Manuscript ID:
TIJCMBLIR-2026-030114

Volume: 3

Issue: 1

Month: February

Year: 2026

E-ISSN: 3065-9191

Submitted: 15 Jan 2026

Revised:20 Jan 2026

Accepted: 10 Feb 2026

Published: 28 Feb 2026

Address for correspondence:
Dr. Yamanappa Kelageri
Assistant Professor, Department of Commerce, Government First Grade College Sindagi. Dist. Vijayapur
Email- yogck12@gmail.com

DOI: 10.5281/zenodo.19159078

DOI Link:
https://doi.org/10.5281/zenodo.19159078

Skills for Future Sustainable India

Dr. Yamanappa Kelageri

Assistant Professor, Department of Commerce, Government First Grade College Sindagi. Dist. Vijayapur

Abstract

India, now the world's most populous country and the fourth-largest global economy in 2025, is experiencing rapid economic growth with a real GDP increase of 6.5%. However, this expansion has not translated proportionately into employment generation. With over 60% of the population comprising youth, the country holds a significant demographic advantage that could either become a dividend or a liability. Despite the economic momentum, a severe gap exists between the skills imparted through formal education and the skills demanded by industry. Alarming statistics show that only 10% of graduates are employable, pointing to a critical mismatch in education and job readiness.

The study aims to identify the types of skills required across various sectors, explore the present condition of the every sector, and propose practical recommendations to strengthen India's workforce capabilities. As industries evolve and expectations shift, technical, practical, soft, and transferable skills become crucial for employability. Skill development is not only essential for individual career advancement but also vital for India's economic competitiveness and social stability. Therefore, strategic interventions and inclusive planning are imperative to make India's workforce future-ready.

Keywords: *Skill Development, Employability, Demographic Dividend, Workforce Readiness, Sector-wise Skills, Technical Skills, Soft Skills, Sustainable Development, Industry–Academia Gap, Digital Transformation, Human Capital Development, Entrepreneurship, Public–Private Partnership (PPP), Vocational Education, Economic Growth, India.*

Introduction

India is the world's most populous country and world's 4th largest global economy in 2025 and world's fastest-growing major economy with real GDP growing at 6.5%. To perform work effectively, skills are a basic necessity. In modern India, skill development is crucial for progress. Need-based and advanced skills contribute significantly to the overall development of the country. Developed nations are far ahead in skill-oriented sectors such as manufacturing, services, healthcare, construction, and innovation. In contrast, underdeveloped countries lag behind due to a lack of focus on skill development. Therefore, investing in skills training is essential for India's growth and global competitiveness.

India holds a significant demographic advantage, with over 60% of its population comprising young individuals. This youth bulge presents a tremendous opportunity for economic growth through a productive workforce. However, to fully capitalize on this potential, the nation must urgently address the issue of employability. Current statistics reveal a concerning reality—only about 10% of recent graduates are considered employable, while the remaining 90% lack the essential skills required for corporate and industrial jobs. This mismatch between education and employment readiness is especially troubling given the pace of India's economic expansion, with GDP growing at a robust rate of 6–8% annually. Despite this growth, job creation has not kept pace, leading to rising unemployment. Each year, approximately 28 million young people enter the workforce, further intensifying the pressure on the labor market. Alarmingly, the National Sample Survey Office reported that India's unemployment rate reached a 45-year high of 6.1% in 2018, highlighting the urgent need for structural reforms in education, skill development initiatives, programs and job creation. While India remains relatively young compared to its neighboring countries, this demographic dividend could turn into a liability if not properly managed.

Review of literature

Review of literature provides imminent to the present study. Few of the previous researcher's work are taken as sources of knowledge to the article.

How to Cite this Article:
Kelageri, Y. (2026). Skills for Future Sustainable India. The International Journal of Commerce Management and Business Law in International Research, 3(1), 77–82. https://doi.org/10.5281/zenodo.19159078

Majority research works findings say that, India struggles with job vacancies due to a lack of skilled workers, contributing to unemployment, programs are narrowly focused (mainly IT) and not aligned with industry needs, major challenges include lack of awareness, competition among industries, and rapid technological change and existing programs often lack quality and relevance.

Need of the study

In today's fast-paced and highly competitive world, every sector is evolving with ever-changing expectations. To meet these demands, individuals must continuously adapt and acquire new skills. As customer expectations shift and industries become more dynamic, there is an increasing need for a skilled workforce capable of handling these challenges effectively. At the same time, unemployment continues to rise due to the rapidly growing population. One of the most viable solutions to this pressing issue is skill development. Equipping individuals with the right set of skills of technical, soft, practical, and transferrable skills is essential for ensuring employability and improving job readiness. In the modern workplace, being competitive is not just about academic qualifications but also about possessing the practical and interpersonal skills that employer's value.

Skill development is not just a necessity for individual career growth, but also a key driver of national economic progress. Therefore, focused efforts and strategic planning are required to overcome the current gaps and make India's workforce future-ready.

Objectives of the study

- To know the types of skills required across different sectors
- To offer suggestions

Research Methodology

Skills development is essential in today's rapidly evolving technological landscape. This research aims to highlight the importance of various skills required across different sectors, examine the skill development initiatives undertaken by the government, and explore the challenges individuals face in acquiring these skills. The study primarily relies on secondary data collected from a variety of sources, including academic research papers, government-published reports, own prepared notes and credible websites.

Skills Needed in Different Sectors

Skills required in various sectors are changing according to need, technology, manpower, time, and type of goods and services. Few of the selected sectors are discussed as follows.

Education Sector: The present education situation of India (as of 2025) is a mix of significant progress, persistent challenges, and ambitious reforms**.** The Indian school Education System is one of the largest in the world with nearly 14.71 lakh schools, more than 1.01 Cr teachers and nearly 24.69 Crore students. The following skills are essential for this sector.

- Efficient communication: effective and fluent communication is a basic essential skill for students**.** Presentation and the ability to articulate ideas convincingly are the skills that help the student to get the jobs.
- Technical expertise: Technological skills are very essential in the digital age for students. Technology and computers are playing a vital role in the modern world and help get employability in different sectors.
- Leadership and teamwork—leadership is one of the skills that is necessary to lead activities and departments in the workplace. Teamwork skills are very much essential in the workplace to complete tasks and objectives.
- Adaptability of transformative and innovation: The education field is always influenced by changing environments. Teaching methods, curriculum, and techniques need to be adjusted from time to time. If students are not ready to adapt to changing skills, they will fail to lead the competitive world.
- Flexibility in adapting to new teaching methods, accommodating diverse learning and training styles, and addressing the individual needs of students will set you apart as an invaluable asset.

Healthcare Sector: "In 2021-22, Total Health Expenditure (THE) was 3.73% of GDP, though public spending as a percentage of GDP remains low compared to global standards" . By 2025, India will require three million additional hospital beds to achieve the target of three beds per 1000 people, along with 1.54 million doctors and 2.4 million nurses to address the growing healthcare demand. Healthcare comprises hospitals, medical devices, clinical trials, outsourcing, telemedicine, medical tourism, health insurance and medical equipment.

The following skills are necessary for this sector.

- Less cost treatment: skills for less cost treatment are needed in the healthcare sector. Cost-effective skills are needed to be learning by the world number one population country, like India.
- Treatment of specified conical diseases: Special skills are need to be treat diseases like cancer, heart diseases, kidney diseases, stroke, diabetes, arthritis, AIDS, etc.
- Special skills in innovating medical aids and instruments: India needs much-skills in innovating medical aids and instruments, which are always purchased outside countries for high costs.
- Skills to research improved medicines: Special skills are need to be innovate improved medicines for a few diseases in India.
- High level advanced skills and facilities required to diagnose specified conical diseases.

Manufacturing Sector: Manufacturing is emerging as a central pillar of India's economic growth, contributing around 16-17% of GDP and employing over 27 million workers. The sector's strength lies in the performance of key industries such as automotive, engineering, chemicals, pharmaceuticals, consumer durables, electronics, and textiles. The following skills are important for this sector.

1. Technologically improved products: Compared to developed countries, India is lagging behind in the manufacturing of technologically developed products. Students in India need to develop these skills.
2. Low-cost products: skills to manufacture low-cost products are essential in India.
3. Variety of products**:** with the help of skills, companies can manufacture different products as per the needs of the customer and the situation.
4. Use more artificial intelligence in manufacturing which helps to produce more quality products, cost saving and increase safety.
5. Data science and robotics implementation in specified sectors.
6. Combining of policy support with technology adoption and a skilled workforce necessary to meet domestic needs.

Energy sector: Non- fossil fuel contributes 49% of total installed capacity of 490.06 GW of July 2025, but still coal energy contributing 45.52% of the Total capacity. India is the third-largest producer and consumer of electricity worldwide, with an installed power capacity of 476 GW as of June 2025. Ministry of new and renewable energy targets 500 GW non-fossil-based electricity generation by 2030. The following skills are fundamental for this sector.

1. Renewable energy: India necessitates developing skills to produce more renewable energy sources such as wind power, solar, sea-tidal energy, biomass energy, etc.
2. Low-cost energy: skills produce Low-cost energy is highly needed because of growing demand. Energy demand is increasing as other sectors are growing.
3. Roof Solar - on top of houses, industrial buildings, and public offices, solar energy needs to be produced. More schemes, cost-cutting techniques, and support are needed to produce solar energy for roofs, which may help individuals generate their necessary energy.
4. Skills should be implemented to produce green hydrogen energy.

Agricultural Sector: A report reveals that India's 46 per cent workforce in agriculture contributes merely 18 per cent to the country's GDP. Agriculture is lagging behind compared to a few developed nations because of a lack of skills and awareness. The following skills are important for this sector.

- Agriculture is treated as a base for the other sectors development. Government support towards skills development to early –maturing seed varieties and higher minimum support prices.
- **Need to increase productivity:** Indian farmers productivity per hectare is very low compared to developed countries. Work on skills and technology to increase productivity is highly needed.
- **Skills to avoid more fertilizers and pesticides: The** agriculture sector needs to develop some skills to produce products with fewer fertilizers and pesticides. Fertilizers and pesticides harmful to agricultural land as well as people's health.
- **Skills need to develop to produce multiple crops:** Farmers need to implement skills on producing multiple or different crops in the same land, which helps earn more money and save the soil quality of the land. crop diversification and innovation will also play crucial role in shaping the sector's outlook.
- Implementation of skill work in food safety and quality assurance framework such as TQM, ISO9000,ISO22000, HACCP, GPM, and GHP which improve product standards, support exports, and increase global competitiveness of Indian agree-products.
- **Skills needed to adapt to engage in multiple activities:** Formers must learn skills to perform various activities to earn more and more income. Activities like animal husbandry, poultry, horticulture, floriculture, etc. will give extra income to farmers.

Irrigation Sector: The following skills are significant for this sector.

- Rain water harvesting: The majority of the rainwater goes into the sea. If the skills are implemented in this area, they can resolve all the water problems and provide sufficient water to agricultural land.
- Water conservation: To conserve water, some skills need to be developed, as most of the time water is wasted through many sources. Skills for protecting and managing water sources are very essential. Most of the time, available water resources are polluted, misused, etc.
- Skilled work is very mach essential to improve ground water which raising concern about future water scarcity.

Transportation and logistics sector: The following skills are important for this sector.

- Skills for improved transportation: many states in India required improvement in transportation. Skills in time management, routes, reducing costs, etc., are much needed on Indian roads.
- Skills in high-level technology: on Indian roads, many vehicles are running with outdated and old technology, which is leading to pollution, an increase in cost, waste of natural resources, and loss of time. Skills to improve these areas are needed to be enhanced.
- Skills in safety: road accidents and mortality rate in Indian transportation is high. Skills and training to improve road quality, driving/riding, signals, etc. are needed.
- Skills should be developed by using artificial intelligence in transportation to increase safety, speed instructors and etc.

Tourism sector and Hospitality : investments in infrastructure, this segment is projected to contribute Rs. 2,60,52,000 crore (US$ 3 trillion) to the country's GDP by 2047. Government initiatives such as the Vision@2047 aim to attract 100 million inbound tourists by 2047, reinforcing India's position as a global tourism hub. According to the World Travel &

Tourism Council (WTTC), the sector's contribution to GDP is projected to rise from US$ 256 billion in CY24 to US$ 523 billion in CY34, supporting about 63 million jobs. The following skills are imperative for this sector.

- **Innovation in tourism places:** Skilled work in tourism places in India is highly demanded. Good transportation, cleanliness, attractiveness, safe adventures, games, etc. areas where special skilled works are required to attract tourists.
- Artificial intelligence based activities should be developed in tourism places to attract tourists.
- To congregate growing demand leading hotel chains should be expand their work in other part of the india.
- Skills to be developed to meet consumer preferences towards wellness tourism, personalized and experience–driven tourism.
- **Skills to Maintain Hygiene:** The hotel industry is demanding more on hygiene and cleanliness. Some skilled work on health hygiene needs to be addressed. Wrong and unhealthy practices are hampering the health of the people, which may lead to serious diseases.
- **Skills on Health Safety:** Skilled work in food preparation and process is very crucial as it considers the health of the people. Defective materials, wrong food manufacturing methods, food chemicals used in preparing food, wrong serving and packing materials, etc., need to be improved with specialized skills only.

Banking Sector: Indian Fintech industry currently is US$111 billion and estimated to be at US$421 billion by 2029. India has the #rd largest Fin-Tech ecosystem globally. India accounts for nearly 46% of the world's digital transactions (as per 2022 data). As on July 2024, there were 602 banks actively using UPI.

The following skills are important for this sector.

- Safety: Skilled work and training are required for the banking sector, as many cybercrimes are increasing. To stop cyber crimes and frauds, the banking sector needed high-level advance technological skills, which are implemented strictly.
- Self banking: more awareness and education among bank customers are still need to develop.
- Rural Banking: Skills are required to encourage rural banking services, as many rural areas are still under the control of private money lenders.
- Customer Relationship Management: CRM skills to manage Customers.
- Skilled work is necessary to improved services experience to their clients by upgrading their technology infrastructure.

Telecommunication Sector: Currently, India is the world's second-largest telecommunications market with a total telephone subscriber base stood at 1,203.69 million and has registered strong growth in the last decade. Tele-density of rural subscribers reached 59.06% as of march 2025. India's digital economy is set to reach 20% of national income by 2029-30, driven by IT, telecom, and electronics manufacturing, with a 13.42% share expected in FY 25. The following skills are important for this sector.

- Skills in manufacturing of special instruments and project management are highly needed.
- Research and skilled work is required in the field of telecommunication to solve and improve network issues, signal processing, wireless communication, and telecom protocols.
- C. Some skills are also required in innovation and cost-cutting technologies.

Service Sector: as per report of IDC India's Domestic IT and Business Service market reached Rs. 141389 crore in 2024, growing by 6.9% YoY, while maintaining a projected CAGR of Approximately 8% between 2022 and 2027. India's service export stood at Approximately Rs. 11,00,517 crore in FY (April-July 2025). India retained its **40th rank** in the Global Innovation Index **(GII)** due to successful advancements in services that are technologically dynamic and can be traded internationally.

- Work on structural reforms, technological adoption and favorable policy measures are needed service sector sustainable growth.
- Skills development towards Digital transformation and human capital development is necessary for future.
- Creative innovation and entrepreneurship is necessary.
- India is the number one population country in the world, lagging behind in the development of technology because of improper skill training, lack of vocational courses, lack of proper initiation, implementation, inter-linkages gap between education institution and industry and information, etc., are to be addressed.

Suggestions to Promote and Develop Skills in India

According to the International Labour Organization (ILO), another concerning fact is that India needs to widen new skill development and lifelong education ecosystems. Skill development plays a most important role in the Indian economic structure. Thus, educational institutions and organizations should incorporate the most rewarding skill development training.

Promoting skill development in India requires an inclusive, multi-dimensional approach that actively involves the government, private sector, educational institutions, and civil society. Although the government has been investing heavily in various skill development schemes, the outcomes have not been proportionate to the scale of investment. To address this gap, the following suggestions and strategies can be considered to strengthen and promote skilling in India.

- **Effective Implementation of Government Schemes:** Government skill development schemes must go beyond certificates and enrollment numbers. Emphasis should be placed on practical implementation to ensure real benefits reach the intended beneficiaries.
- **Strengthening Existing Schemes:** Programs like the Pradhan Mantri Kaushal Vikas Yojana

(PMKVY) and similar initiatives should be reinforced and tailored to meet local and sector-specific skill demands. New schemes should be launched with proper infrastructural and administrative support.

- **Integration of Skill-Based Education:** Skill-oriented courses should be introduced early in schools and colleges to build job-readiness from a young age. This includes vocational subjects, industry exposure, and hands-on training modules.
- **Industry-Academia Collaboration**: Foster partnerships between industries and training institutions to ensure that the curriculum aligns with current and emerging market needs, leading to higher employability.
- **Focus on Emerging Technologies:** Include specialized training in emerging sectors such as artificial intelligence, data science, robotics, cybersecurity, and renewable energy, to prepare a future-ready workforce.
- **Inclusive Skill Development:** Develop targeted initiatives for marginalized communities, including women, persons with disabilities, socially disadvantaged groups, and economically weaker sections, ensuring equitable access to opportunities.
- **Establishment of Regional Skill Development Centers:** Set up accessible and affordable skill development centers across urban and rural areas, ensuring regional balance and minimizing the logistical burden on learners.
- **Development of Skill Support Networks:** Encourage collaboration between government agencies, NGOs, private institutions, and semi-government bodies to create a robust ecosystem that supports post-training needs like job placement, funding, registration, and technical assistance.
- **Training of Trainers (ToT) Programs**: Conduct regular up-skilling and capacity-building programs for trainers and instructors to maintain high standards of teaching and ensure effective delivery.
- **Certification and Accreditation:** Provide nationally and internationally recognized certifications that enhance the credibility of the trained individuals and increase acceptance among employers.
- **Financial Incentives and Support:** Offer financial support to both trainees and institutions through stipends, tax incentives, subsidies, or reimbursements. Skill training should ideally be free for economically disadvantaged groups.
- **Entrepreneurship Development:** Integrate entrepreneurship training into skill programs to encourage self-employment and enterprise creation, thereby generating more jobs and boosting local economies.
- **Public-Private Partnerships (PPP):** Promote PPP models to leverage private sector resources, expertise, and innovation in skill development initiatives. Structured collaborations can enhance quality and reach.
- **Monitoring, Evaluation, and Impact Assessment:** Establish robust monitoring and evaluation frameworks to assess the effectiveness and outcomes of skill development programs. Regular feedback should inform continuous improvement strategies.

1. Mismatch between industry requirements and training outcomes need to be addressed.
2. Skills should be developed based on the need for broader sector-wise coverage beyond IT.
3. Design training based on actual industry demand, and broaden the focus to include diverse sectors is highly recommended.
4. Enhance awareness, mobilization, infrastructure**,** and ensure training aligns with emerging technologies and industry requirements.
5. Design need-based programs**,** increase government involvement in coordination and financing, and expand training availability.

Conclusion

India has a rich manpower resource, but it is crucial to utilize this manpower effectively in today's world. If not properly utilized, it can become a burden on the country. Developing various skills among the population is essential for the growth of different sectors. In a rapidly changing world and environment, communities are expected to develop a range of skills — including technology-oriented skills, practical skills, cost-effective approaches, and creative problem-solving abilities. Both private industries and government bodies must work together to encourage and train people, enabling the country's progress across various sectors. The state and central governments should create a comprehensive action plan to implement skill development programs through a public-private partnership model, semi government institutions and NGO's.

Acknowledgment

I express my sincere gratitude to the Government First Grade College for providing the necessary academic environment and institutional support to undertake this research work. I am especially thankful to the Department of Commerce for its encouragement and cooperation throughout the preparation of this paper.

I also extend my appreciation to the Ministry of Skill Development and Entrepreneurship, India Brand Equity Foundation, and the International Labour Organization for their valuable reports and statistical data, which greatly contributed to the conceptual framework and analysis of this study.

I am grateful to my colleagues, students, and well-wishers for their constructive suggestions and moral support. Finally, I acknowledge all researchers and authors whose scholarly contributions have provided guidance and direction to this research.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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