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Original Article

Indian Knowledge Systems (IKS) and Industrial Development in India

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Abstract

Industrial sector Division The Indian industrial sector has undergone a phenomenal transformation since independence: colonial underdevelopment and dependence on imports have been transformed to diversified and globally integrated economy. Industry contribution was extremely minimal of only 11 percent of Gross Domestic Product (GDP) of India at independence in 1947 with the foundations being textiles, jute, mining and small-scale crafts. The sector (manufacturing, mining, construction, and utilities) contribute nearly 25 percent of the GDP in 2024 and is enabled by large infrastructures, modernization and foreign direct investment. The paper also includes a historical narrative of the process of industrial development, as well as the contribution the Indian Knowledge Systems (IKS) can add to the trend, in the form of traditional crafts, metallurgy, artisanal production, indigenous design systems, and industrial processes, carried out by the community. The paper has adhered to structural changes between planned-economy period and liberalization, globalization through the secondary data of the Reserve bank of India (RBI), Ministry of Commerce and Industry (MoCI), NITI Aayog, World Bank, IMF, and peer-reviewed studies. Findings indicate three key trends, i.e., (1) heavy industry and state-owned enterprises are opened in the post-independence era; (2) integration in the global value chains through liberalization; and (3) modern trends on digitalization, green technologies, and skills. The sustainable industrial development, which is presented in the paper, is claimed to be attained by introducing new science and technology combined with IKS traditions (particularly in handicrafts, indigenous design, sustainable production, and local innovation) into the process of providing inclusive and robust industrialization.

Keywords: *Indian Knowledge Systems, Industrial Development, Liberalization, Sustainability, Manufacturing.*

Introduction

The industrial sector is among the pillars of economic experience of the independent India and it shaped the growth, employment, and modernization. India became a country of independence with a weak industrialization base that primarily consisted of cotton textile, jute, coal, and iron and had a small heavy industry. The indigenous industry was choked by colonial economy, and the orientation was taken at the elimination of raw materials and the importation of finished goods. In 1950 alone, industry generated only around 11 percent of GDP compared with almost 55 percent held by agriculture (RBI, 2024). By 2024, the industrial development has increased to approximately a quarter of the GDP with millions of individuals employed in manufacturing, mining, construction, and small-scale business-related enterprises (World Bank, 2023).

Previously, Indian Knowledge Systems (IKS) played an important role in the work of industries. The old metallurgical skill (iron pillars, making of steel) and the old artisanship (textile, pottery, handicrafts), as well as the systems of native design, retained the lives of Indians centuries. Colonial exploitation had broken these systems but they were able to survive through the assistance of artisanal groupings, handicraft culture and small industries. But when independence came the industrial policy focused on the large industries and the small industries on IKS were put in the backburner.

The process of industrial development can be divided into four overall phases:

1. Planning and Public Sector Growth (1950-1980s): The primary ones were heavy industry, steel works and state corporations based on the Five-Year plans.

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2. Liberalization and Global Integration (1991 onwards): The competitiveness of the industries had been transformed with the deregulation as well as foreign investments and globalization.
3. Knowledge Economy and IT Revolution (2000s): Increase of IT/ITeS, pharmaceuticals and engineering exports.
4. Phase (20152025): Focus on make in India, atmanirbhar Bharat, green technologies, and digital manufacturing (Industry 4.0).

It is in these transitions where IKS comes in a lot. With the introduction of modern science usage in the key industries, the proletariat crafts, the aboriginal crafts, and the eco-friendly forms of production were left to serve the exports, the rural employment and the culture. IKS together with modern science can offer the sources of sustainable industrial development.

Objectives of the Study

1. To determine the trend then the development of the Indian industrial sector since the independence period.
2. To evaluate how the Indian Knowledge Systems (IKS) affect the industrial practice.
3. To learn policy changes in policy stages viz planning, liberalization and globalization.
4. To investigate the current problem of sustainability, technological changes, and inclusion.
5. To give recommendations on the path that IKS can take in the future to integrate with the modern science so as to enhance industrial development.

Research / Methodology Researches

The descriptive-analytical research design is present in this research paper as a bid to comprehend the connection between Indian Knowledge Systems (IKS) and the industrial sector development in India after gaining independence. The suggested methodology includes the historical review, analysis of secondary data, and thematic synthesis to provide the quantitative evidence and qualitative explanation of the long-term tendencies (19472025).

1. **Research Design**

The descriptive section focuses on explaining the trends in the industrial growth, policy interventions and reforms in the sectors since the time of independence. Interpretation of these developments with reference to the overall economic change, technological change and role of indigenous knowledge systems (IKS) is the analytical part. The two strategies combined together aid the study in embracing structural patterns as well as contextual dynamics of industrialization in India.

2. **Data Sources**

The literature review forms the basis of the study, but only secondary data sources are used, authoritative national and international because peer-reviewed research is used to present the strength and credibility:

- **National Sources**
  - Reserve Bank of India (RBI): Annual Reports, Handbook of statistics on the Indian Economy and time-series data on industrial output, flows of credit and share of the sector.
  - Ministry of Commerce and Industry (MoCI): Export-Import statistics, industrial policy reports and also sector analysis.
  - NITI Aayog: Policies on the industrialization, competitiveness and sustainability in the manufacturing industry.
  - Economic Surveys of India (19502024): The indicators of the industry performance, policy frameworks, and the macroeconomic environment.
- **International Sources**
  - World Bank: Indicators of world development, doing business report and data on industrial contribution to GDP.
  - International monetary fund (IMF): Financial stability reports and analysis of the industrial reforms of India throughout the world.
  - United Nations Industrial Development Organization (UNIDO): Global manufacturing value chain statistics and relative industrial competitiveness.
  - International Labour Organization (ILO): Publications of industrial employment, dynamics of informal sector, and labour conditions.
- **Scholarly Literature**
  - Journal articles, books, and other scholarly publications that coordinate the discussion of the issues of post-independence industrial development, industrial policy reforms, sustainability, and integration of IKS into the production systems.

3. **Analytical Framework**

In the study, a three pronged analysis model has been used to bring together data and literature:

1. **Historical Periodization**
   - There are four important stages of the industrial development:

a. Post-Independence Planning Era (19501980s): Industrialization on the basis of government, Five-Year Plans and the development of the state sector business.
b. Liberalization and Structural Reforms (1991 and onwards): Destruction of industrial licensing, FDI inflows and globalization.
c. Knowledge Economy and IT Revolution (2000s): Communications growth in IT, biotechnology and global supply chains.
d. Modern Phase (20152025): Make in India, Atmanirbhar Bharat, Industry 4. 0 and green industrialization.

2. **Thematic Coding**
   - The literature and policy documents were coded and separated into themes:

Industrial policy and structural reform
Fat of small-scale industries and MSMEs
- Indian Knowledge Systems (e.g. crafts, metallurgy, indigenous technologies).
Influences of globalization and FDI
Green production, sustainability, and Industry 4.0 changes

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3. **Trend Analysis**
   - Tabulation, charting and diagramming of the secondary data were done to show:

 Share of industry in GDP (1950–2024)

- Sectoral contribution (manufacturing, mining, construction)

Industrial performance and inflows of FDI

\\ The development of exports in the industrial goods.

Formal and informal employment in the industry

   - The quantitative understandings are then projected against the policy and knowledge frames.

4. **Limitations of the Study**

Despite the credibility of the results that is provided by the methodology, there are certain limitations:

1. The use of Secondary Data: The study will use published sources of data such as RBI, MoCI, and world bank. Such groups of data might be associated with time lags, alterations, and aggregation biases.
2. Lack of Firm-Level/Primary Data no primary surveys, no interviews and no econometric models, which are restrictive in terms of micro-level information (e.g., firm competitiveness, worker productivity).
3. IKS Documentation Problems: The indigenous knowledge systems are mostly local and are mostly taught orally; hence, most of these are not in writing or even even found in pieces of official records.
4. Limitations of Comparisons: Even though the international data can be utilized to complete some form of benchmarking, the comparisons between countries could be constrained due to the differences of classification and methodological frameworks.

Despite these limitations, the three-method approach, which integrates the analysis based on macro-level trends, thematic coding, and secondary literature review produces an incredibly comprehensive and policy-relevant picture of the trend of industrial development in India and the role of IKS.

This is the revised Discussion section of your paper about Indian Knowledge Systems (IKS) and Indian Industrial Development after the Independence era complete with new data, tables and sources to your paper.

Discussion

1. Since independence, Growth Trajectory of Industries.

Industrial sector in India has experienced radical transformation since the time of independence in 1947 that was marked by various times of state planning, liberalization and globalization of the economy. The India inherited a fairly weak and fragmented industrial base during independence, albeit to serve the colonial interests. At 195051, the industrial sector contributed to almost 11 per cent. of the GDP where manufacturing took up nearly 9 per cent. This minor theme was a sign of the Indian economic agrarian dominance at the time (RBI, 2024).

The Planning Era (1950s–1980s):

The heavy industries, which was a part of the capital goods and the infrastructure was a priority under the development plan that was followed by the First and Second Five-Year Plans as part of state-led development according to Mahalanobis model. As a state sector undertaking (PSU), bhilai, Rourkela, and Durgapur major steel plants, fertilizers, cement and machine tool industries were also established. This rise in the contribution of the industrial sector to GDP had reached 22 by the year 1980-81 with manufacturing as 15% (RBI, 2024). It was during this period that the Indian industrial bases were formalised but it was also the period that the license-permit-quota raj was formalised, restricting competition and efficiency.

Pre-Liberalization Peak (1990–91):

Industrialization led by the state had produced greater capacity, but inefficiently, technologically backward, and more productive at the close of the 1980s. By 199091, the share of the industry in GDP had already reached 27, and the manufacturing industry constituted 17% (MoCI, 2024). The high barriers to world competitiveness were however created by the stringent industrial licensing regime, import replacement and incompetent infrastructure.

This was begun in 1991 and is referred to as the Post-Liberalization Era:

Economic reforms in India in the year 1991 were a milestone in the industrial path of India. The Indian industry became a member of the global value chains as a result of the deregulation, de-licensing, the liberalization of the foreign direct investment (FDI) and the trade reforms. Goods engineering, textiles, automobiles, IT hardware and pharmaceuticals are the industries that recorded high growth in terms of export. The manufacturing inflows rose by a figure of negligible value of 0.1 billion in 1991 to a figure more than 13 billion in 2023 (DPIIT, 2024).

Contemporary Structure (2023–24):

Industrial is projected to 25 percent of GDP in 202324, and manufacturing 17 percent, construction 8 and mining approximately 2 (World Bank, 2023; MoCI, 2025). Although the Indian industry constituent as a part of the GDP has overall leveled off since the 1990s, the composition internally has shifted towards consumer goods, automobiles, cement and construction. In the meantime, the services based growth has overshadowed the manufacturing sector and recent countermeasures to it are make in India, Production Linked Incentives (PLI) and atmanirbhar Bharat to realize a revival of industrialization at domestic level.

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Table 1: Industrial Sector Share in India's GDP (1950–2024)

Sr. No.	Year	Industry Share of GDP (%)	Manufacturing (%)	Source
1	1950–51	11	9	RBI (2024)
2	1980–81	22	15	RBI (2024)
3	1990–91	27	17	MoCI (2024)
4	2010–11	26	16	World Bank (2023)
5	2023–24	25	17	MoCI (2025)

Indian Knowledge Systems (IKS) in Industry

The IKS have been significant in the history of the path of industrial production and technological innovation besides the sustainable livelihood in India. The localization of resources usage and community-based model of production was IKS-driven industries as opposed to modern factory-driven industries that came after the independence with the background of centuries-long practices in the native level. These systems contributed to the national consumption not only but also, made India a great exporter of crafts, textile and metallurgical production in the pre-colonial period. These days IKS plays a significant role in the maintenance of small scale industries, rural working places and exportation of cultures.

Metallurgy and Material Sciences:

The Indian metallurgy art can be traced back to more than two millennia. The wootz steel manufactured and which had gained fame due to its tensile strength and sharpness was sold to Europe, West Asia, and China and became the inspiration behind the Damascus steel (Kannan, 2011). Ancient metallurgy is scientifically complicated: the Iron Pillar of Delhi (4 th century CE) requires more than 1,600 years to corrode. Also, the fact remains that the practices did not only form the basis of the indigenous steel making, but also inspired the contemporary metallurgical research.

Textiles and Handicrafts:

One of the pillars, which have not transformed significantly in the IKS-based industries, is textile production. There exists a collusion of tradition and weaving operations with eco-friendly method with khadi and handlooms, Banarasi silk, Kanchipuram sarees and Kashmiri pashmina shawls. Khadi was and still remains a symbol of self dependency (swadeshi) and decentralized production even nowadays. They are the cultural export of India and their industries depend on the thousands of artisans who were primarily women.

Craft Clusters and Regionalization:

The Craft clusters that occur in India are termed localized skill systems. Certain examples of an industry, which make use of indigenous knowledge over generations of artisans include Khurja pottery, Moradabad brass ware, Kanpur leather goods and Saharanpur woodwork industries. These aggregates are not just economic stability, but also cultural heritage through the tendency of frequently making use of local raw materials and production networks which are based on communities. The IKS based industries, as per the projections of the Ministry of Commerce and Industry (MoCI, 2025), have currently started offering employment to over 20 million individuals with 7,000 + craft clusters and all of them contributing a minor portion of the total handicraft exports in India.

Water and Energy Systems in the Industry:

It is also native ingenuity in the form of decentralized systems of energy and production. The Himalayan regions have used traditional water mills (gharats) to grind grain, produce oil, and power small workshops, which is a renewable energy source and that is managed by the community members. In the same way, the labor of blacksmiths and carpenters guilds was also structured on the community principle, making it easier to organize the local industries and could not rely on the manufacturing process that was organized on a central basis and managed to utilize the resources in a sustainable manner.

Applicability of IKS to Industry in modern world:

The IKS-based industries of the modern world are cultural artifacts, but also an important economic player. They enable development of livelihoods that are sustainable, women empowerment and rural industrialization. In addition to this, there are new markets in the world that demand environmental friendly and designed products in the Indian handicraft and artisan products. This has not only regarded IKS as a site of preserving the tradition but also as a source of gaining the new patterns of sustainable industries.

By this, the Indian Knowledge Systems puts forward a parallel account of Indian industrialization, which emphasizes on the sustainability, inclusiveness, and cultural identity and productivity and modernization.

Liberalization and the International Integration

This marks the beginning of Indian industrialization which was experienced when economic reforming was implemented in 1991 and completely changed the state-led industrialization into the market-oriented policies. The pre liberalization industrial sector in India was based on the license-permit raj system in which bureaucratic regulations dominated and prevented the entry of the private industry and also proved ineffective in terms of allocation of resources. The abolition of these barriers was evidenced by the 1991 reforms that spurred the development of the private sector and opened up the economy to foreign competition by liberalizing trade and demystifying the economy and foreign direct investment (FDI).

Growth in FDI and Privatization:

One of the best-observed effects of liberalization was the inflow of FDI. Only the manufacturing has been

accumulating inflows, and the inflows have increased up to 13.2 billion in 2023 which is 1320 percent higher than the year 1991 when India entered into the global production (DPIIT, 2024). The policy provisions that have also supported it are 100 percent FDI on automatic route on various industries, Special Economic Zones (SEZ) and production related incentive plans (PLI). The multinational companies in the automobiles, electronic and pharmaceutical industries set up manufacturing plants in India and this placed the nation in the position of production centres and a global market.

Expansion of Industrial Exports:

The industrial exports were growing at an elevated rate during the post-reform period. Its exports were 460 billion dollars in the FY202324 which is an increment of 18 billion in 199091 (MoC, 2024). The leading contributors had resorted to engineering products, chemicals and textile and gems and jewels. India was also made into a huge supplier within the global pharmaceutical chains especially in the generics market since over 20 percent of the export of generic medicines in the world is carried out by India. The diversification of the exports, which was accompanied by the cheap availability of labor in India and the government incentives helped the industries have more influence than ever before in accessing the international markets.

Digital Revolution of IT and IT services as an exporter:

The most significant shift of the globalization of India was probably the crises in the information technology (IT) and digital services market. The liberalization was also accompanied with the telecommunication invention together with the global outsourcing demand. With the export revenue, the IT and business process management (BPM) services are expected to earn India more than 254 billion in 2023-24 and hire almost 4.5 million individuals (NASSCOM, 2024). The Infosys, TCS and Wipro companies rose to the world leadership and India turned into the back office of the world. The IT business was not only causing foreign incomes but also initiating other related businesses like education, city development and banking.

Industrial and Work-related Change:

The changes brought about structural change in the industrial environment. The large privately owned corporations, foreign invested corporations became competitive on the international level, and in most cases the micro, small, and medium enterprises (MSMEs) simply failed to adapt due to their small access to technology, credit and foreign market. The result of such imbalance was the creation of a two layer economy, industrialized globally on one end, and the reverse of the small industry on the other end.

The Indian Place in Global Economy:

By 2020s, India was major supply chain centre in the world especially in automobiles, pharmaceuticals, information technology services among others in renewable energy and electronics. Free trade agreements (FTA), bilateral investment treaties and membership of the multilateral organization like the WTO increased the global industrialization of India. But the globalization rivalry, especially that of the East and southeast Asian countries, such as China, Vietnam, and Bangladesh, was a challenge, as far as textiles and low cost production was concerned.

To sum up, the opening and integration in the global community was able to transform the Indian industrial sector which was a closed and state-regulated industry to an industry and a competitive national economy. Although it portended unparalleled opportunities in terms of inflows of capital, export formation and IT hegemonies, it also revealed vices in its structure especially to MSME and those industries that were built on the IKS that could not reap the fruits of globalization.

New Technology and Industry 4.0

Industry 4.0 is a paradigm of automation, digitalization, and sustainability that continues to represent the contemporary degree of industrialization in India and transforms the character of production and competitiveness in the world. It is not only a move towards an incremental technological progress, but a systemic change of the industrial systems due to the cyber-physical integration, the high-order analytics and the world trend of decarbonization. Robotics, Artificial intelligence (AI) and Internet of Things (IoT)

Others that are also being picked up by the Automation include the automobile industry, the pharmaceutical industry, the textile industry and the electronic industry. In the current case, robotics performs precision assembly, quality check, and warehouse logistics and AI applications perform predictive maintenance and supply chains optimization. The IoT is transforming the smart factories into more efficient factories by boosting their productivity, decreasing their downtimes and efficiency. The production centers are relocated to the Indian automotive centers of Pune, Chennai and Gujarat nowadays with the use of AI and robotics (NITI Aayog, 2024).

The intelligent manufacturing and 3D printing:

Reformation in the aerospace, defense, and healthcare industry is also being experienced due to additive manufacturing or 3D printing by reducing costs of production and the time taken. Another thought by the Indian defence companies and the startups is 3D printing of spares, drones, medical equipment etc so that it is no longer reliant on imports. The industries are also becoming flexible to respond to the disruptions in supply in the world as a result of the smart manufacturing systems having digital twin and real-time monitoring.

In this case where the quantity of natural resource demanded is below the expected level, producers will be impacted since they will have to allocate a high percentage of their resource to maintain such a demand.

India has been at the forefront in turnover in industrialization to go green. The renewable energy was also greater than 180 GW, primarily on solar and wind by 2024 (MNRE, 2024). The EV market is growing at an incredibly rapid rate, and the FAME-II incentives facilitated the process with EVs sales of 1.6 million cars in 202324.

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Moreover, the investments in the green hydrogen and energy storage solutions can be taken as the signs of the Indian sustainability in the industrial development. The industries also adhere to the net-zero-emission goal of 2070 in India.

Digital Inequality: A Technology Adoption:

In spite of these changes, micro, small, and medium enterprises (MSMEs) and the traditional industry-based crafts industry are subject to influence by the obstacle to the use of Industry 4.0 tools. The cost of start-ups will be very high, a lack of digital competence, and infrastructure will make them unable to integrate robotics, AI, and digital platforms. Such a division presents a threat of growing disparity in the industrial sector which will then be susceptible to going out of business by more technologically endowed companies.

Contemporary Challenges

Although, the trend on the industrial growth of India is resilient and dynamic, there exist a plethora of structural issues that require immediate intervention in terms of policy and institutional interventions.

Sustainability and Environmental Dynamics:

The environment has been affected due to the industries. The Indian contribution to carbon dioxide was 2.7 billion tonnes in 2023 (IEA, 2024) and the 3rd largest in the world. Industrial sectors especially cement, steel and energy are the greatest contributors of the green house gases. Another pressure to the ecosystems is waste management, also dangerous are water pollution and by-products of chemicals industries. Among the sustainable development goals is to achieve industrial growth and at the same time achieve sustainable development goals (SDGs).

Unequal and Two-Sided Industrial Development:

The globalization and the economic reform favored large corporations and multinational companies that are not skewed to the MSMEs and the industry still reeling on IKS. Among the factors that reduce competitiveness of a small scale producer are credit constraints, market inaccessibility, and a poor infrastructure. This dualism is seriously threatening to increase the economic disparity between the new industrial centres and old rustic agglomerates.

International Competitions and Trade Exposure:

Competition by industries in India is growing with that of china, Vietnam and Bangladesh specifically in the areas of textile, electronic and light industries. Such nations are likely to rank better than India in terms of cost effectiveness, logistics and export policies. The COVID-19 pandemic supply-chain shocks indicated that India was relying on imported inputs, which translated to the fact that the manufacturing process at the local level ought to be resilient.

The threats of Work and Robots:

The ability to create job opportunities in the industry has been compromised despite the greater output in the industrial sector that has been realized. Employment elasticity of manufacturing is lower implying that the rarity of the job creation compared to the rise of the output was high (ILO, 2024). The process of increasing automation and AI-related procedures also brings about the concern of eliminating semi-skilled and unskilled workers off the labor market, especially in this labor-sensitive industry, such as textile and assembly. This leads to a contradiction Industry 4.0 can give it a more productive perspective and leave fewer of the people working in the traditional segments.

Findings

1. Structural diversification, modernization and global integrations have resulted in the growth in the industrial sector and the growth in 11% of GDP in 1950 to a projected 25 in 2024.
2. The IKS industries remain significant in regards to providing 20 million or more workers and cultural exports, yet have failed to be assimilated into the mainstream industrial policy accordingly.
3. The liberalization saw the exportation of the industrial products and inflows of FDI to increase but the MSMEs and small-scale producers are at the tail end as far as competitiveness and technology adoption is concerned.
4. The Industry 4.0 presents groundbreaking opportunities in the field of green technologies, artificial intelligence, and intelligent production, and a threat lies in the fact that old and small scale manufacturers will be excluded because of the barrier of cost and expertise.
5. The new attempts to bring back manufacturing, like the policies, like the Make in India, PLI schemes, and the Atmanirbhar Bharat, is also an indication that the policies are putting in effort but the balance between the modern technology and the IKS practices will decide whether their future would or would not succeed.

Your Conclusion and Suggestions, in a more refined scholarly manner, are as follows:

Conclusion and Suggestions

Conclusion

Developing industries in India is one of the most dramatic structural changes that have occurred in Indian economy since the attainment of independence. The nation has developed a global integrated industrial economy that has been highly diversified and robust and on the presumption of the underdevelopment in the colonies which relied on de-industrialization and reliance on imports. It was pre-determined by the initial years of the organized industrialization (1950s1980s), preconditioned by gigantic government and infrastructure business. The liberalization reforms of 1991 led to the liberalization of the business of the entrepreneur, foreign investments, and their incorporation into the global supply chains, and the recent decades were examined in the context of the digitalization, Industry 4.0 and green technologies.

Meanwhile, the Indian Knowledge Systems (IKS) have kept the livelihoods of millions of Indians alive in the handicrafts, textile, metallurgy and other industries indigenous to the Indians. These types of industries also conserve cultural heritage and exports and inclusive

employment in remote and semi-urban areas in specific. Nevertheless, the industries based on IKS are still to be properly represented in the overall industrial policy of the nation in the plea of economic and cultural perspective.

There is here a two-fold challenge:

1. To take advantage of contemporary technologies, i.e. AI, robotics, green energy and online solutions to become competitive and sustainable.
2. To make industrial growth to be inclusive, environmentally friendly as well as based on the system of indigenous knowledge.

Such priorities should be balanced considering that India is going to achieve both of her two-fold dreams of becoming a 5 trillion economy and also achieve her net-zero carbon emission by 2070.

Suggestions

1. Policy Integration of IKS

- Traditional clusters, industrial policy, handicraft mainstream and handlooms.

Form special MKS promotion boards within the ministry of Commerce and Industry (MoCI).

- Promote sustainable production and environmental friendly production through the promotion of the indigenous culture.

2. Technology Democratization

Further: Subsidize and provide tax exemptions to MSMEs and craft clusters to install Industry 4.0 technologies of digital platforms, 3D printers and AI-helped quality tests.

E-commerce intra industry and supply chain integration: Develop e-commerce (a digital infrastructure) the way that UPI has been developed in the financial industry.

3. Financing and Market Access

- SIDBI and NABARD should enhance access to affordable credit and venture capital by MSMEs and artisan firms.

Power up: Crafts, textiles and green technologies export promotion councils.

- Prefer the online markets such that the traditional producers will be compelled to directly confront the international consumers.

4. Human Resource and Training of Skills.

- Professional training with the combination of technical and IKS skills (e.g. CAD and handloom design).

Instead, create Industry 4.0 poles of polytechnics, universities and guilds of artisans.

- Reskill to reduce employment robots.

5. Green Change and Sustainability.

- Promote renewable energy, energy savings equipment and circular economy in the industries.

Special incentives: Offer special incentives in particular to green hydrogen projects, EV manufacturing, and waste-to-energy projects.

Make industrial development in accordance with net-zero prospects of India by sectoral targets in reducing emissions.

Overall, the industrial future of India is conditional not only by its possibilities to be integrated with the very advanced technologies, but also by its possibilities to be able to preserve the native knowledge, empower MSMEs and balance the industrialization process with the ecologic and social goals. The most encouraging trend of the inclusive, sustainable and competitive development in the global environment is a model of industrialization of hybridization that can connect the modern science with the traditional wisdom.

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