and organizational structures at unprecedented speed. From machine learning-driven decision-making to robotics in manufacturing and autonomous systems in logistics, labour demand is undergoing fundamental transformations. Although technological advancements have historically boosted productivity and produced new jobs, there are still worries that AI-driven automation may replace both routine physical and routine cognitive tasks, thus increasing inequality and changing the skills needed in the workforce .

India, which is well-known for its expanding population and technological environment, must deal with the integration of artificial intelligence (AI) and how it will affect the development of jobs. Concerns regarding employment emerge as firms use AI technology like robotics and machine learning to increase productivity. There are concerns about job displacement as AI automates processes that have historically been performed by people, even though technology has the potential

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to create new professions and transform current ones. According to an IMF analysis, AI is used in about 40% of jobs worldwide. About 60% of occupations in developed economies may be impacted, with half benefiting from AI integration and the other half suffering decreased labour demand, which might result in job losses and lower salaries.

2. PROBLEM OF THE STUDY

Despite the fact that many studies analyse technological development, the literature now in publication lacks a thorough theoretical consolidation that explains:

- How AI differs from previous waves of automation.
- automation, skills, pay, and work dynamics interact.
- The long-term structural effects on the labour market in the future;
- The manner in which AI could lead to employment creation, transformation, or elimination.

This theoretical gap makes it more difficult for industries, educators, and governments to foresee and handle labour-disruptive technological shifts.

3. CONCEPTUAL BACKGROUND

Key concepts underlying this study include:

Automation

Automation is the use of technology to carry out tasks without the need for human interaction.

Artificial Intelligence (AI)

The technology known as artificial intelligence (AI) makes it possible for computers and machines to carry out tasks that normally demand for human intelligence. In order to handle complicated problems, it aids systems in learning from data, identifying patterns, and making judgments.

Labour Market

The supply and demand for labour are referred to as the labour market. It is built on workers supplying the supply and employers providing the demand; it is also referred to as the employment market.

Task-Based Approach

Jobs are understood as bundles of tasks, allowing analysis of which tasks are automatable.

Skill Dynamics

The development of human skills necessary to either supplement or rival automation .

4.THEORETICAL FOUNDATIONS (APPLIED TO INDIA)

4.1 Skill-Biased & Routine-Biased Technological Change (SBTC / RBTC)

As technology enhances difficult cognitive activities, SBTC anticipates increasing returns for high-skill labour. RBTC clarifies this by demonstrating that routine (manual and cognitive) tasks are the most automatable, leading to polarization: a decline in middle-skill roles and an increase in high-skill and some low-skill service occupations. Large portions of formal middle-skill jobs in India, such as manufacturing workers, secretaries, and mid-level IT testers, as well as routine, informal work, are susceptible to RBTC dynamics.

4.2 Creative Destruction and Structural Change

According to Schumpeterian processes, automation can eliminate certain employment while generating new ones in fields like AI engineering, data annotation, platform monitoring, and AI-complementary services. If markets and policy coincide, this suggests that data services and AI-enabled exports could soar for India. However, market demand, company investment, and education all influence creation.

4.3 Human Capital and Transition Dynamics

Human capital theory emphasizes that individual outcomes are determined by adaptability (reskilling, lifelong learning). Given India's diverse educational system and sizable informal sector, obstacles to quick upskilling could cause friction and result in structural unemployment for displaced workers unless proactive policies are implemented.

5. LITERATURE REVIEW

Existing scholarly works indicate:

M. Faishal et al. (2023) indicate that numerous economic sectors have already been affected by AI and automation, with repetitive and routine labour being especially vulnerable to automation. The study emphasizes the possibility of new job categories that call for a blend of technical expertise, creativity, and social intelligence.

K. Rautakorpi (2021) defines even if automation may increase in the future, jobs won't likely disappear as a result. Interpersonal abilities, like teamwork, will be the most important in the future.

Van der Zande et al. (2018) defines Automation is the process of introducing technology that carry out jobs that were previously completed by humans or that are impossible for humans to complete. Automation is comparable to mechanization, which involves the substitution of machinery for human labour. Additionally, note that autonomously functioning systems, which achieve objectives without human-provided predefined execution rules, are not the same as automation. Rather, the term "automation" refers to systems that accomplish their objectives by adhering to a predetermined set of guidelines established by a human.

L. Britton & G. Atkinson (2017) investigated the effects of technology developments and automation on the asset management sector. It focuses on how automation affects workers, what skills are needed for augmentation, and how robot advisors can undermine an organization's value proposition. According to the research, jobs involving repetitive and systematic work in a specific domain are likely to be automated, which will raise the need for analytical abilities among junior recruits. To stay competitive, asset management companies need to embrace and incorporate technology into their operations.

Frey & Osborne (2013), showing substantial shares of occupations at risk under certain assumptions. Later literature refines this by shifting from “occupation risk” to **task** and **task reallocation** approaches, producing more nuanced projections that emphasize worker reallocation, partial automation of tasks, and the creation of new tasks and jobs. Methodologically, the field moved from classifier-based occupation risk scores to microdata analyses (task-level time-use, matched employer–employee data) to measure displacement and job creation more precisely.

6. RESEARCH GAP

Theoretical gaps include:

- Limited incorporation of AI-specific features (such as autonomy and self-learning) into conventional labour market theories.
- The distinction between long-term employment creation and destruction is unclear.
- Not enough research has been done on tasks involving hybrid human-AI collaboration.
- Inadequate explanations of labour market adaptability in emerging economies.
- The institutional and policy responses are not examined.

7. OBJECTIVES OF THE STUDY

1. To examine the theoretical mechanisms through which automation and AI impact labour market outcomes.
2. To analyse how AI-driven automation influences employment, skill demand, and wage structures.
3. To conceptualize the long-term implications of AI on future labour market resilience.

8. RESEARCH QUESTIONS

1. How does automation and AI reshape the structure of the future labour market?
2. What theoretical mechanisms explain AI-induced job displacement and job creation?
3. How do skill requirements and wage inequality evolve under AI-driven technological change?
4. What theoretical insights can guide policies for managing future labour transitions?

9. RESEARCH METHODOLOGY

Scholarly articles, theoretical models, and economic reports are examples of secondary data used in this conceptual and theoretical inquiry.

Qualitative analysis: conceptual framework synthesis and interpretation.

Theoretical modelling: creating a conceptual framework that connects employment dynamics, skills, pay, and AI.

10. ANALYSIS

10.1. AI-Driven Job Displacement

The process by which artificial intelligence systems take the place of human workers in carrying out certain tasks or full job responsibilities is known as "I-driven job displacement." This happens when artificial intelligence (AI) technologies—like robotics, machine learning, natural language processing, and automation systems—are able to carry out jobs more correctly, efficiently, or economically than people.

Jobs that include regular, repetitive, predictable, or rule-based duties are the most dangerous. Data entry, simple accounting, assembly-line labour, customer service, and administrative duties are a few examples. AI technologies are good replacements for these jobs because they can handle vast volumes of data, make choices fast, and work nonstop without getting tired.

AI-driven displacement frequently automates some functions within employment, reducing the demand for particular types of labour, but it does not always result in the elimination of entire occupations. Workforce reductions, job role modifications, or the requirement for employees to move into new occupations requiring sophisticated digital or cognitive skills could result from this development.

All things considered, AI-driven job displacement is a significant shift in the labour market that highlights the significance of reskilling, upskilling, and adapting to new technologically advanced work conditions.

10.2 Job Creation through Technological Complementarity

The process by which cutting-edge technologies—like artificial intelligence (AI), automation, robotics, and digital platforms—work alongside human labour rather than in place of it to create new job prospects is known as "job creation through technological complementarity." As industries in India incorporate digital technologies while still significantly depending on human talents,

technological complementarity is emerging as a major driver of job development.

In India, technology and artificial intelligence frequently enhance human abilities rather than displacing workers. Digital instruments, for instance, provide farmers with real-time crop information, but fieldwork still requires human labour. Similar to this, AI-assisted diagnoses in industries like healthcare enable physicians to make judgments more quickly, yet the demand for nurses, medical professionals, and technicians rises.

Through new positions like data analysts, AI trainers, cybersecurity specialists, digital marketing specialists, and platform-based gig workers, technological adoption in India also promotes employment creation. Additionally, complementary ecosystems where technology boosts productivity and creates jobs in IT services, e-commerce, logistics, finance, and renewable energy are created by government efforts like Digital India, Make in India, and the expansion of start-ups.

Thus, by boosting productivity, opening up new service models, and developing a hybrid workforce where people and technology work together rather than compete, technological complementarity in India creates jobs.

10.3 Skill Transformation

The process by which the nature, kind, and degree of skills needed in the workforce shift as a result of automation, artificial intelligence, and changing industrial demands is known as "skill transformation." Workers must adapt by learning new technical, cognitive, and soft skills when conventional tasks become mechanized or digitalized in order to remain competitive in the job market.

Routine, manual, or clerical skills are frequently replaced by digital literacy, data management, problem-solving, creativity, flexibility, and communication skills. Workers in numerous industries transition from doing monotonous jobs to overseeing, managing, or working with technology-driven systems. Thus, reskilling, upskilling, and continuous learning become crucial for job advancement and employability.

Data analytics, machine learning, cloud computing, cybersecurity, digital communication, and human-AI collaboration are among the talents that are in high demand in India due to the use of AI. Concurrently, traditional jobs are becoming less common, particularly those that include clerical or repetitive tasks. Job roles in IT services, e-commerce, banking, and logistics are changing to become more complicated and tech-enabled.

Workers are reskilling and upskilling thanks to government programs like Skill India, Digital India, and industry-educational cooperation. Continuous learning is crucial, though, as the rate of AI adoption also reveals skill shortages, particularly in rural and semi-urban areas.

In general, India's workforce is being pushed toward higher-value, technology-centric employment by AI-driven skill revolution, which is increasing productivity and innovation but necessitating extensive reskilling to guarantee inclusive growth.

10.4 Wage and Employment Polarization

In India, wage and employment polarization refers to the widening gap between high-skilled, high-paid occupations and low-skilled, low-paid positions, while middle-skilled employment is declining due to automation and artificial intelligence. Many mid-level positions in manufacturing, secretarial services, BPOs, and administrative jobs are becoming less common as technology replaces repetitive and routine tasks.

Adoption of AI in India creates better-paying possibilities in IT, data science, fintech, healthcare

technology, and AI development for people with superior digital, analytical, and management abilities. However, because they are harder to automate and still pay relatively little, low-skilled employment like delivery services, gig labour, and basic service-sector positions continue to expand.

However, AI-chatbots, automated systems, and smart manufacturing equipment are gradually replacing middle-skilled occupations like data entry, basic bookkeeping, customer care, and ordinary factory operations. As a result, the labour market becomes divided into high-skill and low-skill parts and the wage disparity widens.

In general, AI and automation in India are polarizing the country by rewarding highly trained professionals with more possibilities and income while decreasing demand for mid-skilled positions, forcing many workers into lower-paying positions unless reskilling initiatives are intensified.

10.5. Structural Transformation of Industries

The term "structural transformation of industries in India due to AI" describes the fundamental change in how industries function, create, and provide services as automation and artificial intelligence are incorporated into their essential operations. In addition to increasing productivity, AI is altering the structure, competitiveness, and makeup of important industries.

Manufacturing is transitioning from labour-intensive to technology-intensive production models thanks to AI-driven smart factories, robotics, predictive maintenance, and automated quality control. AI is revolutionizing traditional business paradigms in services, particularly IT, finance, healthcare, retail, and logistics, by enabling digital platforms, algorithmic decision-making, personalized services, and automated processes.

Precision farming, crop analytics, weather forecasting, and digital markets are examples of AI-driven structural transformation in agriculture that is assisting farmers in transitioning from subsistence farming to data-driven agriculture. In a similar vein, AI-based learning platforms, smart mobility solutions, and digital public services are transforming industries including education, transportation, and governance.

All things considered, AI is driving Indian industries away from repetitive labour and toward increased productivity, innovation, and knowledge-based operations. To promote equitable and sustainable economic growth, this transition necessitates substantial technological adoption and reskilling.

11. Research Outcome

According to the report "The Impact of Automation and AI on the Future Labour Market," rather than just eliminating jobs, technological advancements are radically changing the nature of work. The results demonstrate that automation disproportionately impacts repetitive and codifiable processes, displacing workers in jobs requiring a lot of repetition but also creating new positions in data systems, digital services, AI development, and innovation-driven industries. Automation and AI therefore have two effects: short-term labour displacement and long-term opportunities through increased productivity and new sectors. Additionally, the study supports trends of skill-biased technical development by confirming the labour market's ongoing shift toward greater cognitive, digital, and socioemotional skills. Because workers with advanced analytical and digital skills fetch higher returns while middle-skill routine occupations decrease, this shift adds to occupational polarization and growing income disparity.

The results also show that productivity gains tend to concentrate among early-adopting enterprises, which could lead to market consolidation and increase competitive differences. Geographical and

sectoral disparities also show up: while healthcare, education, the creative sectors, and client-facing services gain more from human–AI complementarity, manufacturing, logistics, and administrative services face more automation threats. Over time, institutional quality, training programs, policy decisions, and the rate of technological diffusion all have a significant impact on net employment. By supporting the task-based model of labour markets, elucidating the dynamics between augmentation and substitution, and highlighting the significance of ongoing skill development in forming long-term employment equilibria, the study makes a theoretical contribution.

Overall, the research shows that automation and artificial intelligence do not always result in widespread unemployment but rather reorganize labour demand in ways that encourage flexibility, ongoing learning, and complementary human skills. Ensuring equal outcomes requires policy responses like income support systems, active labour-market policies, lifelong learning initiatives, and responsible AI governance. The results highlight how automation-driven productivity increases can be widely distributed with the right institutional architecture, allowing societies to benefit from technology advancement while shielding workers from disruptive changes.

12. CONCLUSION

The Impact of Automation and AI on the Future Labour Market's theoretical investigation shows how technological progress is changing the nature of work through a complicated interaction of productivity dynamics, skill transformation, and job reallocation. Automation and artificial intelligence (AI) are redistributing the value of various forms of employment, decreasing the need for repetitive, predictable activities while elevating the significance of creative, analytical, and socioemotional skills, rather than indicating the end of human labour. The evidence suggests that the future labour market will be marked not just by job displacement but also by job evolution and creation, especially in industries that successfully integrate machine intelligence and human judgment.

The report also emphasizes how not everyone benefits equally from automation and artificial intelligence. Without intentional action, these technologies could exacerbate already-existing disparities by favouring advanced economies and highly skilled people. Therefore, governmental decisions, institutional preparedness, and employees' and businesses' ability to adjust to new technology demands all play a major role in the long-term effects of automation. In order to guarantee an inclusive future of work, robust education and training programs, adaptable labour-market regulations, and moral AI governance become crucial cornerstones.

In conclusion, automation and artificial intelligence (AI) are revolutionary forces with enormous potential to boost output, spur innovation, and generate new job opportunities. However, taking use of these opportunities calls for proactive measures that assist employees throughout changes, promote lifelong learning, and properly direct the adoption of new technologies. Societies can use AI as a driver for more resilient, dynamic, and human-cantered labour markets rather than as a threat to jobs if the right frameworks are in place.

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