SAFETY SKILL
DEVELOPMENT FOUNDATION



SKILL GAP ANALYSIS 2026

The Future of OSHE

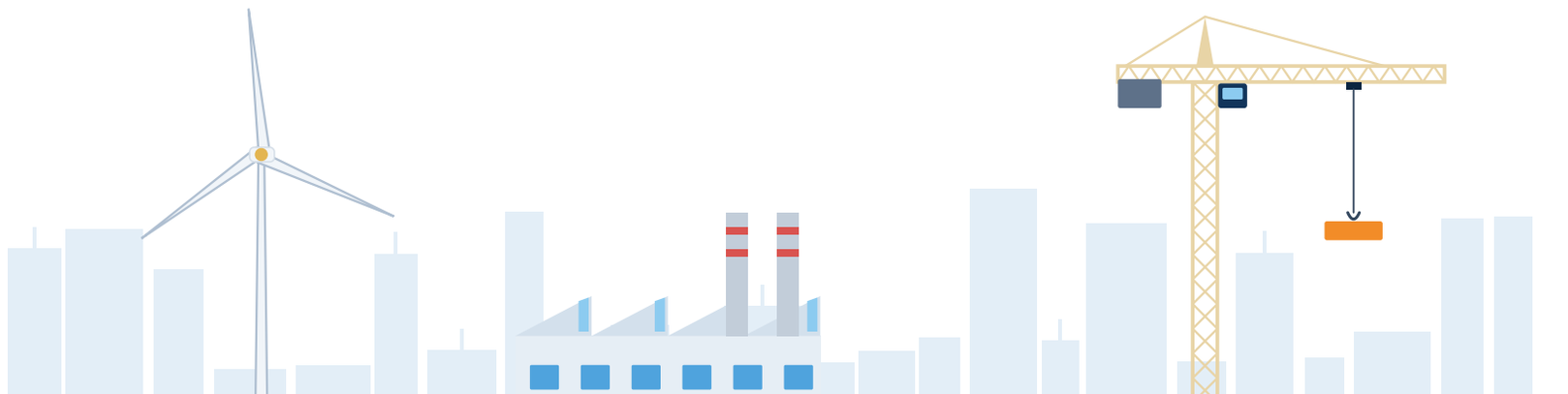
Skill Demand and Workforce Trends

SKILL GAP ANALYSIS 2026

The Future of OSHE

Skill Demand and Workforce Trends

SAFETY SKILL DEVELOPMENT FOUNDATION



ABOUT THIS REPORT

Disclaimer

This Skill Gap Analysis Report has been developed by the **Safety Skill Development Foundation (SSDF)** to identify current and emerging workforce skill requirements, with a particular emphasis on **Occupational Safety, Health, and Environment (OSHE).**

The analysis presented in this report is informed by a combination of primary research, stakeholder consultations, industry engagements, and secondary data sources. While SSDF has undertaken rigorous efforts to ensure the reliability and relevance of the information, the report does not claim completeness or absolute accuracy, given the dynamic and evolving nature of workforce markets and skill ecosystems.

The findings, interpretations, and recommendations are **indicative and directional** in nature. They should not be interpreted as definitive, exhaustive, or prescriptive. Readers and stakeholders are advised to apply independent judgment and contextual understanding when using this report for decision-making purposes.

SSDF assumes no liability for any direct or indirect outcomes resulting from the use of this report. The views expressed herein are those of SSDF and do not necessarily reflect the positions of affiliated organizations, partners, or stakeholders, unless explicitly stated.

> ***Readers and stakeholders are advised to apply independent judgment and contextual understanding when using this report for decision-making purposes.***



A skilled, safe and future-ready workforce for India

ABOUT THIS REPORT

Preface

The accelerating pace of industrial transformation—driven by technological advancements, evolving regulatory frameworks, and increasing emphasis on sustainability—has significantly reshaped workforce skill requirements across sectors. In this changing landscape, the domain of Occupational Safety, Health, and Environment (OSHE) has emerged as a critical pillar for ensuring not only regulatory compliance, but also organizational resilience and long-term value creation and well-being of the workforce & society.

As industries adopt innovative technologies and operational models, the need for a workforce equipped with relevant, future-ready safety competencies has become more pronounced. Understanding the gap between existing capabilities and emerging industry expectations is therefore essential to strengthening workforce preparedness and promoting safer workplaces.

The Safety Skill Development Foundation (SSDF), a recognized awarding body under the National Council for Vocational Education and Training (NCVET), is committed to advancing the OSHE skill ecosystem by aligning training frameworks with evolving industry needs. This Skill Gap Analysis Report represents a strategic step in that direction.

The report aims to:

- Assess current workforce capabilities in the OSHE domain
- Identify critical skill gaps and emerging occupational roles
- Provide actionable insights to support targeted skilling interventions

Drawing on inputs from industry experts, training providers, regulatory frameworks, and field-level observations, the report offers a comprehensive perspective on skill requirements and workforce readiness. It also underscores the importance of integrating safety culture, technological adoption, and sustainability practices into skill development initiatives.

It is envisaged that this report will serve as a practical resource for policymakers, industry stakeholders, training institutions, and ecosystem partners in designing informed interventions, enhancing workforce productivity, and fostering a culture of safety and excellence.

SSDF expresses its sincere gratitude to all stakeholders and contributors whose support and insights have been invaluable in the development of this report.

INSIDE THIS REPORT

Contents

Disclaimer 3
Preface 4
Executive Summary 7
Research Methodology 10
About SSDF 12

01 CONTEXT, OBJECTIVES AND APPROACH 14
Context, Objectives and Approach 15

02 INDIA'S EMPLOYMENT & WORKFORCE LANDSCAPE 16
Introduction 17

03 INDUSTRIAL WORKFORCE: CURRENT STATUS & KEY CHALLENGES 20
Employment Status in India 21
Employment & Safety Resource Requirement 25
The Opportunity 28

04 INDUSTRY LANDSCAPE & WORKFORCE DEMAND 30
Industry Overview 31

05 WORKFORCE MIGRATION & MOBILITY TRENDS 56
Workforce Migration 57
Defining Human Capital in Industrial Domain 60
Employment Void and Potential Growth 64
Future Trends in Employment 66
Sectors at Risk and Diverging Trends 69
Lack of Accreditations or Qualifications Mechanism 71

06 SKILL GAP ANALYSIS SURVEY BY SAFETY SKILL DEVELOPMENT FOUNDATION 73
Skill Gap Analysis Survey by Safety Skill Development Foundation 74

07 RECOMMENDATIONS: TOWARDS A FUTURE-READY WORKFORCE 121
Recommendations: Towards a Future-ready Workforce 122

08 **ROLE OF SAFETY SKILL DEVELOPMENT FOUNDATION (SSDF)** **124**

Purpose of establishing these Qualifications **125**

09 **SSDF PROPOSITION & STRATEGIC INTERVENTION FRAMEWORK** **135**

Creating a Future for Generations to Come **136**

10 **IMPLEMENTATION ROADMAP** **140**

Implementation Roadmap **141**

11 **SYNOPSIS & WAY FORWARD** **144**

Synopsis & Way Forward **145**

Abbreviation **147**

References List **149**

ABOUT THIS REPORT

Executive Summary

India's accelerated growth across infrastructure, manufacturing, energy, and services sectors is fundamentally reshaping workforce dynamics and elevating the strategic importance of **Occupational Safety, Health, and Environment (OSHE)**. As regulatory frameworks strengthen and **Environmental, Social, and Governance (ESG)** considerations become central to investment and operations, safety is increasingly recognized as a **core enabler of sustainable, resilient, and productivity-driven growth** (World Economic Forum, 2025; International Labour Organization, 2026).

This Skill Gap Analysis evaluates the current and emerging demand for safety professionals across high-growth sectors, highlighting a **structural and widening gap between workforce requirements and available skilled talent**. India's total workforce is projected to expand significantly through the second half of the decade, supported by demographic momentum and economic expansion (World Bank, 2026; ILO, 2026). At the same time, rising regulatory enforcement, industrial complexity, and ESG-linked compliance requirements are driving **disproportionately higher demand for OSHE capabilities**, particularly in high-risk and asset-intensive sectors.

Workforce Demand Outlook

- India has around 11–12 million young people entering the workforce market each year, reinforcing both the opportunity presented by its demographic dividend and the pressure on the country's employment and skilling ecosystem (World Bank, 2026)
- Demand for OSHE professionals is increasing across sectors due to stricter compliance norms, global supply chain standards, and ESG reporting requirements (WEF, 2025)
- In addition to incremental demand, replacement demand driven by attrition, workforce mobility, and ageing segments is expected to significantly increase total annual hiring requirements (ILO, 2026)

Overall, the demand-supply gap in safety professionals is expected to widen through 2030 unless large-scale, industry-aligned skilling interventions are implemented.

Sectoral Demand Drivers

The highest demand for safety professionals is concentrated in:

- Construction and infrastructure – driven by large-scale public investments and national infrastructure expansion programs (Government of India, 2025)
- Manufacturing – supported by industrial policy initiatives, supply chain diversification, and increased automation (Ministry of Commerce and Industry India, 2025)
- Power and renewable energy – accelerated by energy transition targets and rapid capacity addition (International Energy Agency, 2025)
- Operations and Maintenance (O&M) – expanding asset base and lifecycle risk management requirements

Systemic Challenges

The analysis identifies several structural constraints within the current skilling ecosystem:

- Persistent skill mismatch between training outputs and industry requirements (National Skill Development Corporation, 2025). Limited availability of industry-aligned, firsthand training programs, particularly in safety-critical domains (NSDC, 2025)
- Gaps in digital, automation-linked, and technology-enabled safety competencies (WEF, 2025). Insufficient scale of standardized certification and quality assurance frameworks, especially for informal and semi-skilled workers (ILO, 2026)

Strategic Imperative

Addressing the OSHE skill gap requires a system-wide transformation of the skilling ecosystem, anchored in:

- Demand-driven, sector-specific training models
- Integration of digital, safety, and sustainability competencies
- Expansion of **Recognition of Prior Learning (RPL)** for informal workers
- Strengthening industry partnerships and apprenticeship pathways
- Safety competencies requirement in public life

A coordinated approach across government, industry, and training institutions will be essential to build a **future-ready, safe, and globally competitive workforce by 2030.**

Role of SSDF

In this evolving landscape, the **Safety Skill Development Foundation (SSDF)** plays a vital role in strengthening the national OSHE skilling ecosystem. Through:

- Development of industry-aligned qualification packs
- Delivery of training and certification frameworks
- Promotion of cross-sectoral Environment, Health, and Safety (EHS) programs
- Promotion of safety culture across industries and public life

SSDF is positioned to enable **standardization, scalability, and quality assurance** in safety training. Its efforts will be instrumental in bridging the workforce gap and advancing India's vision of **safe, sustainable, and globally competitive industries**.

Key Survey Insights

Findings from stakeholder consultations further reinforce the urgency of intervention:

77.9%
of respondents identified skill mismatch as the primary workforce challenge.

80%
indicated that technology and automation will significantly reshape workforce requirements.

89.7%
expressed a strong preference for government-recognized (NCVET/NSQF-aligned) certifications.

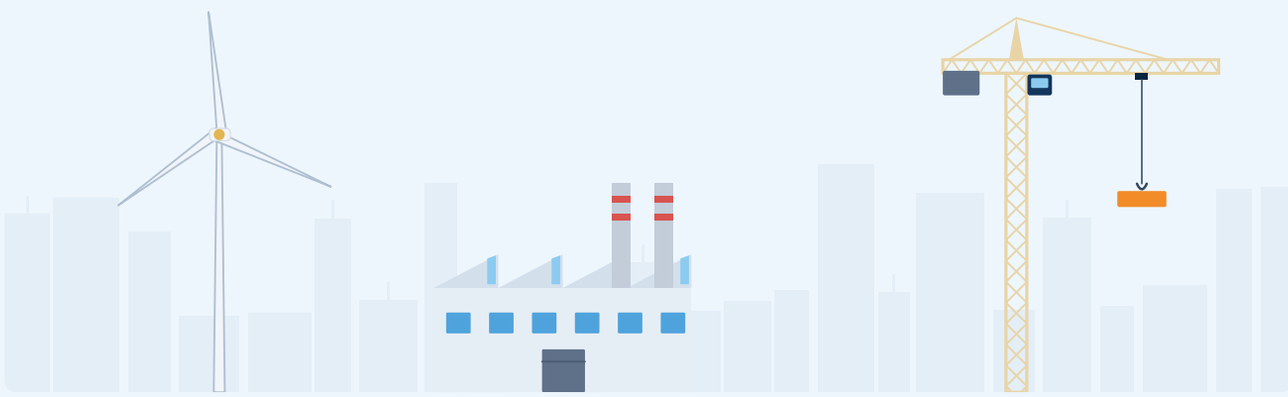
77.8%
emphasized the need for practical, industry-aligned training.

82.5%
highlighted the importance of industry–academia collaboration and structured upskilling programs.

84.1%
identified Emergency Response Planning as a critical future competency.

82.5%
projected high demand for Safety Data Analysts and digitally enabled safety professionals

> ***In this evolving landscape, the Safety Skill Development Foundation (SSDF) plays a vital role in strengthening the national OSHE skilling ecosystem.***



ABOUT THIS REPORT

Research Methodology

This report is based on a **multi-layered research approach** combining primary insights, secondary data, and stakeholder validation to ensure a comprehensive assessment of India's EHS workforce ecosystem.

1

Research Approach

The study adopts a **mixed-method methodology**, integrating qualitative and quantitative inputs to assess workforce demand, skill gaps, and future requirements in the OSHE domain.

2

Primary Research

Primary data was collected through:

- Structured consultations with industry experts, safety professionals, and employers
- Field-level observations across high-risk sectors such as construction, manufacturing, and logistics
- Stakeholder survey conducted by SSDF
- Inputs from training providers and assessment bodies

Key survey insights (as per report):

- 77.9% identified **skill mismatch** as a key challenge
- 89.7% preferred government-recognized certifications
- 77.8% emphasized practical training needs

3

Secondary Research

The study incorporates extensive secondary data from:

- Government reports (PLFS, MOSPI, PIB)
- International organizations (ILO, World Bank, WEF)
- Policy frameworks (NSQF, ESG guidelines, safety regulations)
- Industry publications and sectoral reports

4 Analytical Framework

The analysis is structured across:

- Workforce demand-supply assessment
- Sector-wise risk and employment mapping
- Skill level distribution (NSQF levels)
- Emerging trends (AI, ESG, automation)

5 Validation Process

Findings were validated through:

- Cross-verification with industry stakeholders
- Alignment with national policy frameworks
- Benchmarking against global workforce trends

6 Scope of Analysis

The study covers:

- High-growth sectors (construction, manufacturing, energy, logistics, healthcare)
- Formal and informal workforce segments
- Current and future OSHE skill requirements

7 Limitations

- Dynamic nature of workforce markets may impact long-term projections
- Limited availability of standardized data for informal workforce
- Findings are **indicative and directional**, not exhaustive



Recognised certification turns skills into verifiable competence

ABOUT THIS REPORT

About SSDF

Brief Background	**Safety Skill Development Foundation (SSDF) is a not-for-profit organization incorporated under Section 8 of the Companies Act, 2013, and is recognized as an Awarding Body by the National Council for Vocational Education and Training (NCVET), Ministry of Skill Development & Entrepreneurship, Government of India. SSDF was set up with a vision to create an industry-need based skill ecosystem for safety professionals for industries by developing internationally acceptable National Occupational Standards (NOS), Training Delivery Systems, Assessment & Certification process in line with National Skill Qualification Framework (NSQF) of Government of India and in line with New Education Policy of Government of India, to meet skill demands of industries and keep the safety professional globally & technologically competent.**

The skill gap — "the divide between job-seekers' skills and the skills demanded by industry" has been extremely high in India. At one end we have an exceptionally large young population looking for employment opportunity and at the other end we have acute shortage of suitable skilled manpower at employer/industry end. SSDF is working towards bridging this gap by creating industry need based qualifications for new entrants as well as working professionals which meet the national as well as international standards.

The Safety Skill Development Foundation, with a mission to be among the leading organizations in skilling Indian youth, functions as a bridge between industry skill needs and the youth of India through:

- Effective understanding of the industry's skill requirements, conduct functional analysis and create national occupational standards as per national skill qualification framework with internationally compatible competency parameters
- Developing robust training, assessment & certification modules for professionals based on national & international practices
- Assisting in implementation of skill training projects within India, conduct competency-based assessments and provide industry acceptable competency certificates
- Preparing the safety professional technologically competent through skilling, re-skilling & up-skilling and meeting the present & future requirements
- Reducing workplace related accidents, improving health & safety, and improving environmental compliances through its skilling efforts
- Tie up with international organizations to provide equitable opportunity to Indian youth for international placements as safety professionals

Mission - Vision Statement

To modernize the delivery and assessment of effective qualifications by providing a comprehensive platform for aspiring individuals and professionals. We are dedicated to offering in-depth knowledge, practical exposure, and opportunities for success and excellence in the industrial profession.

Vision

Our vision is to revolutionize the approach to professional assessments and education, ensuring agile, responsive, and fit-for-purpose learning experiences. We strive to empower fresh talent and seasoned professionals alike, fostering a community of continuous growth and achievement in the industry.

References

Several references, internal and external, have been liberally taken to emphasize any critically important aspect in this document. Wherever possible, accurate sources have been provided as a pointer towards these references. These sources have been deemed credible and/or renowned; however, the credibility of these sources is not in control of SSDF. SSDF does not take any responsibility nor is it liable for any damage that may be caused owing to such references being utilized by the reader for any purpose other than those that are written and intended for this document.

Acknowledgements

We are grateful to our patrons (privately and publicly owned companies) who have supported our endeavor to prepare this report. We are also thankful to members of the NCVET, NSDC, MSDE, Government of India, State governments, representatives of various government bodies, representatives of educational bodies, Sector Skill Councils, Awarding Bodies, Universities, Academicians, Ministries, non-profit organizations, training institutions, training partners, individual professionals and thought leaders, for participating in the survey & document and report preparation.

SSDF also takes this opportunity to thank its researchers, industrial experts, content writers, and technical professionals who have contributed significantly to the successful completion and establishment of this document.

Finally, SSDF thanks everyone who has, in some way or the other, provided inputs towards the successful completion of this report.



PART

01

Context, Objectives and Approach

- Context, Objectives and Approach

That is why skill development of the youth of this new generation is a national need; it is the foundation stone for a self-reliant India.

SHRI NARENDRA MODI, PRIME MINISTER OF INDIA
Address on World Youth Skills Day, 15 July 2021

PART 01 · CONTEXT, OBJECTIVES AND APPROACH

Context, Objectives and Approach

India's rapid industrialization, infrastructure expansion, and technological transformation have significantly increased the importance of **Occupational Safety, Health, and Environment (OSHE)** as a critical component of workforce productivity and sustainability.

With approximately **566 million people employed in India in April–June 2026**, and an estimated **87% of workers engaged in informal employment in 2023–24**, strengthening occupational safety, workforce skills and regulatory compliance remains an important challenge. As construction, manufacturing and energy activities evolve, strengthening access to industry-aligned safety training and building a skilled EHS workforce are essential to supporting safer and more resilient workplaces.[1]

At the same time, evolving factors such as:

- Automation and AI adoption
- ESG compliance requirements
- Global supply chain standards

are reshaping workforce expectations and skill requirements.

The report adopts a **system-level approach** to:

01 Assess workforce readiness in the OSHE domain

02 Identify structural skill gaps

03 Analyse sector-specific demand drivers

04 Recommend scalable skilling pathways

This approach integrates insights from industry, policy frameworks, and field-level observations to provide a **holistic view of workforce transformation in India's EHS ecosystem.**

1. https://www.pib.gov.in/PressReleseDetailm.aspx?PRID=2297093&lang=2&reg=48



PART

India's Employment & Workforce Landscape

02

- Introduction

The State shall make provision for securing just and humane conditions of work and for maternity relief.

CONSTITUTION OF INDIA
Article 42, Directive Principles of State Policy

PART 02 · INDIA'S EMPLOYMENT & WORKFORCE LANDSCAPE

Introduction

Workforce Market Structure and Skill Distribution (2026 Perspective)

India's workforce market continues to undergo structural transformation, characterized by a gradual shift from agriculture to manufacturing and services, alongside persistent informality. Recent evidence from the ILO's *Employment and Social Trends 2026* estimates **2.1 billion workers in informal employment in 2026. Informality is** associated with limited access to social protection, rights and income security.[2]

The World Bank notes informality is associated with weaker productivity and economic outcomes.

The overall Unemployment Rate (UR) remained unchanged in June, 2026 at 5.5% compared to May, 2026. During the same period, the rural UR eased marginally from 5.1% to 5.0%, while the urban UR increased slightly from 6.4% to 6.6%.

On a year-on-year basis, the urban UR declined from 7.1% in June, 2025 to 6.6% in June, 2026, a reduction of 0.5 percentage points. The overall UR and rural UR remained broadly stable over the same period.[3]

The rapid integration of artificial intelligence (AI) across sectors is reshaping workforce market structures by altering both job composition and skill demand. In 2026, AI adoption in India is contributing to a dual transformation: while automating routine and repetitive tasks, it is simultaneously generating demand for high-skill roles in data analytics, machine learning, digital operations, and AI governance. This shift is leading to a polarization of the workforce market, where low- and mid-skill roles face displacement risks, whereas high-skill, technology-oriented jobs experience growth and wage premiums. However, a significant skills gap persists, as a large share of the workforce remains concentrated in informal and low-productivity employment with limited access to reskilling opportunities. Consequently, the distribution of skills is becoming increasingly uneven, emphasizing the need for targeted upskilling, digital literacy programs, and institutional support to ensure inclusive participation in an AI-driven economy.

Sector-wise Employment Distribution (Indicative – 2026)

India's employment structure reflects an ongoing process of structural transformation. Agriculture continues to account for a large share of employment, particularly in rural areas, while urban employment is increasingly concentrated in the secondary and tertiary sectors. According to the PLFS April–

2. https://www.ilo.org/publications/flagship-reports/employment-and-social-trends-2026
3. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2297093&lang=1&reg=48

June 2026, agriculture accounted for 52.9% of rural employment, while the tertiary sector accounted for 62.0% of urban employment. Employment in the secondary sector also increased in both rural and urban areas during the quarter.

The broader transition toward manufacturing and services is important for improving workforce productivity and creating more productive employment opportunities. The World Bank identifies the reallocation of workforce and capital from agriculture toward more productive sectors, including manufacturing and services, as a key element of India's structural transformation.

However, significant differences in productivity, job quality and employment conditions persist across sectors. Informal and lower-productivity forms of employment remain particularly important in agriculture and parts of the services economy, underscoring the need for sector-specific skilling, formalisation, improved working conditions and stronger occupational safety competencies.

Formal vs Informal Employment Split (2026 Estimates)

India's workforce market remains highly informal. Depending on the definition and population covered, recent estimates indicate that a substantial majority of workers are engaged in informal employment. NITI Aayog's analysis of PLFS 2023–24 estimates that approximately 87% of India's employed workers were informally employed, while the ILO describes India's workforce market as highly informal and estimates that around 83% of workers are employed in the informal sector. Informal workers frequently have limited access to written contracts, social protection, paid leave and other employment protections.

The informal and unincorporated economy also remains an important source of employment. The Quarterly Bulletin on Unincorporated Sector Enterprises (QBUSE) reported that the unincorporated non-agricultural sector employed approximately 13.70 crore workers during April–June 2026, representing 6.55% year-on-year growth. The number of establishments increased by 9.20% over the same period, with services recording particularly strong employment growth. These trends demonstrate the continuing importance of unincorporated enterprises in providing livelihoods and employment opportunities, particularly outside the formal corporate sector.

Implications for Skill Development

The coexistence of sectoral transition and high informality has direct implications for skill development in Occupational Safety, Health, and Environment (OSHE). A sizeable proportion of workers—especially in construction, agriculture, and logistics—operate in informal settings with limited access to structured training and certification.

Therefore, future skill strategies must prioritize:

- Formalization-linked skilling pathways
- Recognition of Prior Learning (RPL) for informal workers
- Sector-specific safety competencies

- Industry-aligned certification frameworks

Such interventions are critical to bridging skill gaps while improving productivity, safety outcomes, and overall workforce market resilience.

> ***The number of establishments increased by 9.20% over the same period, with services recording particularly strong employment growth.***





PART

03

Industrial Workforce: Current Status & Key Challenges

- Employment Status in India
- Employment & Safety Resource Requirement
- The Opportunity

> *Work-related diseases and injuries were responsible for the deaths of 1.9 million people in 2016.*

WORLD HEALTH ORGANIZATION & INTERNATIONAL LABOUR ORGANIZATION
WHO/ILO Joint Estimates, September 2021

PART 03 · INDUSTRIAL WORKFORCE: CURRENT STATUS & KEY CHALLENGES

Employment Status in India

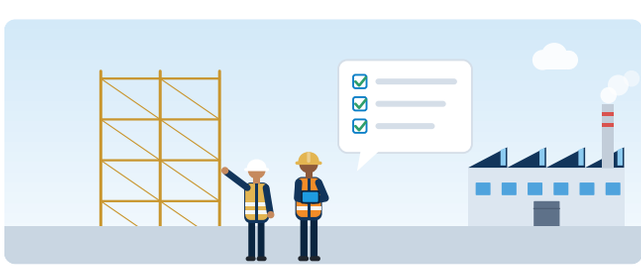
India's workforce market is among the largest in the world and continues to evolve alongside demographic and economic transformation. The World Bank estimates that around 11–12 million young people enter India's workforce market each year, creating sustained demand for employment, skills development and job creation.

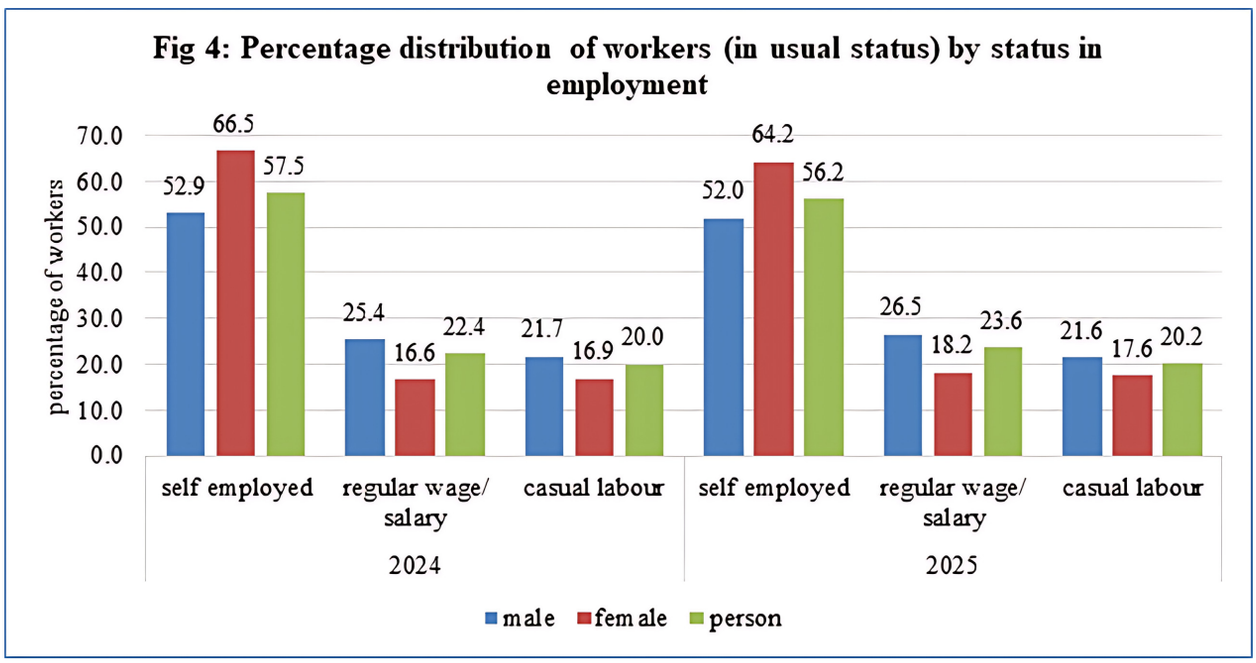
Recent Periodic Labour Force Survey (PLFS) data indicate relatively stable workforce-market participation. In August 2026, the Labour Force Participation Rate (LFPR) for persons aged 15 years and above was 55.6%, while the Worker Population Ratio (WPR) was 52.8% and the unemployment rate was 5.0%, based on the Current Weekly Status (CWS) approach.

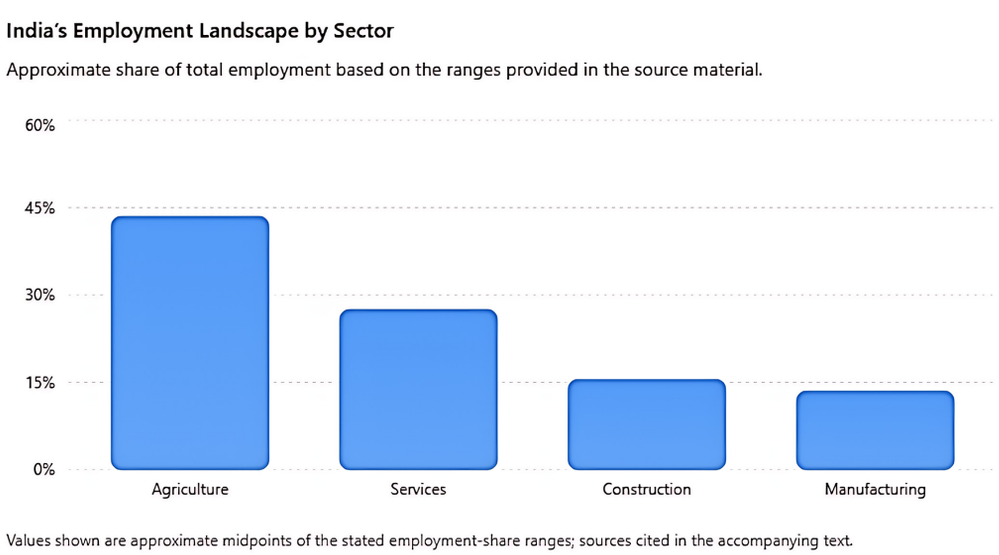
A defining feature of India's workforce market is the high prevalence of informal employment. The International Labour Organization (ILO) describes India's workforce market as highly informal, with around 83% of workers employed in the informal sector, particularly among rural, self-employed and casual workers. Many informal workers have limited access to written contracts, social security, paid leave and other legal protections.

This high degree of informality has important implications for Occupational Safety, Health and Environment (OSHE). Workers in informal and less-regulated employment arrangements may have more limited access to structured safety training, social protection and formal mechanisms for workplace risk management. Strengthening accessible, industry-relevant and competency-based OSHE skilling can therefore contribute to safer and more resilient workplaces, particularly across construction, manufacturing, services and other high-risk sectors.

> ***Such interventions are critical to bridging skill gaps while improving productivity, safety outcomes, and overall workforce market resilience.***







4

Sectoral Employment Distribution

India's sectoral employment structure reflects its transition toward a more diversified economy:

- **Agriculture** remains the largest employer, accounting for **~42–45% of total workers in 2025**, confirming that it remains one of the largest sources of employment in India (PLFS, 2025)

4. https://www.mospi.gov.in/publications-reports; https://www.pib.gov.in/PressReleasePage.aspx?PRID=2246009&lang=1&reg=3; https://competitiveness.in/wpcontent/uploads/2025/06/Report_Skill_Roadmap_Final_Compressed.pdf

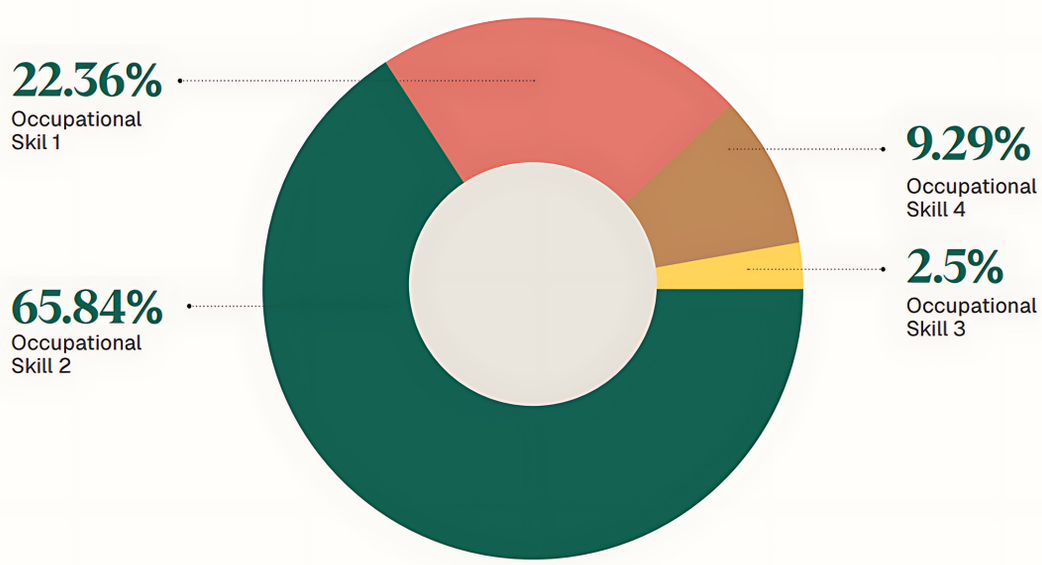
- **Manufacturing:** Manufacturing remains an important source of non-agricultural employment and is being influenced by industrial investment, supply-chain diversification and technology adoption
- **Construction:** Construction is a major source of non-farm employment and is closely linked to India's infrastructure and urbanisation cycle
- **Services sector** (including logistics, healthcare, IT, and retail): PLFS 2025 shows **43.0% in services overall** using the broad industry grouping in the all-India table
- Emerging sectors such as **renewable energy, logistics, and infrastructure development** are expected to be key drivers of incremental employment, aligned with India's energy transition and urbanization trends

Skill Distribution and Workforce Composition

India does not currently have a comprehensive national dataset mapping the entire workforce to NSQF Levels 1–8. Available workforce-market evidence indicates a large concentration of workers in low- and medium-skill occupations, alongside growing demand for higher technical, digital and professional skills

Figure 1

Occupational Skills in 2023-24



Source: Unit Level Data Analysis of Periodic Labour Force Survey (PLFS)

5

5. https://competitiveness.in/wp-content/uploads/2025/06/Report_Skill_Roadmap_Final_Compressed.pdf

At the same time, the Survey reflects a positive outlook for employment generation. A combined **88.7% of industry experts expect workforce demand to increase over the next three to five years**, including 50.0% anticipating significant growth and 38.7% expecting moderate growth. This demonstrates that future workforce challenges are likely to be driven not by the availability of jobs, but by the availability of appropriately skilled and certified professionals capable of meeting evolving industry requirements.

Implications for OSHE and Workforce Development

The current employment structure—characterized by high informality, sectoral shifts, and skill imbalances—has direct implications for **OSHE outcomes**:

- Large segments of the workforce lack formal safety training and certification
- High-risk sectors (construction, manufacturing, logistics) **face acute shortages of trained safety professionals**
- Informal workers remain excluded from structured safety systems and compliance frameworks

Addressing these challenges requires a systemic transformation of the skilling ecosystem, including:

- Expansion of formalization-linked training pathways
- Scaling Recognition of Prior Learning (RPL) for informal workers
- Integration of **safety, digital, and ESG competencies** into training frameworks
- Strengthening industry-led certification and apprenticeship models

Such interventions will be critical to improving **productivity, reducing workplace risks, and enabling inclusive, sustainable economic growth.**

> ***A combined 88.7% of industry experts expect workforce demand to increase over the next three to five years , including 50.0% anticipating significant growth and 38.7% expecting moderate growth.***



PART 03 · INDUSTRIAL WORKFORCE: CURRENT STATUS & KEY CHALLENGES

Employment & Safety Resource Requirement

India's economic expansion across infrastructure, manufacturing, energy and services is expected to reshape workforce demand through the remainder of the decade. The World Bank's 2026 India programme places private-sector-led job creation, investment, entrepreneurship and structural transformation at the centre of India's growth agenda, while around 11 million young people are expected to enter the workforce market each year over the next two decades. Digitalisation, technological adoption and the green transition are also expected to reshape employment patterns and skill requirements. The World Economic Forum identifies technology, demographic change and the green transition among the major drivers of workforce-market transformation through 2030.

This transformation has important implications for Occupational Safety, Health and Environment (OSHE) capabilities. As workplaces adopt new technologies, expand infrastructure and industrial activity, and transition towards cleaner energy systems, safety competencies increasingly need to be integrated with technical, operational and sustainability capabilities. The WEF estimates that around 63% of Indian workers will require training by 2030, highlighting the scale of the broader reskilling and upskilling requirement. For SSDF, this reinforces the need for job-relevant, competency-based OSHE training that combines practical safety skills with technological, environmental and regulatory awareness.

Safety Workforce Demand Outlook

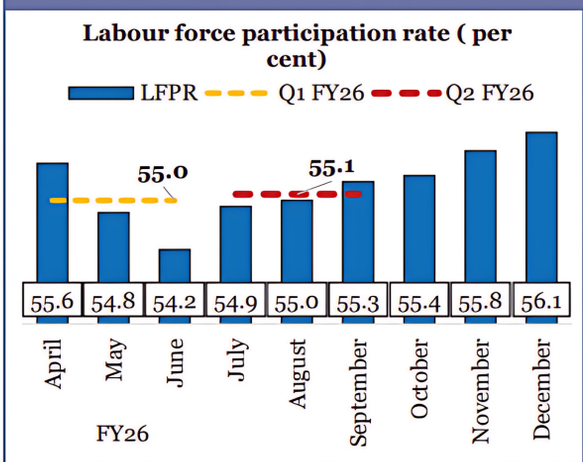
- Demand for OSHE professionals is expected to **grow at a faster pace than overall employment**, driven by regulatory tightening and risk exposure across sectors
- Safety workforce requirements are projected to **increase through 2030**, particularly in high-risk industries such as construction, manufacturing, and energy
- In addition to new job creation, **replacement demand** (attrition, workforce mobility, and ageing workforce segments) will further amplify annual hiring needs (ILO, 2026)

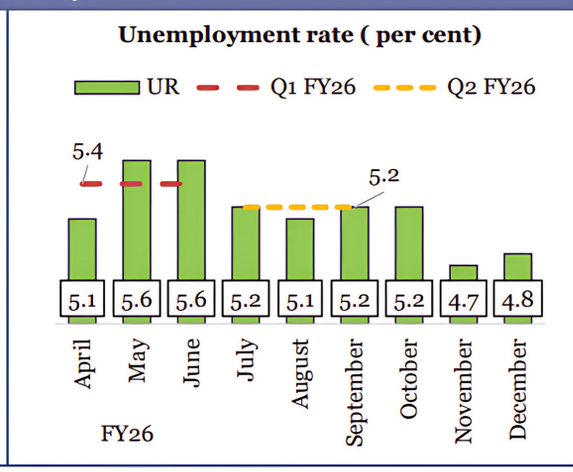
[6]

From a skills perspective, the workforce requirement is distributed across **NSQF Levels 1 to 8**, with the highest concentration at the lower and mid-levels. As reflected in the workforce assessment, **Levels 1–3 account for the majority of the existing workforce**, comprising a substantial share of the operational workforce, while Levels 4 and above represent progressively more specialised technical, supervisory, and professional roles.

6. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2174773&reg=3&lang=2; https://www.indiabudget.gov.in/economicsurvey/doc/eschapter/echap12.pdf

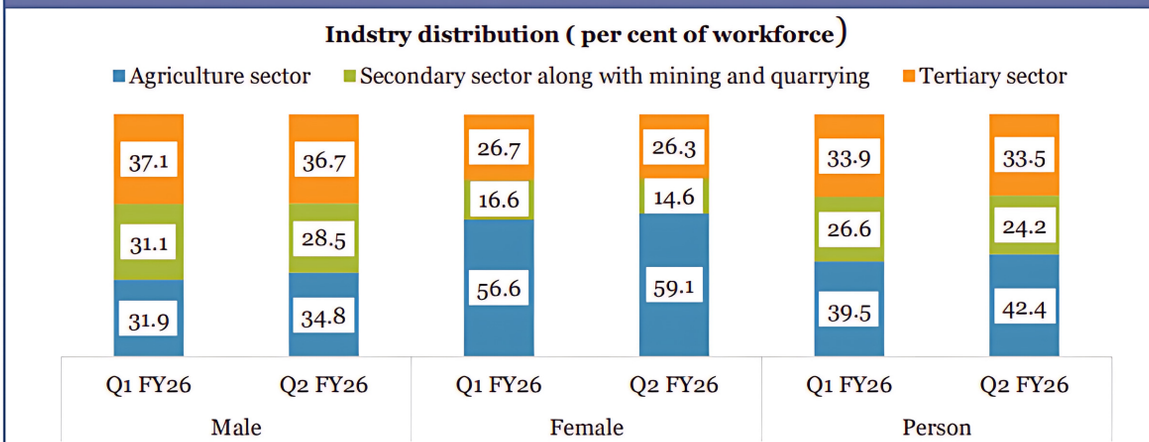
Chart XII. 1: Labour market dynamics for H1 FY26





Source: PLFS Monthly and Quarterly Bulletin; Note: Age 15 years and above in CWS

Chart XII. 2: Labour market dynamics in H1 FY26: Industry distribution



Source: PLFS Quarterly Bulletin; Note: Age 15 years and above in CWS

The assessment also indicates a continuing requirement for fresh workers across all NSQF levels, with the largest absolute requirements at Levels 1–4. This highlights the need for a balanced workforce development strategy that addresses both the scale of entry-level and skilled workforce requirements and the growing need for higher-level technical, supervisory, and specialised competencies.

As industrial operations increasingly adopt automation, digital technologies and more stringent safety and compliance requirements, workforce development will need to go beyond basic occupational skills. Greater emphasis will be required on formal training, recognised qualifications, safety competencies, digital capabilities, and continuous upskilling, particularly for workers progressing towards higher NSQF levels (ILO, 2026; WEF, 2025).

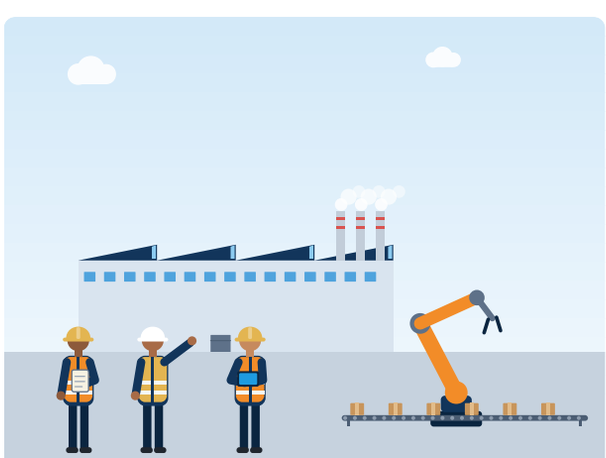
Overall, the analysis indicates a substantial and widening gap in the availability of trained safety professionals, driven by rapid workforce expansion, increasing regulatory requirements, and rising operational complexity across sectors. Industry-based estimates suggest a significant shortfall in OSHE tal-

ent, translating into a multi-million annual requirement for trained professionals, further amplified by replacement demand due to attrition, workforce mobility, and demographic shifts (International Labour Organization, 2026; World Economic Forum, 2025).

The Survey highlights a growing demand for skilled and certified professionals across occupational safety, health, environment, and sustainability domains. Organizations reported persistent challenges in recruiting competent manpower, particularly for safety-critical functions requiring technical expertise, regulatory compliance, and operational risk management. Findings also indicate that 89% of industry experts expect workforce demand to increase over the next three to five years, reflecting expanding industrial activity, infrastructure development, and increasing compliance requirements.

The demand is no longer limited to traditional safety roles. Employers increasingly require professionals equipped with competencies in emergency response planning, safety leadership, digital safety systems, ESG compliance, incident analytics, and risk assessment. These findings underscore the need for a structured workforce development ecosystem capable of producing certified, industry-ready professionals aligned with evolving industry and regulatory expectations.

> ***The WEF estimates that around 63% of Indian workers will require training by 2030, highlighting the scale of the broader reskilling and upskilling requirement.***



PART 03 · INDUSTRIAL WORKFORCE: CURRENT STATUS & KEY CHALLENGES

The Opportunity

The accelerating demand for a skilled safety workforce presents a transformational opportunity to embed Occupational Safety, Health, and Environment (OSHE) as a core pillar of India's workforce development ecosystem. As industries expand and regulatory frameworks strengthen, demand for safety capabilities is rising sharply across sectors. Industry-based projections indicate a substantial shortfall in trained safety professionals, translating into a multi-million annual requirement for skilled personnel, driven by both new job creation and replacement demand (International Labour Organization, 2026; World Economic Forum, 2025).

This demand surge creates large-scale opportunities for **structured skilling, certification, and capacity building**, particularly in high-risk and high-growth sectors. It also reinforces the need to transition from fragmented training approaches toward a **standardized, industry-aligned, and scalable safety skilling ecosystem**.

The Safety Skill Development Foundation is playing a pivotal role in advancing this transformation by developing and implementing **industry-aligned safety qualifications and training frameworks**. Through the creation and operationalization of **Qualification Packs (QPs)** and **National Occupational Standards (NOS)**, SSDF has established structured pathways across key domains including:

- Construction safety
- Scaffolding and rigging
- Ergonomics and workplace safety
- Process and industrial safety
- Road safety and others

These frameworks align with national skilling architecture and support **standardization, portability, and quality assurance of safety competencies** (National Skill Development Corporation, 2025).

SSDF's expanding training ecosystem—comprising training partners, assessors, and industry workforce—is enabling the delivery of scalable skilling and certification programs across multiple sectors and geographies.

SSDF's initiatives in **capacity building, assessor development, and certification systems** are critical enablers for scaling safety training delivery. In parallel, its focus on **Recognition of Prior Learning (RPL)** is particularly important in the Indian context, where **75–85% of the workforce is engaged in informal employment** (ILO, 2026; World Bank, 2026).

By formalizing existing skills within the informal workforce, these interventions contribute to:

- Improved safety awareness and compliance

- Enhanced employability and wage outcomes
- Greater inclusion in formal economic systems

Alignment with High-Growth Sectors

SSDF's strategy is closely aligned with sectors driving India's economic expansion, including:

- **Construction and Infrastructure** – largest employment generator with high safety risk exposure
- **Manufacturing** – increasing automation and compliance requirements
- **Renewable Energy and Power** – rapid expansion under energy transition goals (International Energy Agency, 2025; World Bank, 2026)

This alignment ensures that safety skilling efforts are **demand-driven, sector-specific, and future-oriented**, addressing both current workforce needs and emerging risks.

The Survey further reveals strong industry preference for government-recognized certifications, advanced safety competencies, digital skills, and emerging roles such as Safety Data Analysts, ESG Specialists, and AI-enabled Operations Professionals. These findings present a strategic opportunity for SSDF to lead the development of future-ready qualification frameworks, certification pathways, and workforce development initiatives that address both current and emerging industry needs. By strengthening industry partnerships, promoting competency-based training, and aligning skilling programs with Industry 4.0 & ESG, SSDF can play a pivotal role in building a safer, more productive, and globally competitive workforce while supporting national skill development and economic growth objectives.

> ***SSDF's initiatives in capacity building, assessor development, and certification systems are critical enablers for scaling safety training delivery.***



Hands-on, competency-based training builds a job-ready safety workforce



PART

Industry Landscape & Workforce Demand 04

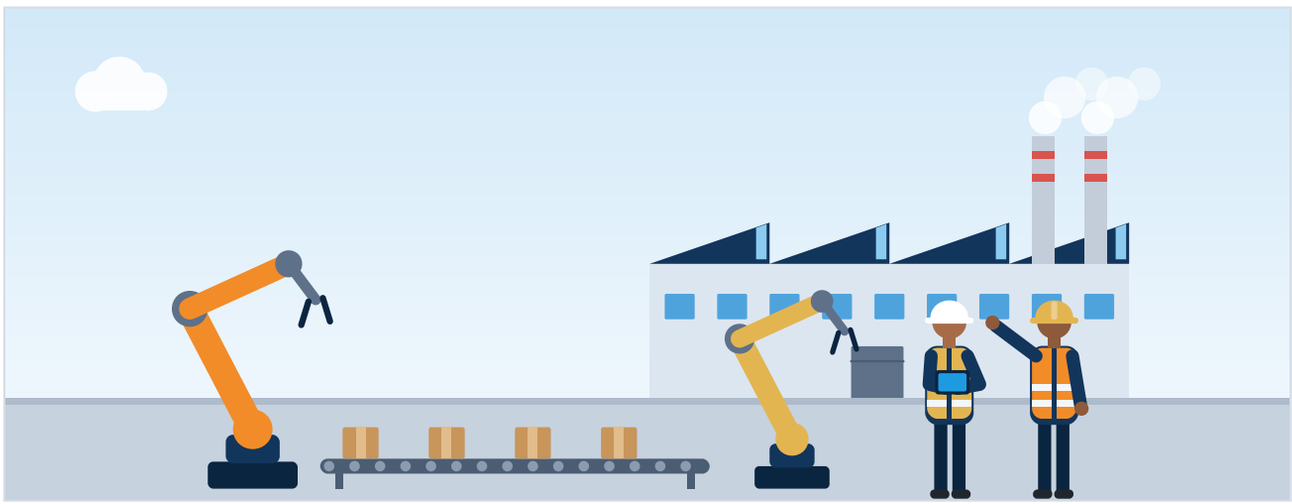
- Industry Overview

Nearly three million workers die every year due to work-related accidents and diseases, an increase of more than 5 per cent compared to 2015.

INTERNATIONAL LABOUR ORGANIZATION
ILO estimates, November 2023

PART 04 · INDUSTRY LANDSCAPE & WORKFORCE DEMAND

Industry Overview



SECTOR 01

Manufacturing

A Key Growth Drivers

The Make in India initiative continues to drive domestic manufacturing by:

- Promoting local production and value addition
- Attracting global manufacturers and supply chains
- Enhancing sectoral competitiveness across industries

This expansion is increasing demand for **structured safety frameworks and skilled industrial safety professionals.**

B Industrial Expansion

India is witnessing rapid growth across key manufacturing sectors:

- Automotive and EVs
- Pharmaceuticals and chemicals
- Electronics and semiconductors

This expansion introduces **complex production environments, requiring**:

- Advanced process safety systems
- Strong regulatory compliance mechanisms
- Skilled technical and safety workforce

(World Bank, 2026)

C Export Growth and Global Integration

India's increasing participation in global value chains is driving:

- Higher export volumes and manufacturing output
- Adoption of international safety and quality standards

- Greater focus on ESG and compliance frameworks

(World Economic Forum, 2025)

D Framework for Future

- Industry 4.0 adoption
- Automation & robotics
- Advanced Process Safety Systems

Process industries (chemicals, oil & gas, pharma) are increasingly adopting:

- Hazard analysis systems (HAZOP, SIL assessments)
- Real-time monitoring and control systems
- Emergency response and containment mechanisms

These systems are critical for **preventing high-impact industrial incidents.**

(International Labour Organization, 2026)

E Enablers

E.1 Industrial Corridors and Clusters

Development of industrial corridors such as:

- Delhi-Mumbai Industrial Corridor
- Chennai-Bengaluru Industrial Corridor

is enabling:

- Large-scale manufacturing ecosystems
- Integrated infrastructure and logistics
- Standardized safety and compliance frameworks

E.2 Rising FDI Inflows

India continues to attract significant foreign direct investment (FDI), leading to:

- Adoption of global safety standards and best practices
- Increased compliance requirements and audits
- Transfer of advanced technologies and safety systems

(World Bank, 2026)

E.3 Technology Integration

Integration of digital and engineering technologies is enhancing:

- Operational efficiency
- Workplace safety monitoring

Incident prediction and prevention capabilities

F Talent and Capability Landscape

F.1 Machine Safety

With increasing mechanization, **machine safety** is a critical priority:

- Safe operation of automated systems and production lines
- Implementation of guarding systems and interlocks

Compliance with international safety standards

F.2 Process Safety Expertise

Demand for **process safety** professionals is growing, particularly in high-risk industries:

- Chemicals and petrochemicals
- Pharmaceuticals
- Energy and heavy industries

These roles **require specialized training in hazard identification, risk assessment, and system safety design.**

F.3 Industrial Hygiene and Occupational Health

Industrial hygiene is gaining importance due to:

- Exposure to chemicals, dust, and hazardous substances
- Need for monitoring air quality and workplace conditions
- Increasing regulatory and ESG requirements

(ILO, 2026)

G Best Case Scenario: High-Performance Industrial Safety Systems

G.1 Automated and Smart Plants

Advanced manufacturing facilities are leveraging:

- Fully or partially automated production systems
- AI-driven monitoring and predictive maintenance
- Integrated safety control systems

Resulting in **significant reduction in manual intervention and human error.**

G.2 Reduced Human Exposure to Risk

Automation and process optimization are minimizing:

- Worker exposure to hazardous environments
- Repetitive and high-risk manual tasks
- Incident probability in critical operations

G.3 High Safety Compliance and Global Standards

Organizations adopting global best practices demonstrate:

- Strong regulatory compliance and audit performance
- Lower incident and downtime rates
- Improved investor confidence and ESG ratings





SECTOR 02

Logistics & Warehousing

A Key Growth Drivers

- Rapid expansion of e-commerce and last-mile delivery ecosystems (World Bank, 2026)
- Increasing demand for integrated and resilient supply chains (ILO, 2026)
- Growth in domestic and international trade volumes (PLFS, 2025–26)

B Framework for Future

- Large-scale adoption of warehouse automation and robotics (ILO, 2026)
- Digitization of logistics through AI, IoT, and real-time tracking systems
- Implementation of advanced safety management systems across logistics operations

C Enablers

- Infrastructure growth
- Technology adoption
- Private investment

D Talent & Knowledge

- Material handling safety
- Transport risk management
- Warehouse safety

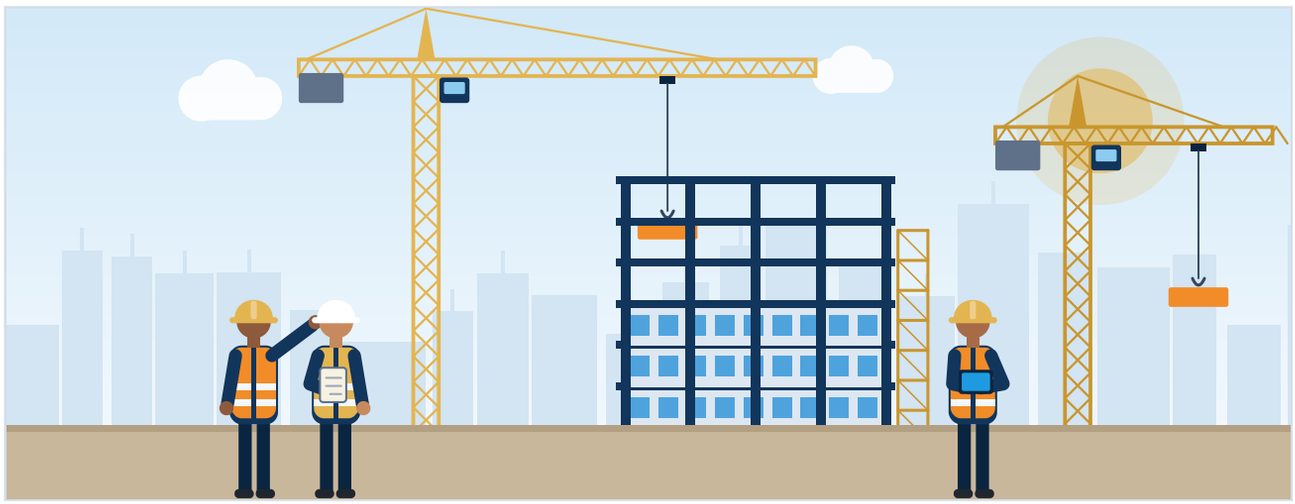
E Best Case Scenario / Case Study

- Automated warehouses
- Minimal human risk
- Efficient operations



Source: PIB, Government of India (PIB Backgrounders)





SECTOR 03

Construction & Real Estate

Key Growth Drivers

A Urbanization and housing demand

India's urban population is projected to reach ~600 million by 2030, significantly increasing demand for residential, commercial, and urban infrastructure development (World Bank, 2026).

This rapid expansion is intensifying the need for:

- Standardized safety practices across construction sites
- Skilled Environment, Health & Safety (EHS) professionals
- Risk mitigation frameworks in high-density urban projects

B Smart cities and infrastructure projects

Flagship programs such as the Smart Cities Mission and large-scale infrastructure initiatives—including metro rail, highways, and industrial corridors—are accelerating construction activity.

These projects introduce:

- High complexity and multi-stakeholder environments
- Advanced engineering and execution risks
- Greater need for integrated safety planning and monitoring systems

C Private real estate investments

Rising foreign direct investment (FDI) and institutional participation are transforming the sector. Global investors are increasingly prioritizing:

- ESG compliance and reporting
- Worker safety and welfare standards
- Transparency and regulatory adherence

(World Economic Forum, 2025)

This shift is driving **formalization and professionalization of safety roles** across construction value chains.

D Framework for Future

D.1 BIM and digital construction

The adoption of **Building Information Modelling (BIM)** is transforming project planning and execution. BIM-enabled environments allow:

- Early-stage hazard identification and risk simulation
- Improved coordination across stakeholders
- Lifecycle-based safety planning and monitoring

Industry studies suggest BIM adoption can reduce **project risks by 20–30%**, improving both safety and cost efficiency.

D.2 Green Buildings

Green Building frameworks are becoming central to real estate and infrastructure development. The **"Social" pillar**, particularly worker safety, is now:

- A measurable performance indicator
- A factor influencing investment decisions and ratings
- A driver of corporate reputation and compliance

(WEF, 2025; World Bank, 2026).

D.3 Safety integration in lifecycle

Safety is increasingly being embedded across the **entire asset lifecycle**:

01	02	03	04
Design phase	**Construction phase**	**Operations & maintenance**	**Demolition**
risk elimination	hazard control	ongoing compliance	end-of-life safety

Early-stage safety integration has been shown to significantly reduce:

- Accident rates
- Project delays
- Cost overruns

E Enablers

E.1 Government-Led Demand and Schemes

Programs such as Pradhan Mantri Awas Yojana and Smart Cities Mission are:

- Driving large-scale construction demand
- Embedding quality and safety benchmarks
- Expanding the need for trained construction workforce

E.2 Policy Support and Public Investment

India's infrastructure push—supported by˜ 10 lakh crore+ annual public expenditure—is strengthening both sector growth and regulatory oversight (Ministry of Finance India, 2026).

E.3 Strengthening Safety Regulations

Key frameworks such as:

- Building and Other Construction Workers Act
- National Building Code of India
- India Labour Codes (2020 reforms)

are reinforcing compliance requirements, although enforcement variability remains a structural challenge.

F Talent & Knowledge

F.1 Site Safety Supervisors (NSQF L3–5)

There is a growing demand for certified safety supervisors at site level. Estimates suggest a shortage of trained EHS personnel, especially at supervisory levels in Tier 2 and Tier 3 cities.

F.2 Scaffolding and Working at Height Skills

Working at height and scaffolding-related activities account for **~30–40% of construction fatalities globally** (International Labour Organization, 2026).

This highlights the urgent need for:

- Specialized, first-hand training programs
- Certification and compliance systems
- Continuous skill upgradation

F.3 Construction Safety Management

Demand for **safety officers, auditors, and managers** is increasing due to:

- Regulatory mandates
- Client and investor expectations
- Integration of safety KPIs into project performance

Organizations are now linking safety outcomes directly with:

- Project efficiency
- Cost management
- Reputation and ESG scores

G Best Case Scenario / Case Study

G.1 Certified Safety Officers Mandatory at Sites

Mandating certified safety professionals across all large construction sites ensures accountability and structured safety management systems.

G.2 Reduction in Accident Rates

Evidence from structured safety interventions indicates:

- 40–60% reduction in workplace accidents
- Significant decline in fatalities and serious injuries

(ILO, 2026; global industry benchmarks)

G.3 Improved Productivity

Safer worksites lead to fewer disruptions, higher worker morale, and improved efficiency—resulting in up to 10–15% productivity gains.

> ***Safer worksites lead to fewer disruptions, higher worker morale, and improved efficiency—resulting in up to 10–15% productivity gains.***



GLIMPSES FROM THE FIELD





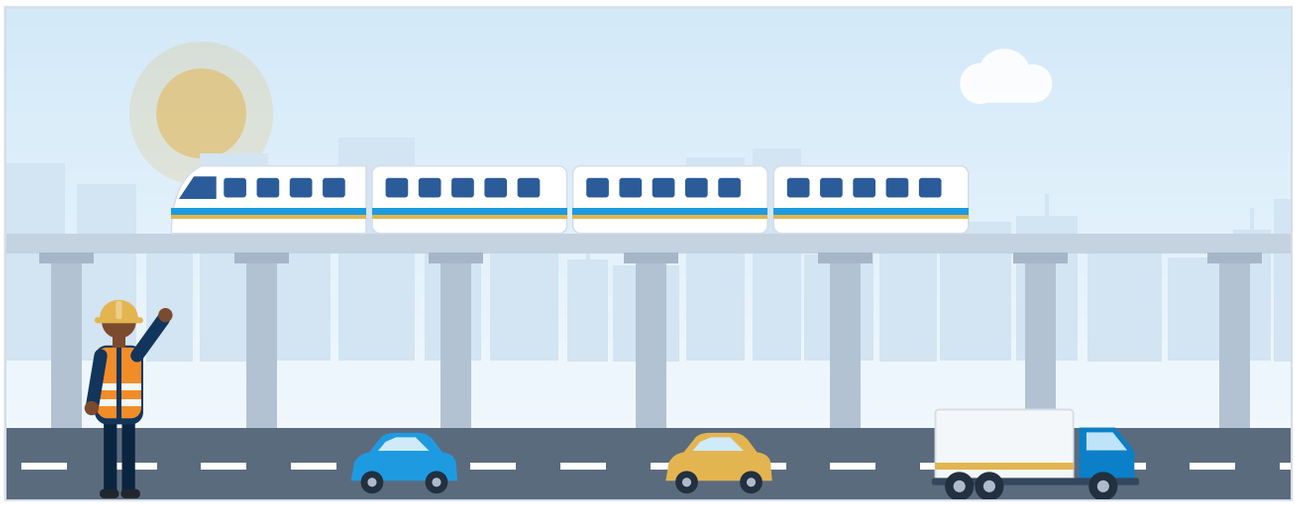




> ***Mandating certified safety professionals across all large construction sites ensures accountability and structured safety management systems.***



Right equipment, right training: personal protective equipment is the last line of defence



SECTOR 04

Infrastructure (Road, Rail, Metro)

A Key Growth Drivers

A.1 National Infrastructure Pipeline (NIP)

The National Infrastructure Pipeline, with an investment pipeline exceeding~ 100 lakh crore, is a key driver of infrastructure growth across:

- Transport (roads, railways, metro systems)
- Energy and utilities
- Urban infrastructure

(Ministry of Finance India, 2026)

This scale of investment is significantly increasing demand for:

- Structured safety systems
- Certified EHS professionals
- Standardized safety frameworks across projects

A.2 Rail & Metro Expansion

India is witnessing rapid expansion and modernization of rail networks, led by agencies such as Indian Railways.

- **900+ km of metro lines operational**, with significant additions under construction
- Expansion across Tier 1, 2, and emerging cities

These projects involve high-risk environments such as:

- Tunnelling and underground construction
- Elevated corridors
- Live-track operations

Requiring advanced safety planning, monitoring, and specialized workforce capabilities.

A.3 Highway Development

Flagship programs like Bharat Mala Pariyojana are accelerating road construction.

- India is constructing ~30–35 km of highways per day
- Increasing use of high-speed, mechanized construction techniques

This rapid pace increases exposure to:

- Equipment-related accidents
- Traffic interface risks
- Worker fatigue and operational hazards

B Framework for Future

B.1 Digital Monitoring Systems

Emerging technologies are transforming infrastructure safety:

- **IoT-enabled sensors** for real-time hazard detection
- **Drones** for site surveillance and inspections
- **AI-based analytics** for predictive risk management

These technologies can:

- Reduce incident response time by up to 50%
- Improve compliance monitoring and reporting accuracy

(World Economic Forum, 2025)

B.2 Integrated Safety Management

Organizations are moving toward integrated systems combining safety, quality, and environment (EHSQ). This ensures initiative-taking risk identification and aligns safety with overall project performance.

B.3 Smart Infrastructure

Smart infrastructure integrates digital systems into physical assets, requiring new safety protocols for cyber-physical risks and advanced construction techniques.

C Enablers

C.1 PPP Models (Public-Private Partnerships)

PPP frameworks are enhancing infrastructure delivery by:

- Bringing private sector efficiency and capital
- Introducing global safety standards and compliance practices
- Strengthening accountability and performance monitoring

(World Bank, 2026)

C.2 Government Funding

India's continued capital expenditure—₹ **10 lakh crore+ annually**—is:

- Fuelling infrastructure expansion
- Enabling technology adoption and modernization
- Strengthening regulatory and safety oversight

(Ministry of Finance India, 2026).

C.3 Technology Adoption

Adoption of automation, robotics, and digital tools is improving construction efficiency and safety, though it also creates demand for upskilled workers.

D Talent & Knowledge

D.1 Safety Heavy Equipment

With rising mechanization, safe operation of cranes, excavators and road-laying equipment is critical, as equipment-related incidents constitute a significant share of infrastructure accidents (International Labour Organization, 2026).

D.2 Tunnelling & Project Safety

Tunnel construction (metro, highways) involves high-risk environments such as confined spaces, poor ventilation, and ground instability, requiring specialized safety training.

D.3 Risk Management

Risk assessment and mitigation are becoming core competencies. Organizations are adopting structured tools like HAZOP, JSA, and digital risk registers.

E Best Case Scenario / Case Study

- Real-Time Safety Tracking

Use of wearable devices and tracking systems allows continuous monitoring of worker health and site conditions, enabling immediate intervention.

- Minimal Incident Projects

Projects implementing strong safety culture and systems have demonstrated near-zero accident records, improved reputation, and reduced delays.

- High Compliance Standards

Strict adherence to safety regulations and international standards leads to better audit outcomes, reduced legal risks, and improved investor confidence.

GLIMPSES FROM THE FIELD



> ***Projects implementing strong safety culture and systems have demonstrated near-zero accident records, improved reputation, and reduced delays.***



SECTOR 05

Oil & Gas

A Key Growth Drivers

A.1 Energy Demand Growth

India's energy demand continues to grow rapidly, driven by:

- Industrial expansion
- Urbanization and infrastructure growth
- Rising consumption across sectors

(International Energy Agency, 2026)

This growth is increasing the need for:

- Robust safety systems across the energy value chain
- Skilled workforce in high-risk operational environments

A.2 Exploration Activities

A.3 Refining Expansion

India is expanding its refining and petrochemical capacity to meet domestic and export demand. These facilities involve:

- Complex chemical processes
- Hazardous materials handling
- Continuous, large-scale operations

Driving demand for **advanced process safety and risk management systems.**

(World Bank, 2026)

B Framework for Future

- Advanced Risk Management
- Emergency Response Systems
- Global Safety Standards

C Enablers

- Regulatory Compliance
- Technology Upgrades
- Industry Expertise

D Talent & Knowledge

- HAZOP & Risk Analysis
- Offshore Safety
- Process Safety

E Best Case Scenario / Case Study

- Zero-Incident Operations

- High Safety Benchmarks
- Strong Emergency Systems



Source: ONGC (Oil and Natural Gas Corporation Ltd.), ongcindia.com





SECTOR 06

Power (Thermal & Renewable)

A Key Growth Drivers

A.1 Rising electricity demand

India's electricity demand continues to grow due to:

- Industrialization and manufacturing expansion
- Urbanization and infrastructure development
- Electrification of mobility and rural areas

(International Energy Agency, 2026)

This growth is driving the need for:

- Safe and reliable power generation systems
- Skilled workforce for high-risk electrical environments

A.2 Capacity expansion

A.3 Energy transition

India's commitment to clean energy transition is accelerating:

- Large-scale renewable deployment
- Integration of distributed energy systems
- Shift toward low-carbon technologies

(World Bank, 2026)

This transition requires **new safety frameworks for emerging technologies and grid systems.**

B Framework for Future

B.1 Smart Grids

B.2 Predictive Safety Systems

B.3 Digital Monitoring

Power plants and networks are increasingly adopting:

- SCADA and remote monitoring systems
- IoT-enabled sensors
- AI-driven operational insights

(World Economic Forum, 2025)

This enhances both **operational efficiency and safety performance.**

C Enablers

C.1 Government Policies

Policy frameworks such as:

- Renewable energy targets
- Grid modernization programs

- Safety and compliance regulations

are driving both **sector growth and safety standardization.**

(Ministry of Power India, 2026)

- Private Investment
- Technology Adoption

D Talent & Knowledge

- Electrical Safety
- O&M Safety
- Plant Safety Management

Comprehensive safety management systems are required across:

- Thermal plants (boilers, turbines, fuel handling)
- Renewable plants (solar farms, wind installations)
- Transmission and distribution networks

(International Labour Organization, 2026)

E Best Case Scenario / Case Study

- Predictive Maintenance
- Zero Downtime Incidents
- Safe Plant Operations

GLIMPSES FROM THE FIELD











SECTOR 07

Renewable Energy (Solar, Wind, Clean Energy)

A Key Growth Drivers

A.1 Clean energy targets

India has set ambitious renewable energy targets as part of its long-term energy strategy, including large-scale expansion of:

- Solar power capacity
- Wind energy installations
- Hybrid and storage-integrated systems

(International Energy Agency, 2026)

This expansion is driving demand for **safe installation, operation, and maintenance practices across dispersed and large-scale assets.**

A.2 ESG commitments

Global and domestic investors are increasingly prioritizing **Environmental, Social, and Governance (ESG)** performance:

- Safety is a key component of the **"Social" pillar**
- ESG-linked financing is tied to **safety and compliance metrics**
- Companies are required to demonstrate **robust safety governance systems**

(World Economic Forum, 2025)

A.3 Global climate goals

India's alignment with global climate commitments is accelerating:

- Decarbonization of power systems
- Adoption of low-carbon technologies
- Development of green hydrogen ecosystems

(World Bank, 2026)

These transitions introduce **new safety challenges and regulatory requirements.**

B Framework for Future

- Standard safety protocols
- ESG integration
- Hydrogen safety systems

C Enablers

- Policy incentives

Government initiatives supporting renewable growth include:

- Incentives for solar and wind deployment
- National missions for green hydrogen

- Regulatory frameworks promoting safety and quality standards

(Ministry of New and Renewable Energy, 2026)

- Global investments
- Technology innovation

D Talent & Knowledge

- Electrical safety
- WAH skills

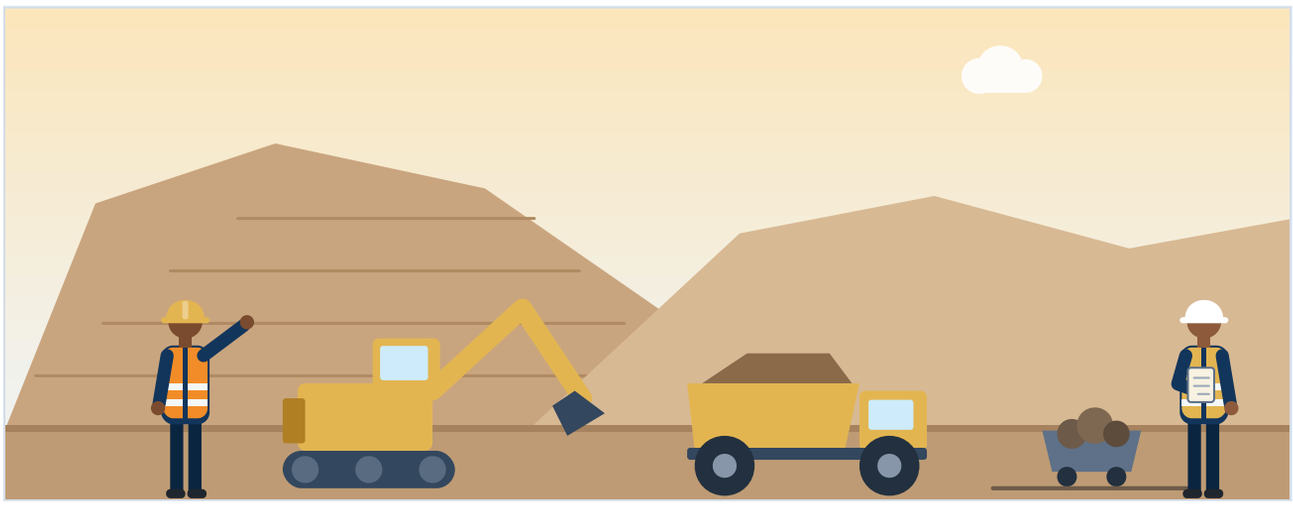
Wind energy and utility-scale solar installations involve significant **working at height risks**, particularly in:

- Wind turbine installation and maintenance
- Elevated solar structures
- WAH remains a **critical safety skill area**, with high-risk exposure if not responsibly managed (International Labour Organization, 2026)
- Hydrogen risk awareness

E Best Case Scenario / Case Study

- Safe renewable parks
- Global compliance standards
- Zero major incidents





SECTOR 08

Mining & Metals

A Key Growth Drivers

- *Make in India 2.0* and Production-Linked Incentive (PLI) expansion driving industrial output (World Bank, 2026)
- Accelerated industrial expansion across MSMEs and large-scale manufacturing clusters (PLFS, 2025–26)
- Export-led growth supported by global supply chain diversification (ILO, 2026)

B Framework for Future

- Adoption of Industry 4.0 technologies, including IoT-enabled safety systems (ILO, 2026)
- Increased deployment of automation and robotics reducing manual risk exposure
- Integration of advanced process safety management systems

C Enablers

- Development of industrial corridors and smart manufacturing zones
- Rising FDI inflows into core manufacturing sectors (World Bank, 2026)
- Rapid technology integration across production systems

D Talent & Knowledge

- Mine safety
- Hazard control
- Risk assessment

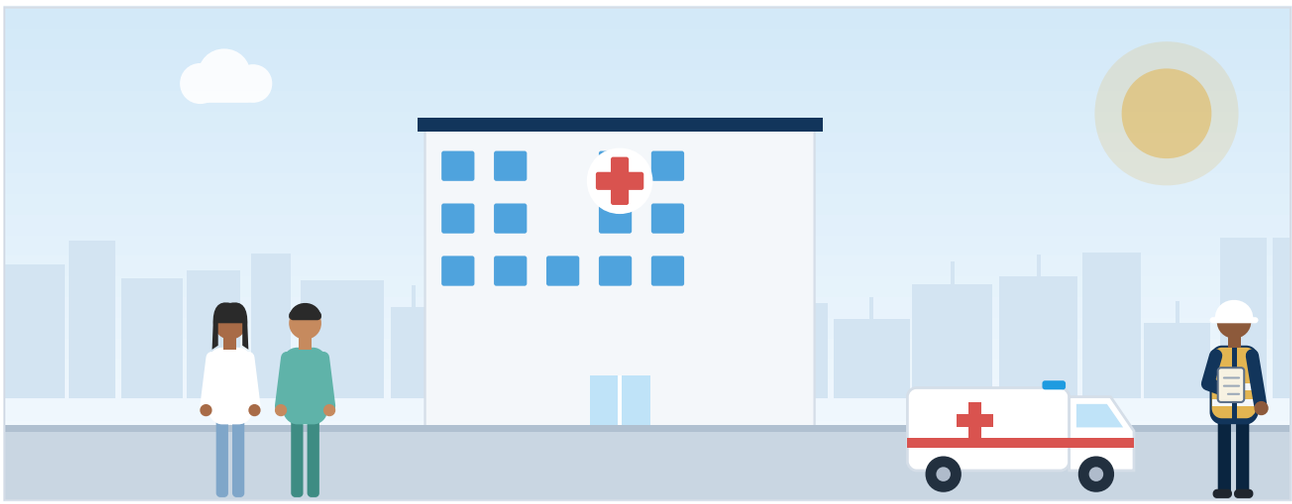
E Best Case Scenario / Case Study

- Smart Mines
- Automated Hazard Detection
- Reduced Fatalities


MINING EVOLUTION
TRADITIONAL PRACTICES
SMART SOLUTIONS
SMART MINES
सुरक्षा हेलमेट पहनें
WEAR HELMET
आंखों को सुरक्षा करें
WEAR EYE PROTECTION
नाक को सुरक्षा करें
WEAR RESPIRATOR
N95 Filter Efficiency: 92%
प्रतिबंधित क्षेत्र
NO UNAUTHORISED ENTRY
खनन क्षेत्र
MINING AREA
DETECTION ANALYSIS
REAL-TIME GAS MONITORING: OK
ROCKFALL WARNING: CLEAR
EQUIPMENT HEALTH: 98%
REDUCED FATALITIES
ZERO INCIDENTS FOR [dynamic number]




A skilled, safe and future-ready workforce for India



SECTOR 09

Healthcare



A Key Growth Drivers

- Rising healthcare demand driven by population growth, aging demographics, and disease burden (World Bank, 2026)
- Expansion of hospitals, diagnostics, and tertiary care infrastructure (PLFS, 2025–26)
- Increased public health focus and pandemic preparedness (ILO, 2026)

B Framework for Future

- Infection control systems
- Digital healthcare

- Safety protocols

C Enablers

- Government schemes
- Private sector growth
- Technology

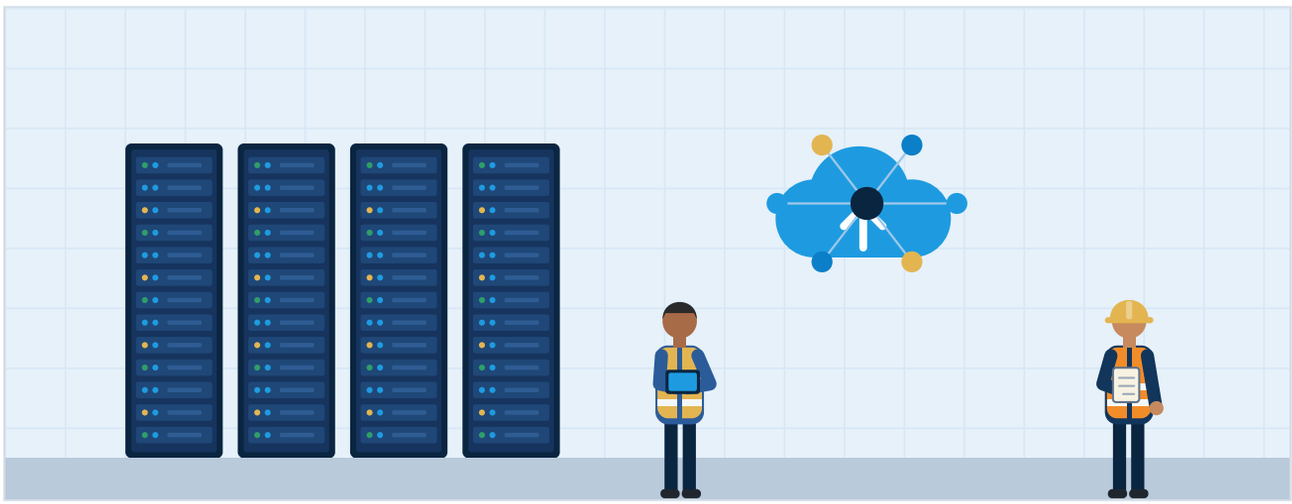
D Talent & Knowledge

- Occupational health
- Biomedical waste management
- Infection control

E Best Case Scenario / Case Study

- Zero infection spread
- Safe healthcare facilities
- High compliance





SECTOR 10

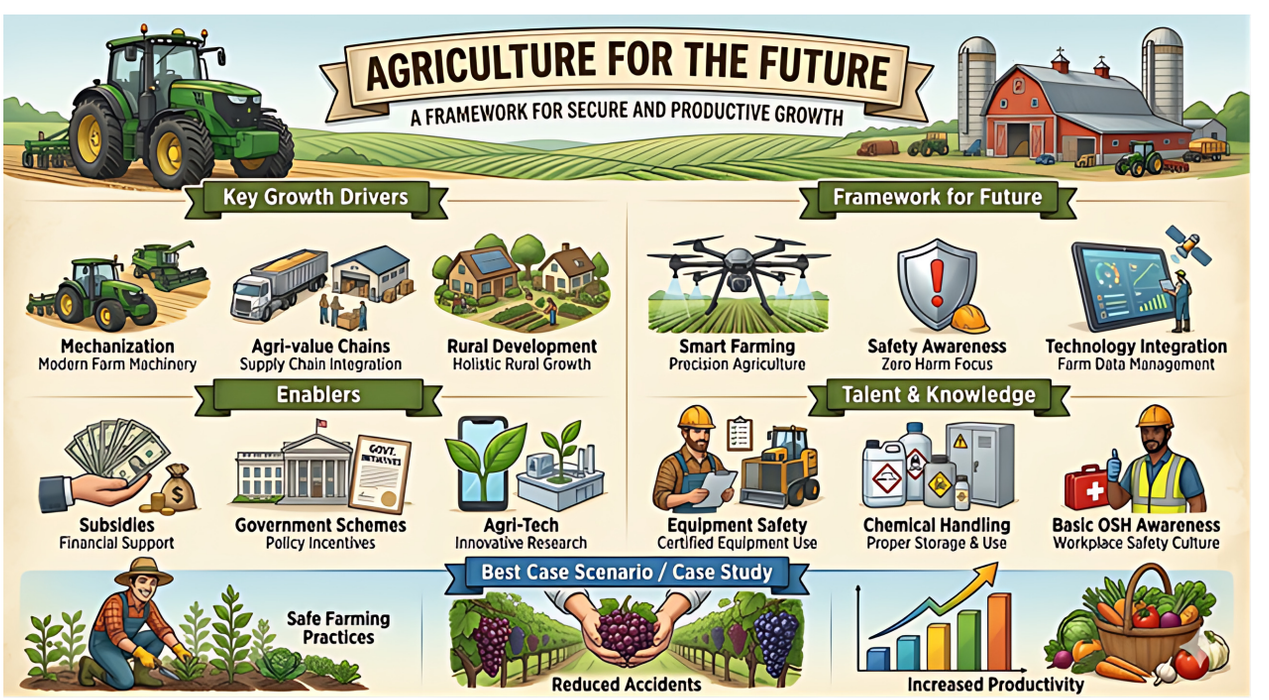
IT & Data Centers

	(Strategic Points)
💡 Key Growth Drivers	• Digital economy • Data consumption growth • Cloud expansion
⚙️ Enablers	• Policy Support • Technology • Investment
🛡️ Framework for Future *(Core Focus)*	• Cyber-physical safety • Fire & electrical systems • Risk management
🎓 Talent & Knowledge	• Electrical safety • Fire safety • Data center risk
🚀 Best Case Scenario / Case Study	• Secure Infrastructure • Resilient Systems • Zero Downtime Incidents



SECTOR 11

Agro Based & Allied



India's industrial ecosystem is undergoing significant transformation driven by infrastructure expansion, manufacturing growth, digitalization, sustainability commitments, and increasingly stringent safety and compliance requirements. The Survey indicates that workforce capability has emerged as a major business concern, with 77.9% of industry experts identifying difficulties in the availability of skilled manpower and 80% reporting that technology and automation are significantly impacting skill requirements. These findings suggest that industries are not only seeking additional manpower but also demanding a workforce equipped with modern technical, safety, digital, and compliance-related competencies.

It further highlights that organizations are prioritizing workforce quality and future readiness. Industry experts identified Industry-Academia Collaboration (82.5%) and Upskilling/Reskilling Programs (82.5%) as the most effective strategies for addressing workforce challenges, while 74.6% emphasized the need for practical training approaches. These findings confirm that workforce development has become a strategic requirement for industrial competitiveness, operational excellence, and sustainable growth.

> ***These findings confirm that workforce development has become a strategic requirement for industrial competitiveness, operational excellence, and sustainable growth.***



Right equipment, right training: personal protective equipment is the last line of defence



PART

05

Workforce Migration & Mobility Trends

- Workforce Migration
- Defining Human Capital in Industrial Domain
- Employment Void and Potential Growth
- Future Trends in Employment
- Sectors at Risk and Diverging Trends
- Lack of Accreditations or Qualifications Mechanism

> *Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.*

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS
SDG Target 8.8

PART 05 · WORKFORCE MIGRATION & MOBILITY TRENDS

Workforce Migration

A prominent feature in South-East Asia and a key driver of economic growth and development

Workforce migration remains an important feature of India's workforce-market dynamics, particularly for sectors and regions with strong demand for mobile and seasonal workforce. Estimates based on Census trends and migration research have placed India's internal migrant-worker population at around 140 million, although this is an estimate rather than a current official PLFS count and should not be presented as a 2026 figure. Internal migration is predominantly short-distance, with rural-to-rural migration accounting for a large share; rural-to-urban and urban-to-urban migration together represented around 40% of total internal migration in estimates based on Census patterns.

Migration is influenced by employment opportunities, wage differentials and regional disparities in economic opportunities. Major destination areas include states and metropolitan regions with substantial industrial, construction and services activity, while poorer and employment-constrained regions contribute significant workforce out-migration.

Migrant workers are particularly relevant to OSHE because many are engaged in temporary, casual or informal employment arrangements. Evidence highlights vulnerabilities related to limited access to social protection, employment documentation, worker representation and structured workplace safety mechanisms. These concerns are particularly significant in construction and other workforce-intensive activities. Research has estimated that 50–60% of workers employed in construction may be circular migrants when intra-state circular migration is included, although this estimate should not be generalised across all migrant workers or sectors.

For OSHE skilling, this mobility reinforces the importance of portable, competency-based training and certification, particularly for workers moving across worksites, contractors, states and sectors. These sectors are also characterized by higher occupational risk exposure, thereby increasing the vulnerability of migrant workers to workplace accidents, injuries, and long-term health hazards (ILO, 2026).

The nature of workforce migration in India is circular and seasonal, with 60–70% of migrant workers moving periodically between source and destination regions (World Bank, 2026). This cyclical mobility leads to discontinuities in skill development, limited access to standardized induction training, and inconsistent adherence to safety practices across worksites. Additionally, structural challenges such as linguistic diversity (20+ major languages), low literacy levels, and absence of formal onboarding systems further constrain effective communication and implementation of safety protocols.

In terms of occupational roles, migrant workers are engaged in job roles aligned with various **National Occupational Standards (NOS)** such as:

- Construction Safety Steward / Scaffolder / Mason Helper
- Rigging and Lifting Technician
- Warehouse Associate / Material Handler; Machine Operator / Helper (Manufacturing)
- Mine Worker / Equipment Operator; Farm Worker / Agri Equipment Handler

A considerable proportion of migrant workers require basic to intermediate safety competencies, including hazard identification, use of personal protective equipment (PPE), safe manual handling practices, and emergency response preparedness. However, these competencies are rarely imparted through formal or standardized training mechanisms, particularly within informal and high-risk sectors (International Labour Organization, 2026).

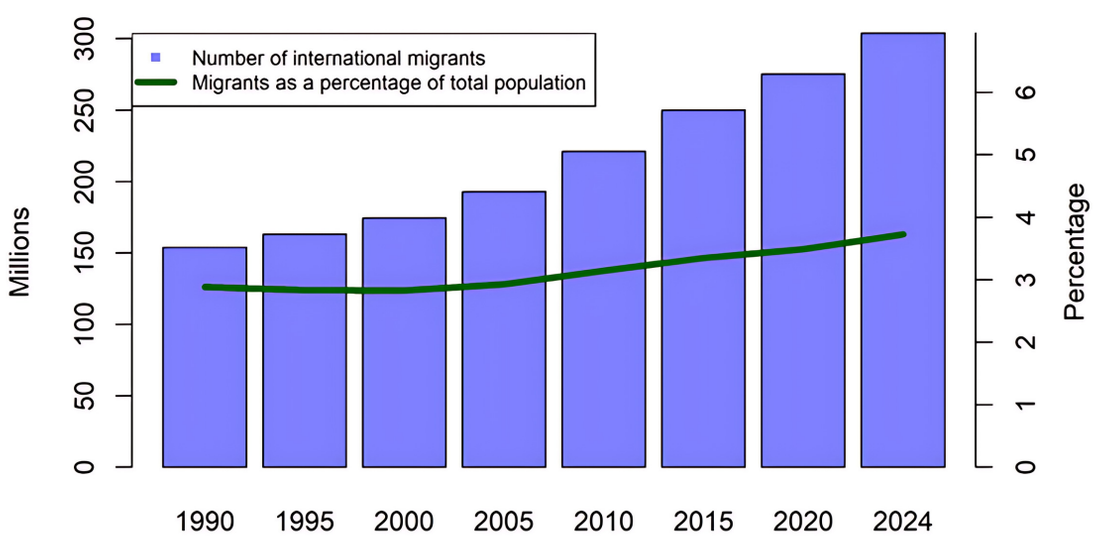
Addressing workforce migration effectively presents a strategic opportunity to strengthen the occupational safety ecosystem. Targeted interventions such as multi-lingual training modules, mobile-based learning platforms, and standardized induction programs can significantly enhance accessibility and training penetration among migrant workers. In addition, scaling Recognition of Prior Learning (RPL) frameworks can help formalize existing skills and improve employability outcomes (Ministry of Labour and Employment, 2026).

A critical enabler in this context is the development of a nationally portable skill registry, linked with NSQF-aligned certification systems, enabling workers to carry verifiable credentials across employers, sectors, and geographies. Such portability is essential in addressing the challenges posed by circular migration patterns and fragmented employment structures (World Bank, 2026).

Integrating migrant workers into the formal skilling ecosystem is therefore essential—not only for improving occupational safety outcomes, but also for enhancing productivity, reducing workforce attrition, and supporting inclusive economic growth (ILO, 2026; World Bank, 2026). Strengthened focus in this area will play a pivotal role in bridging the safety skill gap, while contributing to the development of a resilient, mobile, and industry-ready workforce aligned with India's long-term development priorities.

Figure 1

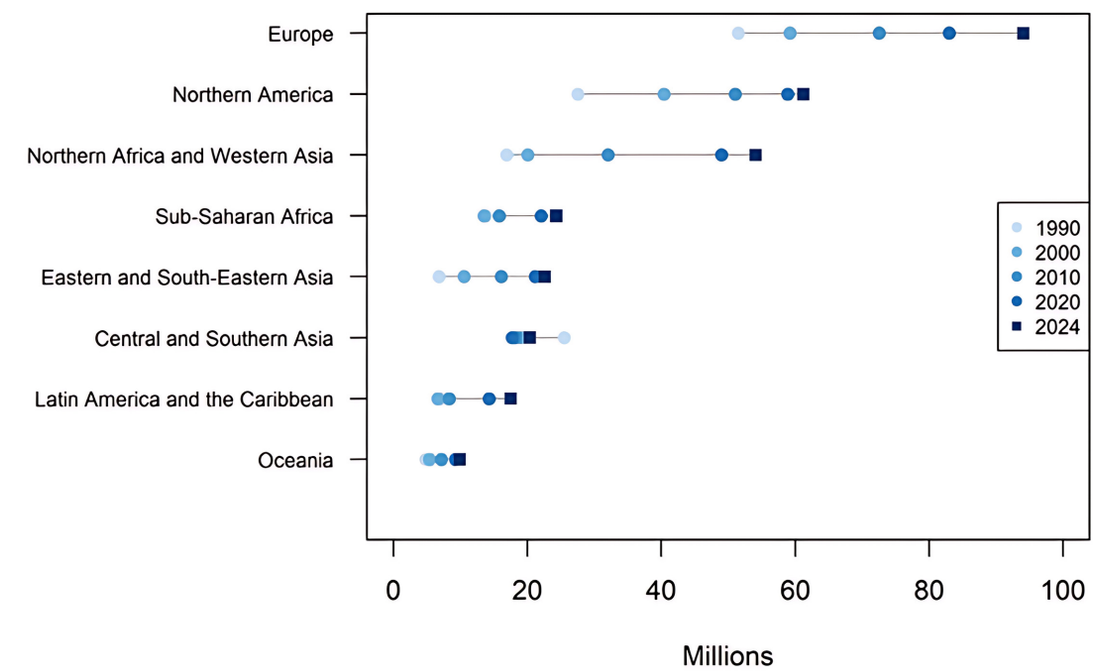
Number of international migrants worldwide and as a share of the global population, 1990-2024



Data source: United Nations (2025).

7

Number of international migrants by region of destination, 1990-2024



Data

source: United Nations (2025).
Note: Regions ordered by number of international migrants in 2024.

8

Areas that can alleviate the unrest within the workforce market:

The Survey findings demonstrate dedicated support for nationally recognized certification frameworks as a solution to these challenges. An overwhelming 96.8% of industry experts prefer government-recognized certifications, while 77.8% support certification through recognized third-party awarding bodies. These findings indicate that standardized qualifications and certification systems can improve workforce mobility, strengthen employer confidence, and ensure consistent competency standards across geographic and industrial boundaries.

7. https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/undesa_pd_2025_intlmigstock_2024_key_facts_and_figures_advance-unedited.pdf
8. https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/undesa_pd_2025_intlmigstock_2024_key_facts_and_figures_advance-unedited.pdf; https://www.mea.gov.in/population-of-overseas-indians.htm; https://worldmigrationreport.iom.int/

PART 05 · WORKFORCE MIGRATION & MOBILITY TRENDS

Defining Human Capital in Industrial Domain

Identifying the industrial and construction needs (2026-30)

Human capital in the industrial domain refers to the collective workforce comprising skilled, semi-skilled, and unskilled workers, equipped with technical expertise, safety competencies, and operational capabilities required across key sectors such as construction, manufacturing, infrastructure, mining, and energy (International Labour Organization, 2026).

In the 2026–2030 period, the role of human capital is transitioning from a quantity-driven workforce model to a quality- and productivity-driven paradigm, with increasing emphasis on safety, efficiency, and technology integration.

Industrial and Construction Workforce Needs (2026–2030)

India's employment landscape is expected to evolve significantly through 2030, supported by economic growth, infrastructure investment, manufacturing expansion, energy transition and increasing private-sector investment. The World Bank's 2026 India Country Partnership Framework places job-rich, private-sector-led growth at the centre of India's development strategy, with infrastructure and energy, value-added manufacturing and other workforce-intensive sectors identified as important areas for employment generation.

Key Workforce Requirements

1 Structured Skilling Across NSQF Levels

- Demand will increasingly focus on NSQF Levels 1-4, covering semi-skilled to supervisory roles
- Emphasis on formal certification and standardized training pathways (PLFS 2025–26)
- Need to transition workers from informal skill acquisition to certified competencies



Obstacles or Challenges Prevalent in India

- Fragmented ecosystem: Multiple stakeholders with limited coordination lead to inconsistent training quality (World Bank, 2026)
- Low industry alignment: Skill programs often do not match evolving industrial and technological requirements (International Labour Organization, 2026)
- Limited practical exposure: Insufficient first-hand training and apprenticeship opportunities reduce job readiness
- Regional disparities: Unequal access to training infrastructure across states, especially in rural and low-income regions
- Informal sector exclusion: The majority of the workforce lacks access to formal skilling, certification, and safety training (PLFS 2025–26)

- Weak safety integration: Safety competencies are not systematically embedded in mainstream skill development frameworks

INDIA'S WORKFORCE CHALLENGES: KEY ISSUES & STRATEGIC IMPACT

CORE ISSUES	DATA POINTS & SUB-TEXT	STRATEGIC IMPACT
1. HIGH INFORMALITY	• 80-85% of the workforce (~450 million) operates in the unorganized sector. • Limited access to formal training, social security, and workplace safety standards.	Weakens the social security safety net and severely escalates on-site workplace hazards.
2. SIGNIFICANT SKILL GAPS	• Less than 5% of the workforce is formally skilled, heavily concentrated in low NSQF levels (1–3). • A critical projected deficit of 12.8 million safety workers by 2030.	Leads to severe and chronic shortages of qualified site supervisors, technicians, and safety professionals.
3. FRAGMENTED MIGRATION	• 120–140 million mobile domestic migrant workers active across industries. • Persistent language barriers and a complete lack of portable certifications.	Frequent seasonal mobility heavily disrupts workforce integration and long-term organizational stability.
4. LOW SAFETY CULTURE	• Extremely poor implementation and adoption of safety (OSHE) practices in high-risk zones. • Exceptionally weak or absent enforcement of sectoral safety standards.	Results in a continuous surge of preventable workplace injuries and lower overall operational productivity.
5. TRAINING & INFRASTRUCTURE	• Severe deficit of qualified trainers and skilling infrastructure in high-growth corridors. • Highly inadequate scale-up and execution of emerging green and digital skill modules.	Creates a massive operational mismatch between training academy outcomes and real-world industrial needs.
6. WEAK REGULATION & POLICY	• Inadequate or loose enforcement of central labour codes and workplace safety regulations. • Weak or fractured industry-academia linkages, rapidly lowering skill relevance.	Directly dampens and slows down digital literacy and ESG compliance adoption rates among the active labor force.

Addressing these core issues through integrated policy, skilling, safety culture, and industry collaboration is critical for building a future-ready, resilient, and inclusive workforce.

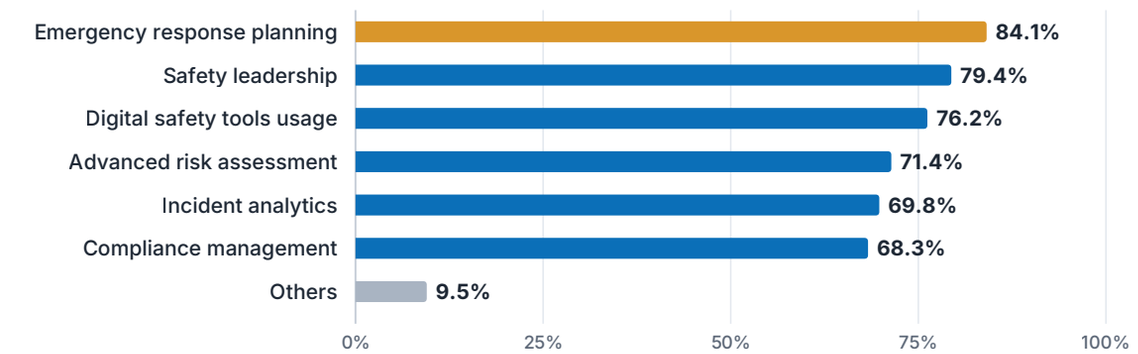
The Survey findings clearly demonstrate this shift. Industry experts identified Emergency Response Planning (84.1%), Safety Leadership (79.4%), and Digital Safety Tool Utilization (76.2%) as the most important future competencies. Furthermore, emerging occupational roles such as Safety Data Analysts (82.5%), AI/Digital Operations Specialists (76.2%), and ESG/Sustainability Specialists (69.8%) reflect the growing need for multidimensional workforce capabilities. These findings suggest that future human capital development must integrate technical, digital, safety, and sustainability competencies within a unified workforce development framework.

> ***An overwhelming 96.8% of industry experts prefer government-recognized certifications, while 77.8% support certification through recognized third-party awarding bodies.***

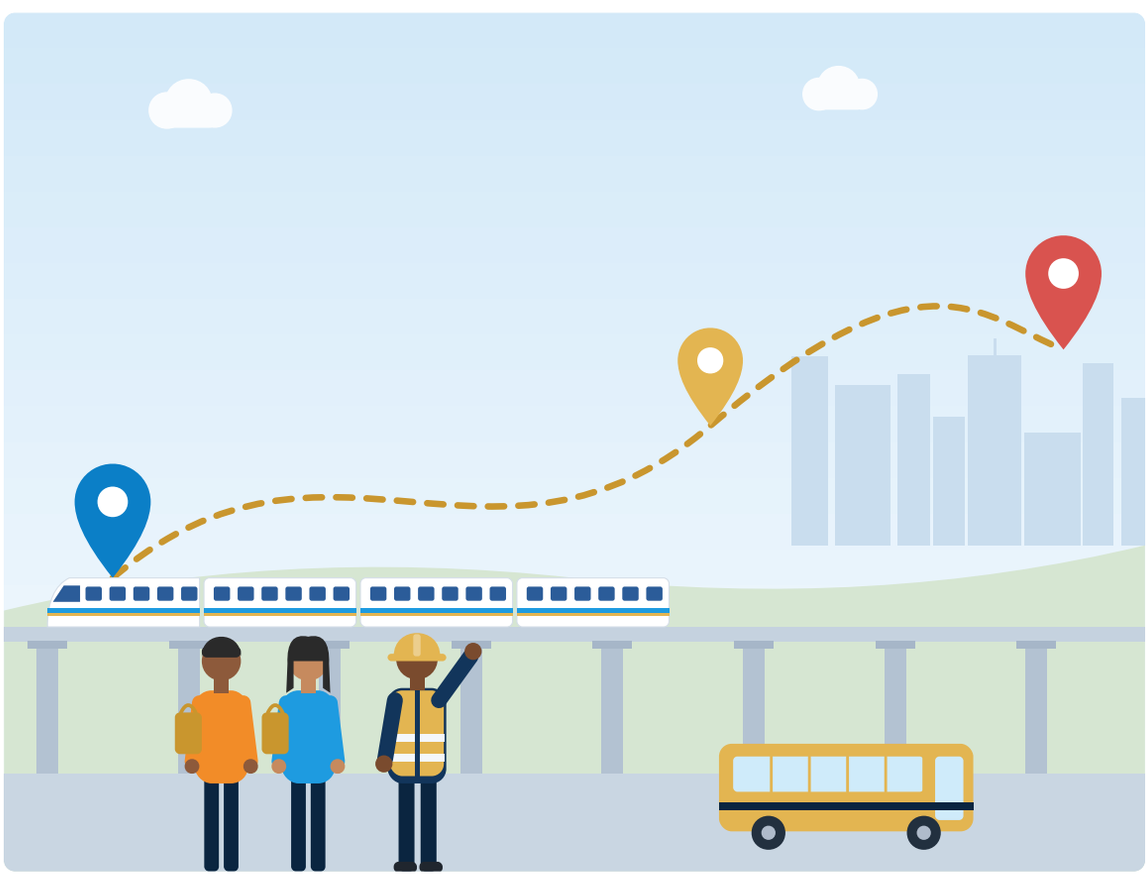
SURVEY Q28

Additional safety competencies required

Multiple responses permitted · % of industry experts



> ***Industry experts identified Emergency Response Planning (84.1%), Safety Leadership (79.4%), and Digital Safety Tool Utilization (76.2%) as the most important future competencies.***



PART 05 · WORKFORCE MIGRATION & MOBILITY TRENDS

Employment Void and Potential Growth

India's employment landscape is expected to undergo significant transformation through 2030, driven by economic growth, infrastructure investment, manufacturing expansion, energy transition and technological change. The World Bank estimates that around 11–12 million young people enter India's workforce market each year, highlighting the continuing need to expand employment opportunities while strengthening the country's skilling and workforce-development systems.

A key challenge is the alignment between industry demand and the availability of job-ready workers with relevant technical, digital and occupational competencies. The skills gap is particularly important in sectors involving infrastructure, construction, manufacturing, energy and other safety-critical activities, where workforce expansion needs to be accompanied by appropriate OSHE competencies. Rather than treating the shortage as a single national number of safety professionals, the evidence supports a sector-specific approach to identifying competency gaps and strengthening occupational safety, health and environmental capabilities.

Nature of the Employment Void

The employment gap is most evident in **high-growth sectors** such as:

- Construction
- Manufacturing
- Renewable energy
- Logistics and warehousing

These sectors are expanding rapidly, but skill **development and certification systems are not scaling at the same pace**. Despite India's large workforce pool, employability remains constrained due to:

- Low penetration of formal vocational and occupational training — a significant proportion of India's workforce has limited access to structured, formally recognised training and upskilling pathways
- Limited integration of safety awareness and practical OSHE training — safety competencies are not uniformly integrated into workforce preparation, particularly across informal, MSME and high-risk work environments
- Uneven adoption of standardised, industry-recognised safety certifications — although India has established NSQF- and NCVET-aligned qualifications, access, adoption and recognition of structured safety certifications remain uneven across sectors and workforce segments

- High dependence on informal and mobile/migrant workforce — informal employment remains a major feature of India's workforce market, while migrant and seasonal workers are particularly important in sectors such as construction, infrastructure and logistics

Opportunity for Growth and Job Creation

At the same time, this gap represents a significant opportunity for workforce development and economic expansion.

- Annual demand for **3.8–4.0 million trained safety professionals** (including replacement demand)
- Rapid job creation across **emerging sectors**:
- Renewable energy
- Green hydrogen
- Data centers
- Advanced manufacturing

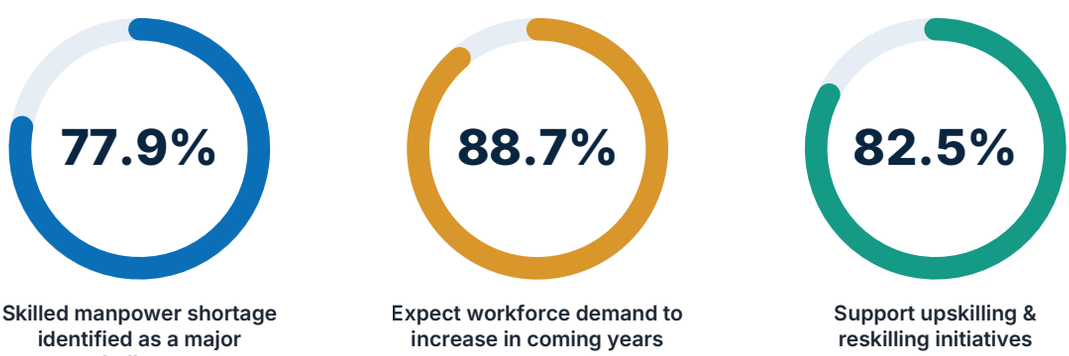
These sectors require **future-ready, specialized skill sets**, particularly in safety, digital operations, and process management.

The Survey confirms both the existence of this gap and the scale of future opportunity. While **77.9% of industry experts identified skilled manpower shortages as a major challenge**, a combined **88.7% expect workforce demand to increase** in the coming years. Additionally, **82.5% of industry experts support upskilling and reskilling initiatives**, indicating strong recognition that workforce development is essential to bridging existing competency gaps. These findings demonstrate that the future employment challenge is not merely quantitative but also qualitative, requiring focused investments in skill development, certification, and competency enhancement.

SURVEY HIGHLIGHTS

Industry perspectives on workforce demand & skill development

% of industry experts



PART 05 · WORKFORCE MIGRATION & MOBILITY TRENDS

Future Trends in Employment

India's employment landscape over 2026–2030 will be shaped by **rapid industrial expansion, technological transformation, and sustainability-led growth**. The total workforce is projected to grow significantly over the decade, driven by investments in infrastructure, manufacturing, logistics, renewable energy, healthcare, and digital ecosystems.

A key structural shift will be the **transition from informal to semi-formal and formal employment**, supported by digital workforce platforms, regulatory reforms, and increasing compliance requirements across industries.

One of the most significant trends is the **rising demand for mid-skill roles (NSQF Levels 3–6)**, including technicians, supervisors, operators, and safety professionals. As industries adopt automation and process optimization, job roles will evolve, requiring **multi-disciplinary skill sets** that combine technical expertise, digital literacy, and safety competencies.

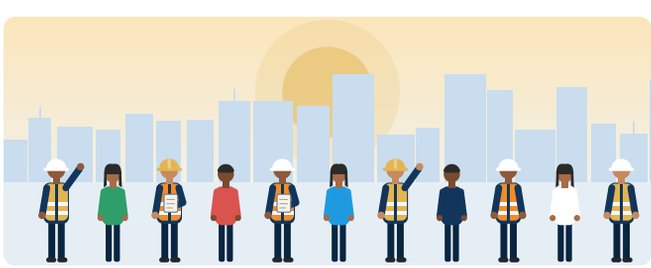
The integration of Industry 4.0 technologies—including automation, IoT, artificial intelligence, and advanced analytics—will redefine job functions and workplace practices. Workers will increasingly operate in technology-enabled environments, making digital and safety integration essential components of workforce readiness.

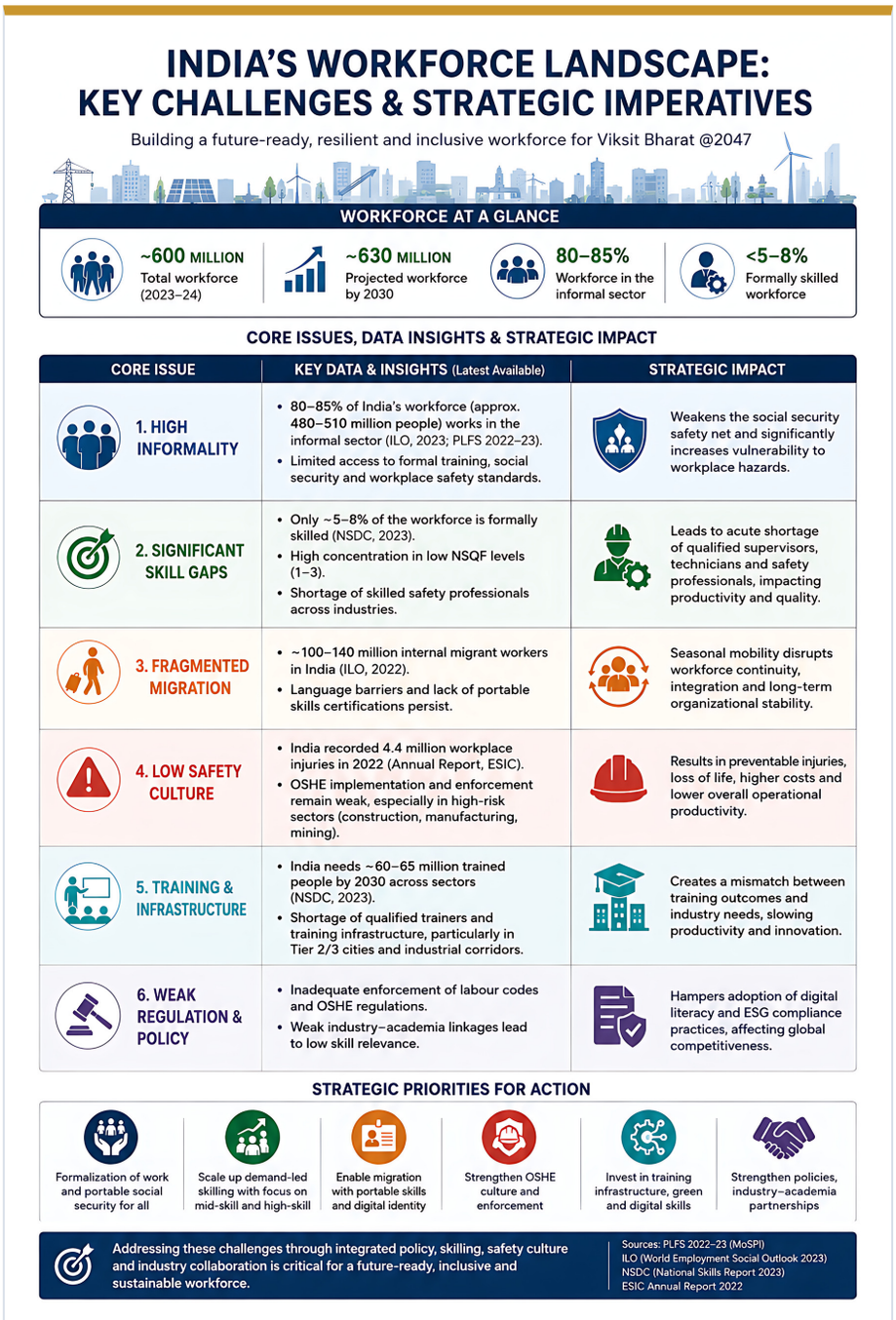
The green transition will be a major employment driver. Sectors such as renewable energy (solar, wind, and green hydrogen), circular economy, and sustainable infrastructure are expected to generate millions of new jobs, increasing demand for green skills, ESG compliance, sustainability

The expansion of **data centres, digital services, and e-commerce ecosystems** will further accelerate employment in IT-enabled services and logistics, requiring a workforce proficient in **digital operations, supply chain management, and safety protocols**.

Workforce mobility and migration will remain central to industrial growth, with a large migrant workforce supporting key sectors. This will drive the need for portable skill certifications, multilingual training systems, and digital skill tracking mechanisms.

There will also be increasing emphasis on **Occupational Safety, Health, and Environment (OSHE)** as a core pillar of employment frameworks, with stronger regulatory enforcement and corporate governance standards making safety integration mandatory across job roles.





Employment Vulnerability Among Low-Skilled Workers (2026 Perspective)

Low-skilled workers have shouldered a disproportionate share of job losses in recent years, a trend that continues into 2026. Globally, low-skilled occupations have accounted for a significant share of job displacement since the pandemic recovery phase, despite contributing a smaller share of total wage income.

In emerging economies such as India, informal and low-skilled workers constitute 80–85% of the workforce, making them particularly vulnerable to economic shocks, demand fluctuations, and limited social protection coverage.

The impact is further intensified by automation and digitization. Estimates suggest that a substantial proportion of routine and low-skilled tasks are at elevated risk of automation by 2030, with early effects already visible across manufacturing, retail, and logistics sectors.

Between 2023 and 2026, sectors employing a high share of low-skilled workers—including construction, textiles, small-scale manufacturing, and gig work—have experienced significantly higher job volatility compared to high-skilled sectors. This reflects the cyclical nature of demand and lower employment security in these segments.

Wage recovery has also been uneven. While high-skilled workers have experienced moderate real wage growth, low-skilled workers have faced wage stagnation or marginal increases, often insufficient to offset inflationary pressures.

Within this segment, women and migrant workers remain disproportionately affected, with workforce participation and employment recovery lagging behind pre-pandemic levels in several regions.

Importantly, the definition of “low-skilled” is evolving. Workers lacking digital literacy, safety certification, or multi-functional capabilities are increasingly categorized as low-skilled, even if they possess traditional technical experience. This shift reflects the growing importance of adaptive, technology-enabled, and compliance-oriented skills in modern industrial systems.

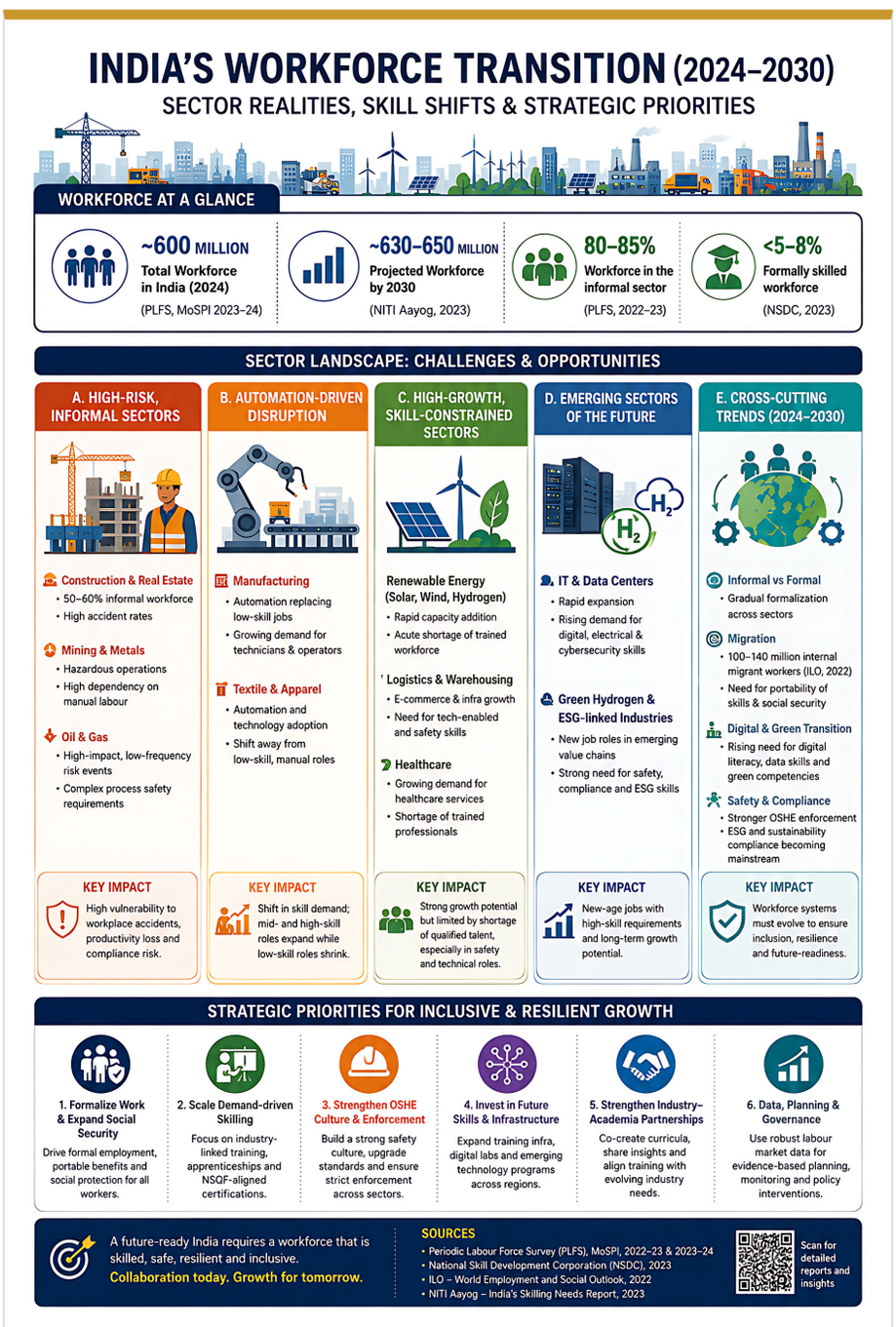
As industries adopt smart manufacturing, real-time monitoring, and stricter compliance frameworks, workers without such adaptive capabilities face higher risks of displacement. This indicates that workforce challenges in 2026 are less about absolute job availability and more about the changing definition of employability and skills relevance.



This shift reflects the growing importance of adaptive, technology-enabled, and compliance-oriented skills in modern industrial systems.

PART 05 · WORKFORCE MIGRATION & MOBILITY TRENDS

Sectors at Risk and Diverging Trends



The Survey findings indicate that organizations continue to face substantial occupational safety, health, and environmental risks across sectors. Electrical hazards, fire and explosion incidents, equipment failures, working-at-height activities, and hazardous material exposure emerged as the most significant safety concerns. Although industry experts reported moderate levels of safety preparedness, the results suggest that many organizations still require improvements in emergency response capability, safety leadership, risk assessment practices, and incident prevention systems.

The increasing adoption of automation, digital technologies, and sustainability-driven business models is also creating diverging workforce trends across sectors. While some traditional occupations may decline, demand for digitally enabled, compliance-focused, and sustainability-oriented professionals is expected to grow significantly, requiring initiative-taking workforce planning and continuous competency development.

The Survey findings indicate that organizations continue to face substantial occupational safety, health, and environmental risks across sectors.



Hands-on, competency-based training builds a job-ready safety workforce

PART 05 · WORKFORCE MIGRATION & MOBILITY TRENDS

Lack of Accreditations or Qualifications Mechanism

A fundamental challenge in India's industrial workforce ecosystem is the **absence of a robust, standardized accreditation and qualification framework** that ensures consistent recognition of skills, competencies, and experience across sectors. This raises critical questions: how can a structured and reform-oriented system be developed to enable workers to acquire relevant skills, how can such systems be effectively communicated to ensure last-mile delivery, and how can workers be empowered to compete based on competencies rather than informal experience?

Bridging this gap requires a collaborative and well-defined institutional ecosystem, with the government providing strategic direction, policy oversight, and quality standards, and industry playing a central role in defining occupational requirements, emerging skills, and workplace competencies. This government–industry alignment can ensure that skill development initiatives remain **demand-driven, industry-relevant, scalable, and outcome-oriented**, while enabling the workforce to respond effectively to evolving technologies and employment needs.

While several initiatives—such as the **National Skill Qualification Framework (NSQF)** and sector skill councils—have been introduced, **implementation gaps persist**, particularly in ensuring uniform adoption, quality assurance, and industry alignment.

A key limitation is the lack of **function-specific competency frameworks**, as different industrial roles require distinct technical expertise, safety standards, and operational capabilities. Developing such competencies requires **active participation not only from individuals but also from industry ecosystems**, including employers, contractors, and training providers.

Equally important is the inclusion of the **informal and unorganized sector**, which constitutes a significant share of the workforce. This requires a **mindset shift towards formal recognition of skills**, supported by accessible certification pathways, recognition of prior learning (RPL), and modular training systems.

Stakeholder engagement will be critical in this process. **Trade unions, workforce associations, NGOs, and community organizations** must play an active role in facilitating awareness, mobilization, and adoption of skill certification systems, particularly among marginalized worker groups.

The development of a **centralized and credible accreditation ecosystem** can enable large-scale skill standardization while improving workforce productivity, safety, and employability. However, achieving this will require:

- Strong institutional coordination
- Knowledge sharing across sectors

- Adequate domain expertise
- Targeted investments in skilling infrastructure
- Long-term commitment from both public and private stakeholders

Such a framework would not only enhance **industrial performance and workforce mobility** but also support India's transition towards a **formal, skill-driven economy**.

Most challenges in this domain lie at the intersection of **institutional inefficiencies, economic constraints, and social barriers**, requiring integrated and multi-stakeholder solutions.

The below-provided diagram simplifies the overall message, while the individual cases clearly identify and document the on-ground challenges, all the while making a case for different solutions, which, when merged, can alleviate and bridge skills to employment for a stronger workforce and progressive India.



The Survey demonstrates strong industry support for formal certification and certification frameworks. All industry experts expressed a preference for government-recognized certifications, while a significant majority supported independent industry-based certification mechanisms. Industry experts also emphasized the need for advanced safety certifications, updated Qualification Packs (QPs), and industry-relevant competency standards that reflect emerging workforce requirements.

These findings suggest that while industries recognize the value of certification and competency validation, there remains a need to expand qualification pathways, strengthen assessment systems, and improve accessibility to recognized certifications. Developing a robust qualification ecosystem aligned with industry needs will be critical to enhancing workforce quality, employability, and regulatory compliance.



PART

06

Skill Gap Analysis Survey by Safety Skill Development Foundation

- Skill Gap Analysis Survey by Safety Skill Development Foundation

> *Overall, employers expect 39% of workers' core skills to change by 2030.*
>
> **WORLD ECONOMIC FORUM**
> Future of Jobs Report 2025

PART 06 · SKILL GAP ANALYSIS SURVEY BY SAFETY SKILL DEVELOPMENT FOUNDATION

Skill Gap Analysis Survey by Safety Skill Development Foundation

INTRODUCTION

India is entering a period of significant workforce-market transformation, driven by technological adoption, digitalisation, the green transition and changing industry requirements. The World Economic Forum's *Future of Jobs Report 2025* estimates that **around 63% of Indian workers will require training by 2030**, while approximately 12% may not receive the training they need. Skills gaps are also identified as a major barrier to business transformation.

These changes are reshaping occupational tasks and increasing demand for technical, digital, analytical, sustainability and other transferable competencies. The International Labour Organization likewise emphasises the importance of strengthening lifelong learning systems to help workers adapt to technological, environmental and demographic changes.

> **Implication:** India needs to move from predominantly one-time training models toward **continuous reskilling, upskilling and lifelong learning systems**, with stronger alignment between industry requirements, qualifications, workplace competencies and emerging technologies.

1 Rising Demand for Digital, Green, and Safety Skills

Workforce demand is increasingly centred around:

- **Digital skills:** AI/ML, IoT, data analytics, automation
- **Green skills:** Renewable energy, ESG compliance, sustainability practices
- **Safety (OSHE) skills:** Risk mitigation, process safety, regulatory compliance

This transition reflects evolving industrial ecosystems and sustainability commitments.

> *Implication:* Future employability depends on multi-dimensional skillsets combining technical, sustainability, and safety competencies (ILO, NSDC reports).

2 Informal Workforce and Access to Skilling

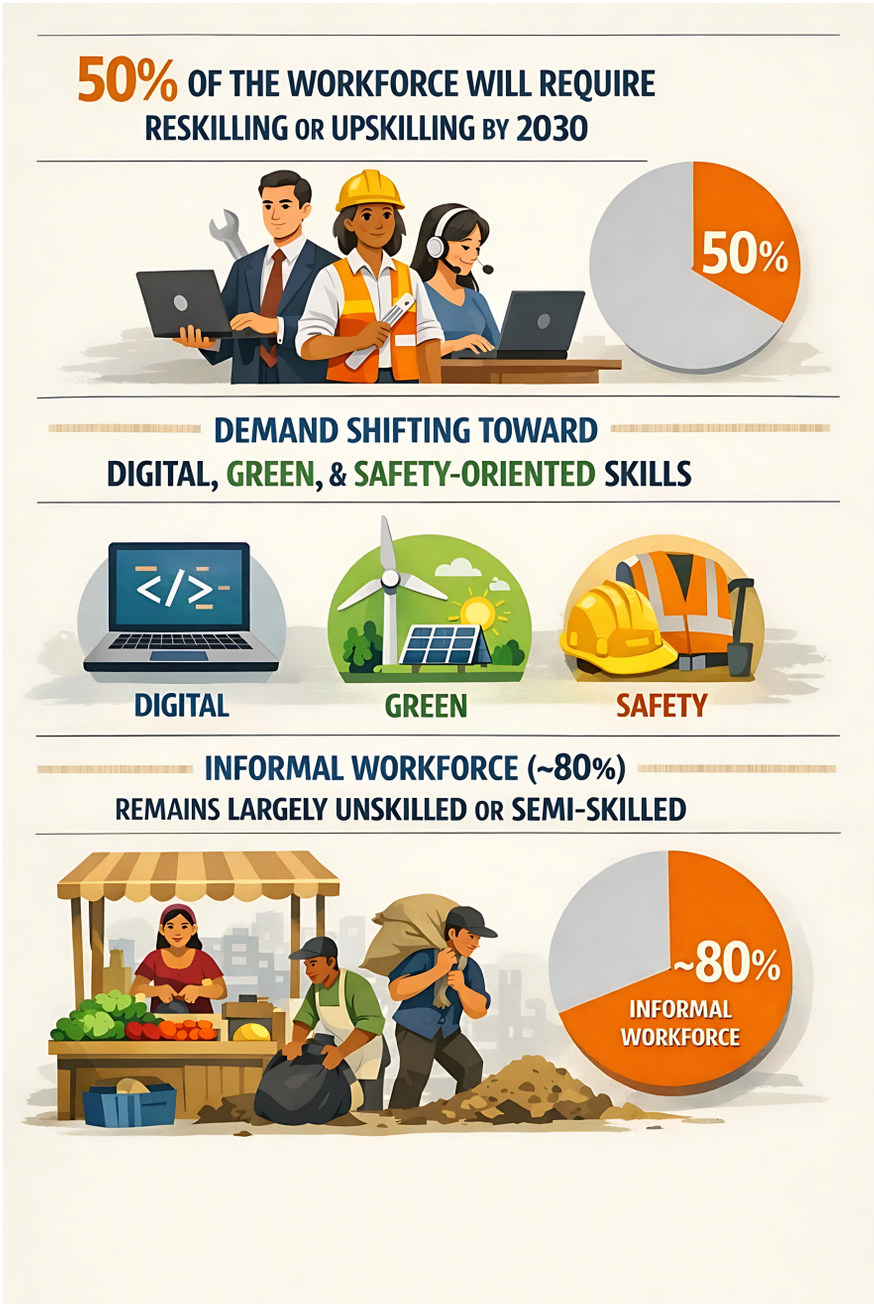
India's workforce market remains highly informal. The International Labour Organization (ILO) estimates that around 83% of workers are employed in the informal sector, while NITI Aayog's analysis of PLFS 2023–24 estimates that approximately 87% of employed workers are informally employed, depending on the definition and population covered.

Informality does not necessarily imply that workers are unskilled; rather, informal workers may have limited access to formal training pathways, recognised certification, social protection and structured opportunities for upskilling and career progression. This can contribute to productivity, employability and occupational safety challenges, particularly in sectors with high concentrations of informal and casual employment.

> Implication: Scaling Recognition of Prior Learning (RPL), flexible competency-based certification, and accessible/localised training programmes can help recognise existing worker competencies while providing pathways for further upskilling, formalisation and safer work practices.

> ***The World Economic Forum's Future of Jobs Report 2025 estimates that around 63% of Indian workers will require training by 2030 , while approximately 12% may not receive the training they need.***





A Integration of Primary Research into the Survey

India's rapid industrialization, infrastructure development, manufacturing expansion, renewable energy transition, and digital transformation are reshaping workforce requirements across sectors. These developments are increasing the demand for a skilled and competent Occupational Safety, Health and Environment (OSHE) workforce capable of addressing both conventional workplace hazards and emerging risks. At the same time, evolving regulatory requirements, technological advancements, ESG expectations, and increasingly complex work environments are creating demand for safety professionals with a broader and more specialized set of competencies.

To validate these emerging workforce trends and complement the findings of secondary research, Safety Skill Development Foundation (SSDF) conducted primary stakeholder research as an integral component of this Skill Gap Analysis. The survey was designed to assess workforce availability, identify competency and employability gaps, understand industry-specific skill requirements, evaluate certification preferences, and assess future demand for OSHE professionals.

B Stakeholder Representation and Data Quality

The survey received valid responses from professionals representing diverse sectors, including construction and infrastructure, manufacturing, healthcare, education, information technology, research and innovation, renewable energy, and public services. The diversity of respondents provides a multi-sector perspective on current and emerging workforce requirements.

The experience profile of respondents further strengthens the relevance of the findings, with approximately 65.7% of participants having more than 10 years of professional experience. This indicates substantial exposure to workplace practices, workforce challenges, safety requirements, and industry skills needs among the stakeholder group.

C Objectives, Data Integrity and Research Design

The primary research component was designed to generate directional and evidence-based insights rather than function as a standalone statistical representation of the entire Indian workforce. The analysis is based on complete and valid responses from a multi-sectoral and multi-stakeholder sample, covering industry, academia, training, research, and related workforce-development organizations.

The combination of respondent diversity, professional experience, and structured survey inputs provides a credible basis for identifying industry perceptions, emerging skill requirements, workforce gaps, and future training priorities.

Overall, the integration of primary stakeholder research strengthens the robustness of the Skill Gap Analysis by ensuring that its findings and recommendations are informed not only by secondary data, policy analysis, and workforce projections, but also by direct industry perspectives and practical workplace realities. This approach enables SSDF to develop more relevant strategies for skill development, qualification design, certification, practical training, industry partnerships, and future OSHE workforce planning.

D Some of the Key Trade-Specific Skill Gap Analysis

Manpower deployment ratio of normal practices followed by good multi-national companies.

Sr.	Position	Behind Every	Required Qty.
1	Project Safety Head	03 Managers	1
2	Safety Manager	05 Safety Officers/Engineers	1
3	Safety Administrator	10 Safety Professionals	1

Sr.	Position	Behind Every	Required Qty.
4	Safety Officer/Engineer	150 Workers	1-2
5	Safety Supervisor/Steward	25-50 Workers	1-2
6	Project Training Coordinator	200 Workers	1
7	Safety Induction Trainer	500 Workers	1-3
8	Scaffold Engineer	10 Scaffolding Gangs	1
9	Scaffolding Inspector	05 Scaffolding Gangs	1
10	Area Scaffolding Supervisor	05 Scaffolding Gangs	1
11	Scaffolding Supervisor	01 Scaffolding Gang	1
12	Advanced Scaffolder	01 Scaffolding Gang	2
13	Trainee/Basic Scaffolder	01 Scaffolding Gang	3-4
14	Rigging Engineer	01 Critical Lift	1
15	Rigging Supervisor	Any Mechanical Lifting	1-2
16	Rigging Inspector	Any Mechanical Lifting	1
17	Riggers	Any Mechanical Lifting	4-5
18	PTW Controller/Administrator	200 Workers	2-4

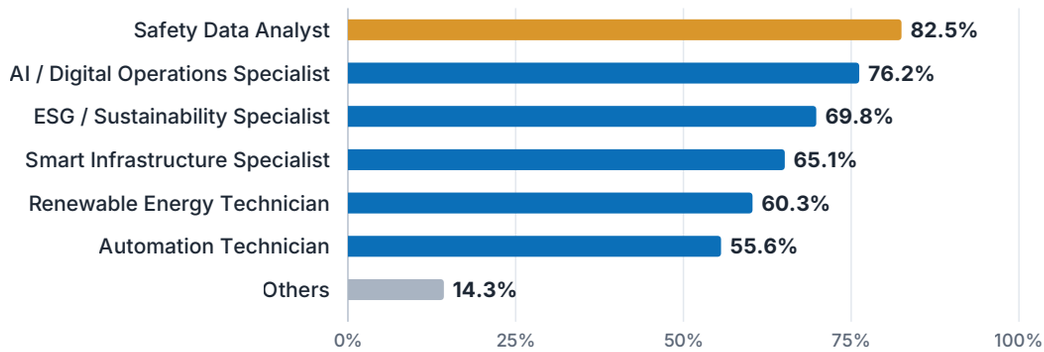
The Survey findings indicate that skill gaps vary significantly across occupational categories and increasingly extend beyond traditional technical functions. Organizations identified deficiencies in practical safety implementation, emergency preparedness, risk assessment, compliance management, leadership capability, and digital competency. These gaps are particularly evident in safety-critical occupations where workforce competence directly influences operational performance and risk management outcomes.

It also highlights the emergence of entirely new occupational categories. Safety Data Analysts were identified by 82.5% of industry experts as a key future role, followed by AI/Digital Operations Specialists (76.2%), ESG/Sustainability Specialists (69.8%), Smart Infrastructure Specialists (65.1%), and Renewable Energy Technicians (60.3%). These findings suggest that future Qualification Packs (QPs), National Occupational Standards (NOS), and certification frameworks must evolve to address not only current workforce needs but also the competency requirements of emerging industries and technology-driven occupations.

SURVEY Q32

Emerging job roles

Multiple responses permitted · % of industry experts



E Key Interpretation

The dataset is balanced and credible, with sufficient diversity to draw cross-sectoral conclusions.

Parameter	Value
Total Industry Experts	Multiple experts
Sectors Represented	Cross-Sectoral
Industry Experts with >10 Years Experience	61.8%
Industry Professionals	Majority Representation
Coverage	Pan-India

F Sector / Industry Representation

Sector	% Share
Healthcare / Education / Public Sector	22.1%
Construction & Infrastructure	20.6%
IT & Technology	10.3%
Research & Innovation	8.8%
Manufacturing (Core + Allied)	8.8%
ESG / Renewable Energy	2.9%
Emerging Tech (AI/EV/Smart Systems)	2.9%

Sector	% Share
Others / Unclassified	23.5%

- Top 2 sectors (Construction + Public Systems) = 42.7%
- Tech-driven sectors (IT + Emerging + Research) = ~22%
- Safety-critical sectors dominate (>60%)

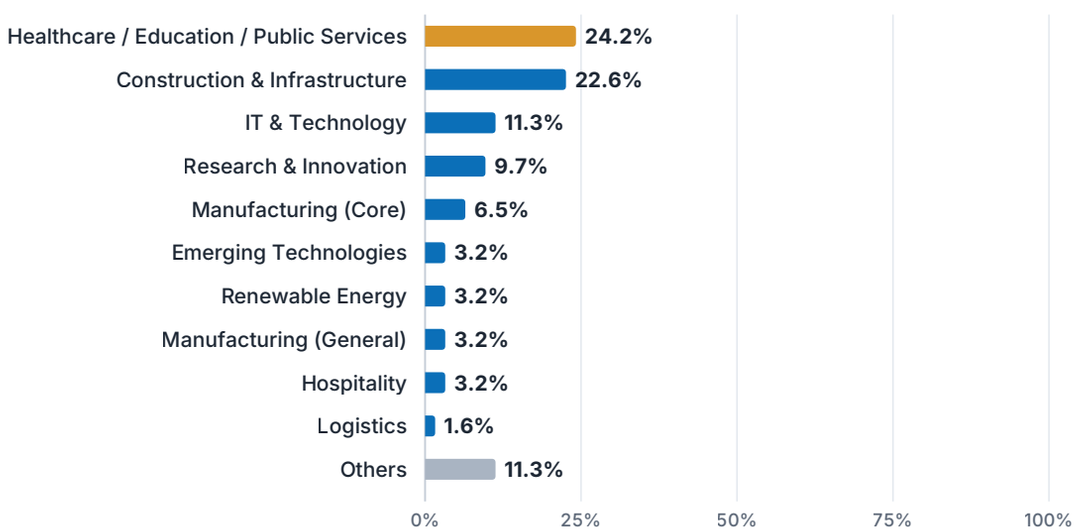
Insight:
Achieved representation across multiple sectors, with Healthcare, Education, and Public Services accounting for 22.1% of industry experts, followed by Construction and Infrastructure at 20.6%. Information Technology represented 10.3%, Research and Innovation 8.8%, Manufacturing 8.8%, and Renewable Energy and Emerging Technology sectors approximately 2.9% each. The remaining 23.5% were categorized under other sectors.

Collectively, safety-intensive sectors such as construction, manufacturing, infrastructure, healthcare, and public systems accounted for more than 60% of total participation. Technology-oriented sectors represented approximately 22% of responses, reflecting growing interest in future workforce requirements and emerging occupational roles.

SURVEY Q3

Area of operations

% share of participating organisations



G Industry Expert Profile

INDUSTRY EXPERT PROFILE

Participation by designation level

Share of participating industry experts, based on designation mapping · decision-makers and implementers across industry, academia and the skilling ecosystem



~35%
Mid-Level Management
Manager / Coordinator

DESIGNATIONS REPRESENTED

- Senior Manager (HR & Operations)
- Project Manager
- Deputy Manager – Operations
- Assistant Manager
- Manager – Standards
- Manager – Rail & Road Safety
- Project Coordinator
- Coordinator
- Business Development
- Principal Consultant

~25%
Technical / Operational Roles
Assessors, trainers & specialists

DESIGNATIONS REPRESENTED

- Master Assessor
- Lead Assessor
- Assessor
- Subject Matter Expert
- Safety Trainer
- Supervisor
- Senior Technical Officer
- Consultant & Assessor

~22%
Academic Leadership
Professor / Dean

DESIGNATIONS REPRESENTED

- Professor
- Associate Professor
- Assistant Professor
- Vice Principal
- Lecturer
- Associate Lecturer
- Guest Faculty
- Academic Manager

~18%
Senior Leadership
Director / Head / CEO

DESIGNATIONS REPRESENTED

- Managing Director
- Director
- Deputy Director
- VP – Industry Engagement
- AVP – Operations
- Head – Education & Skilling
- Head – EHS
- Head – Standards & Research
- Head – Operations
- HSE Head
- State Lead – Skills Development

Based on designation mapping:

- Senior Leadership (Director / Head / CEO): **~18%**
- Academic Leadership (Professor / Dean): **~22%**
- Mid-Level Management (Manager / Coordinator): **~35%**

- Technical / Operational roles: **~25%**

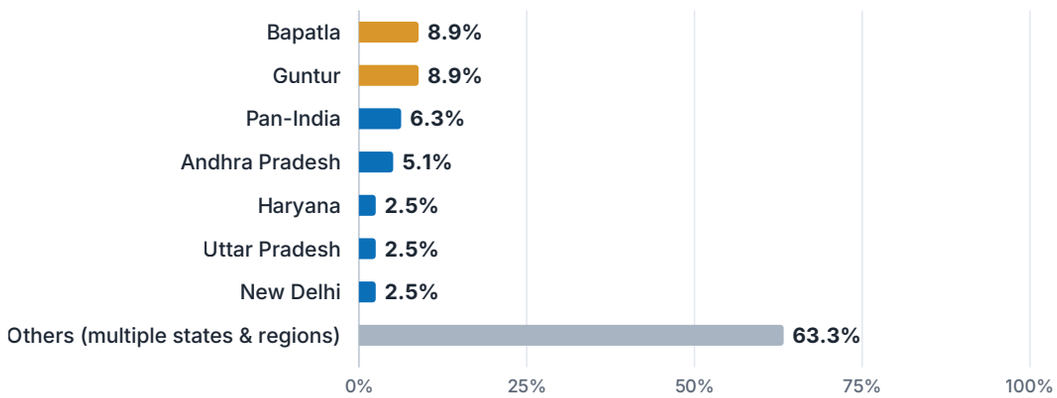
> **Insight:**
>
> Strong representation of **decision-makers + implementers,** enabling **both strategic and ground-level insights.**

H Geographical Coverage of Survey

SURVEY COVERAGE

Geographical presence of participating organisations

% of participating organisations



Received responses from organizations operating across multiple geographical regions of India, including national, regional, and state-level operations. A considerable proportion of industry experts represented organizations with pan-India presence, while others operated within specific states or regional clusters. The participation of organizations with diverse geographical footprints ensures that the findings reflect workforce challenges and skill requirements across different economic and industrial contexts.

The geographic diversity of industry experts indicates that workforce shortages, skill mismatches, and safety competency gaps are not isolated to specific regions but are common concerns across multiple parts of the country. Organizations from both metropolitan and non-metropolitan locations reported similar challenges related to workforce readiness, practical training, certification availability, and recruitment of competent safety professionals.

I Methodology

To supplement secondary research findings and obtain industry-validated insights, the Safety Skill Development Foundation (SSDF) conducted a structured stakeholder survey as part of the Skill Gap Analysis study. The Survey was designed to capture perceptions, experiences, and recommendations from professionals directly involved in occupational safety, health, environment, training, compliance, operations, workforce development, and related sectors.

The Survey adopted a descriptive research approach and utilized a structured questionnaire comprising 39 questions. The questionnaire included a combination of multiple-choice, rating-scale, ranking, and open-ended questions to gather both quantitative and qualitative insights.

It focused on the following key dimensions:

Workforce Availability and Employability

Assessment of workforce supply, recruitment challenges, employability issues, and workforce readiness.

Technical and Safety Competencies

Identification of technical skill deficiencies, safety competency gaps, and emerging occupational requirements.

Industry Transformation and Technology

Evaluation of the impact of digitalization, automation, Industry 4.0 technologies, Artificial Intelligence (AI), sustainability requirements, and regulatory changes on workforce demand.

Certification and Qualification Requirements

Assessment of industry preferences regarding certifications, qualification frameworks, competency standards, and recognition mechanisms.

Training Ecosystem Effectiveness

Evaluation of current training practices, curriculum relevance, industry engagement, practical exposure opportunities, and future training requirements

It was administered through an online platform, enabling participation from industry experts across multiple sectors and geographical locations. Responses were collected over the designated period and screened for completeness and consistency before inclusion in the analysis.

Data Analysis Approach

The Survey data was analyzed using a combination of quantitative and qualitative analytical techniques to ensure comprehensive interpretation of stakeholder responses.

Quantitative Analysis

Responses obtained through multiple-choice and rating-scale questions were analyzed using descriptive statistical methods. Frequency distributions, response percentages, ranking analysis, and comparative assessments were used to identify key trends, priorities, and areas of concern.

The quantitative analysis focused on:

- Workforce availability challenges
- Technical competency gaps
- Safety skill deficiencies
- Technology adoption impacts
- Certification preferences
- Training requirements
- Future workforce expectations

Response percentages were calculated to identify the relative significance of each issue and to establish priority areas for intervention.

Qualitative Analysis

Open-ended responses were subjected to thematic analysis. Similar responses were grouped into thematic categories to identify recurring concerns, recommendations, and stakeholder expectations.

Key themes emerging from qualitative responses included:

- Need for practical and industry-oriented training
- Stronger industry-academia collaboration
- Expansion of certification pathways
- Integration of digital and AI competencies
- Greater emphasis on workplace-based learning
- Enhanced recognition of safety qualifications
- Validation and Triangulation

The Survey findings were compared with:

- Secondary research findings
- Industry reports
- Government publications
- Occupational standards
- Workforce projections
- Stakeholder consultation outcomes

This triangulation approach helped validate findings and improve the reliability of conclusions.

Interpretation Framework

The findings were interpreted from three perspectives:

- Current Workforce Challenges
- Emerging Skill Requirements
- Future Workforce Development Needs

This framework enabled the identification of both immediate and long-term interventions required for strengthening workforce capability within the sector.

J Limitations

While the Survey provides valuable insights into workforce requirements, competency gaps, and industry expectations, certain limitations should be considered when interpreting the findings.

Sample Size

The Survey received quite valid responses. While the industry expert profile includes experienced professionals from multiple sectors, the findings may not fully represent all organizations, regions, or occupational categories within the broader workforce ecosystem.

Voluntary Participation

Participation in the Survey was voluntary. As a result, responses may reflect the perspectives of individuals with a greater interest in workforce development, training, certification, and safety-related issues.

Sector Representation Variability

Although the Survey achieved representation across multiple sectors, participation levels varied between industries. Certain sectors may therefore have a greater influence on overall findings than others.

Perception-Based Responses

Several Survey questions sought industry experts' perceptions regarding workforce challenges, future skills, and training requirements. Such responses reflect professional judgment and experience rather than direct measurement of workforce performance.

Dynamic Industry Environment

Workforce requirements, technology adoption patterns, regulatory frameworks, and industry priorities continue to evolve rapidly. Consequently, some findings may require periodic review and updating to remain aligned with changing industry conditions.

Geographic Distribution

While industry experts represented diverse organizational and sectoral backgrounds, the Survey was not designed as a statistically representative regional study. Therefore, findings should be interpreted primarily as indicative of national-level stakeholder perspectives.

Purpose of the SSDF Survey

The Survey was intended to complement secondary research and stakeholder consultations rather than function as a standalone workforce market assessment. Accordingly, findings have been interpreted in conjunction with additional evidence sources to strengthen overall conclusions.

Despite these limitations, the Survey provides a robust and credible evidence base for validating workforce challenges, identifying competency gaps, and informing recommendations for future workforce development initiatives within the Occupational Safety, Health, and Environment sectors.

K Key Findings & Interpretation Notes

L.1 Highlights/Top Findings

The SSDF industry survey highlights key workforce, training, certification, and industry-readiness trends identified by industrial experts. The major findings are summarized below:

Survey Parameter / Key Finding	Industrial Experts (%)
Growing Demand for a Skilled Workforce	77.9%
Need for Stronger Industrial Safety Awareness	60.3%
Need for Greater Access to Skill Training	58.8%
Shortage of Job-Ready Skilled Workforce	58.8%
Inadequate Practical and Industry-Based Exposure	52.9%
High Impact of Technology on Workforce Skills	~80%
Strong Preference for Recognized NSQF/NCVET Certifications	89.7%
Increasing Demand for Practical Hands-on Training	69.1%
Need for New and Emerging Qualification Packs	67.6%
Growing Demand for Advanced Professional Certifications	64.7%
Need for Stronger Industry–Training Partnerships	63.2%

The Survey findings reveal significant challenges in workforce preparedness and skill development. A substantial 77.9% of industry experts identified a skill mismatch between available competencies and industry requirements, making it the most critical concern. Additionally, 60.3% highlighted low safety awareness, while 58.8% pointed to both limited access to training opportunities and the lack of a job-ready workforce. More than half of the industry experts (52.9%) also emphasized insufficient practical exposure, indicating a need for greater firsthand learning and workplace-based training experiences.

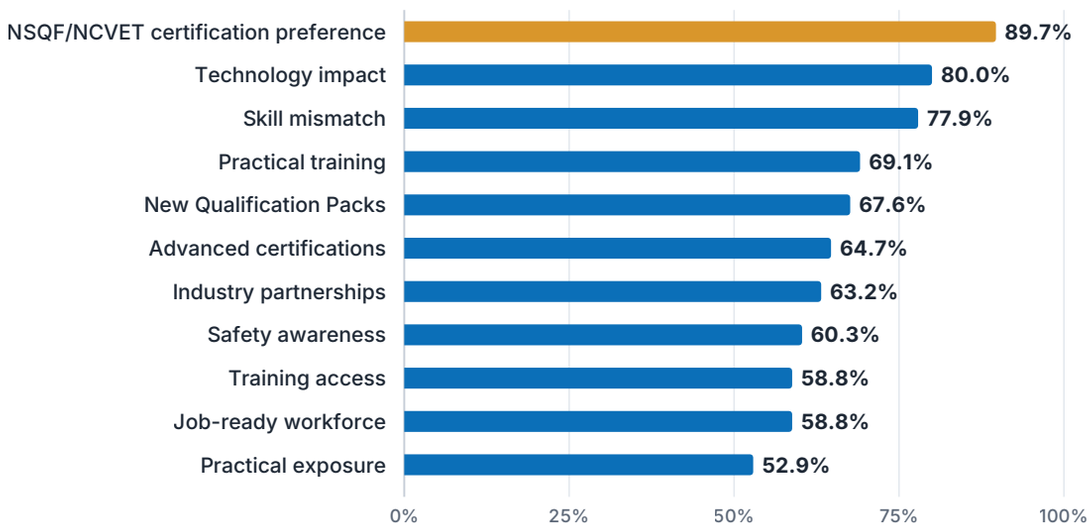
At the same time, it reflects dedicated support for reforms aimed at improving employability and industry alignment. 80% of industry experts rated the impact of technology on jobs and skills as high or extremely high, underscoring the importance of digital and emerging technology competencies. There was an overwhelming preference for NSQF/NCVET-aligned certifications (89.7%), along with strong de-

mand for practical training-focused programs (69.1%), development of new Qualification Packs (67.6%), advanced certifications (64.7%), and stronger industry partnerships (63.2%). These findings suggest that stakeholders prioritize industry-relevant, competency-based training models that enhance workforce readiness and support evolving workforce market needs.

SURVEY SUMMARY

Workforce and training survey findings

% of industry experts reporting each challenge, preference or demand



L.2 Key Trends Impacting Workforce Requirements

Trend	%
AI / Data-driven Systems	64.7%
Digitalization / Industry 4.0	63.2%
Sustainability / ESG	60.3%
Increased Safety Regulations	60.3%
Workforce Shortage / Aging	48.5%
Global Compliance Requirements	~42%

Insight:
There is a triple pressure on workforce systems:

- Technology transformation
- Regulatory tightening
- Talent scarcity

Industry experts identified several major trends that are expected to reshape workforce requirements over the coming years. Artificial Intelligence (AI) and data-driven operations emerged as the most significant trend, identified by approximately 69.8% of industry experts. Digitalization and Industry 4.0 technologies followed closely at 68.3%, while sustainability and ESG requirements, along with increasing safety regulations, were each highlighted by approximately 65.1% of industry experts. Workforce aging and automation were also recognized as important drivers of future workforce demand.

The findings demonstrate that organizations are increasingly preparing for technology-enabled work environments where digital competencies, data literacy, and sustainability-related knowledge will become essential workforce attributes. Traditional occupational roles are expected to evolve significantly as automation and digital systems become more integrated into workplace operations.

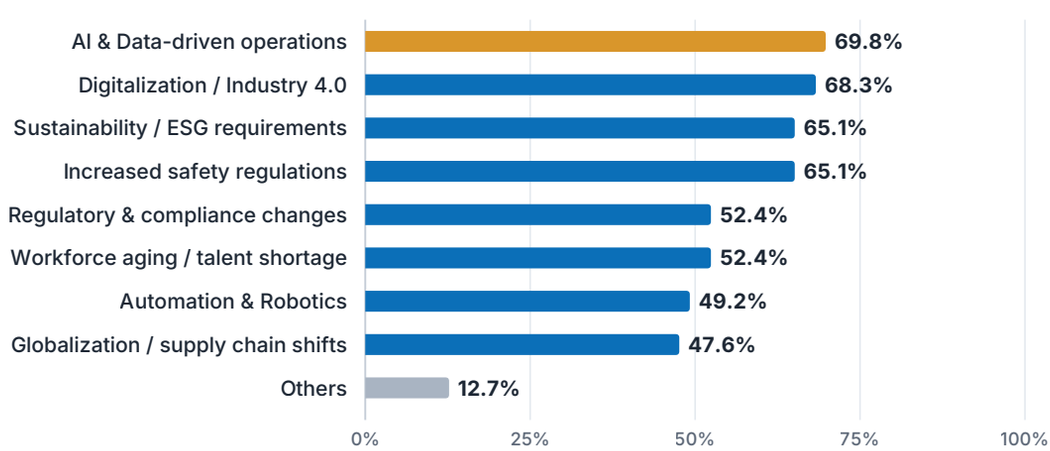
The results indicate that future workforce development strategies must extend beyond conventional technical and safety training. Qualification frameworks and training programs will need to incorporate AI awareness, digital tools, automation systems, data analytics, and sustainability competencies to remain relevant to industry requirements.

The convergence of technology, compliance, and sustainability requirements suggests that future workforce demand will increasingly favor multi-skilled professionals capable of operating within complex and technology-driven environments. Workforce planning initiatives should therefore prioritize emerging competencies alongside traditional occupational skills.

SURVEY Q7

Key trends impacting workforce requirements

Multiple responses permitted · % of industry experts



L.3 Workforce Availability Challenges — Deep Dive

Challenge	%
Skill mismatch	77.9%
Low safety awareness	60.3%
Lack of training access	58.8%

Challenge	%
Lack of job-ready workforce	58.8%
Low practical exposure	52.9%
Certification gaps	~44%

Gap Layering Analysis:

- **Primary Gap:** Skill mismatch (**78%**)
- **Secondary Gaps:** Awareness + Training (~60%)
- **Tertiary Gap:** Practical exposure (~53%)

> **Insight:**
> The issue is **systemic**, not isolated:

01
Education
misaligned

02
Training
insufficient

03
Industry
evolving faster

The findings indicate that organizations are experiencing challenges not only in recruiting personnel but also in finding candidates who possess the necessary technical, safety, and behavioural competencies. Employers frequently reported that substantial additional training is required before newly recruited personnel can effectively perform their assigned roles.

The results suggest that workforce shortages are primarily driven by employability and competency issues rather than by workforce availability alone. Existing education and training systems are producing candidates whose skills do not fully align with workplace expectations and industry requirements.

Addressing these challenges will require stronger industry participation in curriculum design, greater emphasis on practical training, expanded apprenticeship opportunities, and competency-based certification frameworks that ensure workforce readiness before employment.

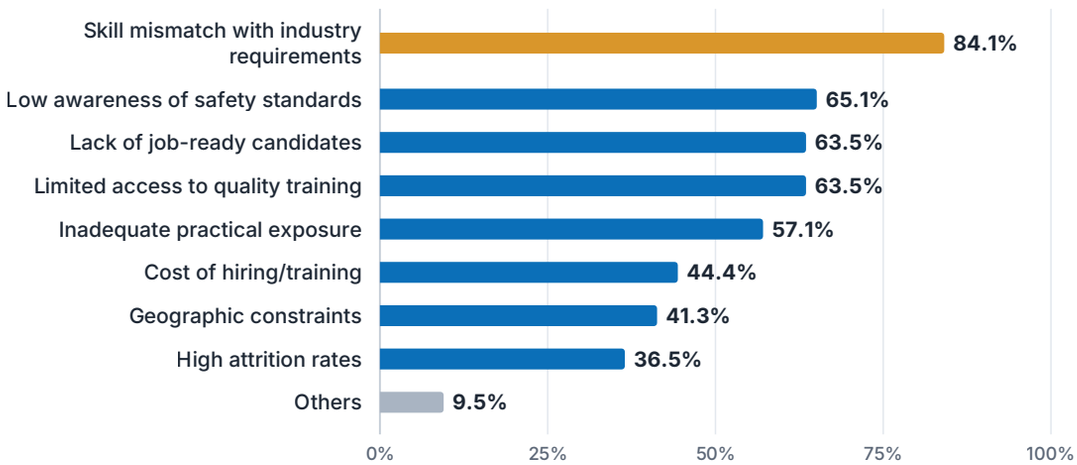


L.4 Impact of Technology and Automation on Skill Requirements

SURVEY Q8

Major challenges in availability of skilled manpower

Multiple responses permitted · % of industry experts



Rating	Interpretation	Approx Share
5	Very High Impact	~38%
4	High Impact	~42%
3	Moderate	~15%
1–2	Low	<5%

- Average Score: 4.21 / 5
- High Impact (4+): ~80% industry experts

Insight:

Technology is **not incremental** — it is **transformational**.

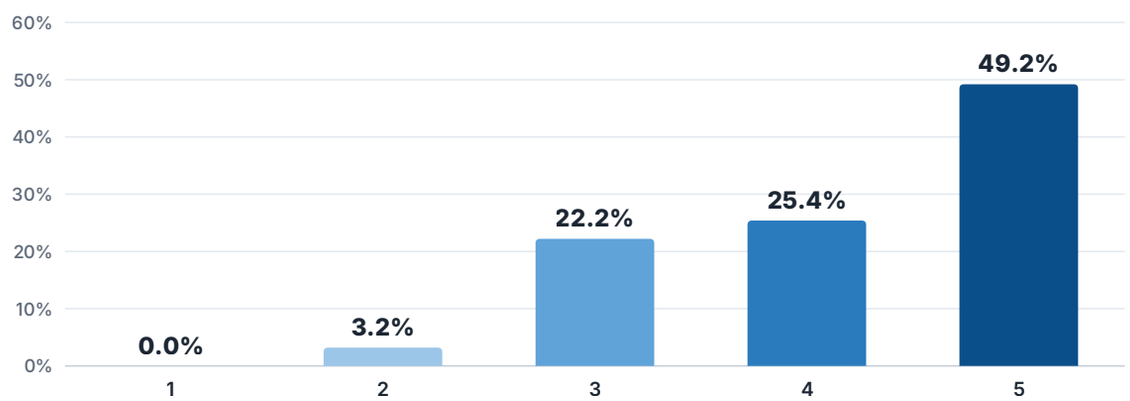
The findings demonstrate that traditional occupational competencies alone will no longer be sufficient to meet future industry requirements. Workers will increasingly require digital literacy, technology adaptation capabilities, analytical skills, and familiarity with automated systems to remain competitive in the workforce market.

Training providers, educational institutions, and qualification developers should therefore integrate Industry 4.0 concepts, digital technologies, AI applications, and automation-related competencies into future curricula and qualification frameworks. Failure to do so may widen the existing gap between workforce capabilities and industry expectations.

SURVEY RATING

Impact of technology and automation on skill requirements

Rating scale: 1 = lowest impact, 5 = highest impact · % of industry experts



L.5 Job Roles Expected to Experience Increased Safety Demand

Job Role Analysis

High-Performing Roles (76–100%)

These roles have the highest concentration in the top performance band, indicating strong competency, compliance, or achievement levels.

Job Role	Observation
Fire & Safety Officer	Highest representation in 76–100% category, demonstrating excellent performance and strong adherence to safety standards.
Electrical Engineer / Technician	Strong presence in the highest category, reflecting good technical competence and execution.
Environmental Engineer	Considerable number in the top band, indicating effective environmental management practices.
Industrial Hygienist	Good representation in the highest category, suggesting strong occupational health monitoring capabilities.
Quality Control Inspector	Moderate-to-high-performance distribution with room for further improvement.
Warehouse & Logistics Manager	Reasonable presence in the top category but lower than engineering and safety functions.
Transport & Fleet Manager	Like logistics management, showing acceptable but improvable performance levels

Key Insight

Technical, environmental, and specialized safety functions dominate the highest performance bracket, suggesting stronger capability development and role-specific expertise.

Upper-Mid Performing Roles (51–75%)

Job Role	Observation
Industrial Hygienist	Highest count in this range, indicating a substantial proportion of competent performers nearing top-tier status.
Fire & Safety Officer	Strong representation, showing a stable and skilled workforce.
Electrical Engineer / Technician	Superior performance consistency with opportunities to move more personnel into the 76–100% band.
Environmental Engineer	Moderate representation reflecting steady competency levels.
Quality Control Inspector	Consistent but requires targeted development to improve top-band achievement.
Warehouse & Logistics Manager	Moderate performance distribution.
Transport & Fleet Manager	Lowest among this group, suggesting potential training needs.

Key Insight

Most specialized operational and engineering roles fall within the 51–75% range, indicating a healthy talent pipeline that can be developed into high performers.

Mid-Level Performing Roles (26–50%)

Job Role	Observation
HSE Manager	Highest representation in this category, suggesting many managers are performing at a moderate level but have not reached advanced competency.
Safety Supervisor	Strong representation, indicating a need for further leadership and safety management development.
Site Safety Officer	Moderate count with opportunities for competency enhancement.
Project Manager	Similar performance levels to Site Safety Officers.
Plant Operator	Moderate representation.
Maintenance Engineer	Moderate representation.
Machine Operator	Moderate representation.
Lifting & Rigging Supervisor	Strong representation compared to peer operational roles.
Scaffolding Supervisor	Moderate presence in this band.

Job Role	Observation
Construction Manager	Lowest representation among this group.

Key Insight

Most of the operational leadership and supervisory roles are concentrated in the 26–50% category, highlighting a significant opportunity for targeted capability-building programs.

Lower-Mid Performing Roles (11–25%)

Job Role	Observation
Project Manager	Highest representation in this range.
Site Safety Officer	Considerable number in lower-mid performance levels.
Safety Supervisor	Similar representation to Site Safety Officer.
Plant Operator	Moderate presence.
Lifting & Rigging Supervisor	Moderate presence.
Construction Manager	Moderate presence.
Machine Operator	Moderate presence.
Maintenance Engineer	Lower presence.
HSE Manager	Low presence compared to the 26–50% category.
Scaffolding Supervisor	Lowest representation.

Key Insight

Project management and frontline safety supervision roles exhibit noticeable concentrations in lower performance bands, indicating a need for focused mentoring and competency development.

Low-Performing Roles (0–10%)

Job Role	Observation
Site Safety Officer	Highest representation among low performers.
HSE Manager	Noticeable presence requiring attention.
Safety Supervisor	Similar trend to HSE Manager.
Project Manager	Moderate presence.
Lifting & Rigging Supervisor	Moderate presence.
Construction Manager	Low representation.

Job Role	Observation
Maintenance Engineer	Low representation.
Plant Operator	Extremely low representation.
Machine Operator	Extremely low representation.
Scaffolding Supervisor	Minimal representation.

Key Insight

Low-performance cases are primarily concentrated within safety and supervisory functions, which may indicate gaps in training effectiveness, experience levels, or role expectations.

Executive Summary

Strengths

- Fire & Safety Officers, Electrical Engineers/Technicians, and Environmental Engineers demonstrate the strongest overall performance
- Specialized technical and compliance-focused roles dominate the 76–100% category
- Very few personnel remain in the lowest performance band across most operational roles

Areas for Improvement

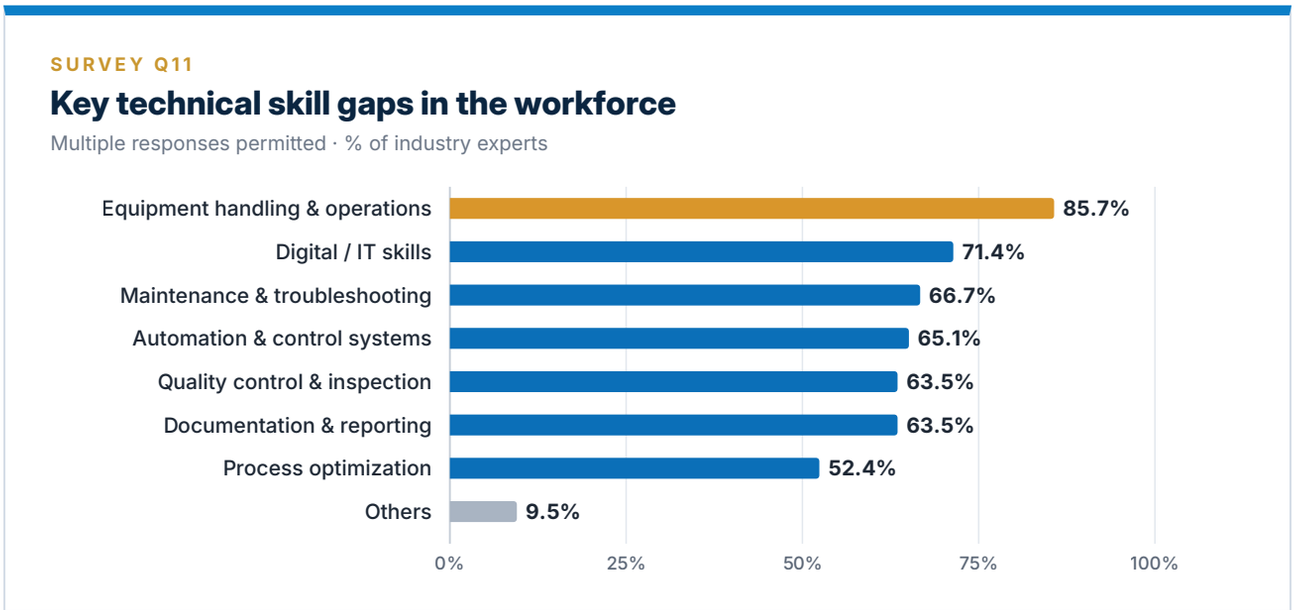
- Site Safety Officers, Safety Supervisors, and HSE Managers show significant populations in the 0–50% ranges
- Project Managers have notable representation in the 11–25% and 26–50% categories, indicating a need for leadership and project execution development
- Supervisory roles underperform compared to specialist technical roles

Recommendations

- Prioritize competency enhancement programs for Site Safety Officers, Safety Supervisors, and HSE Managers
- Implement leadership development initiatives for Project Managers and Construction Managers
- Develop targeted coaching for personnel in the 0–25% bands to accelerate progression
- Use Fire & Safety Officers, Environmental Engineers, and Electrical Engineers as benchmark groups to share best practices
- Establish periodic competency assessments and role-specific training plans to move employees from the 26–50% band into higher performance categories

Overall conclusion: The organization demonstrates impressive performance among technical and specialist roles, while supervisory and management-level safety positions require focused development to improve overall workforce competency and performance distribution.

L.6 Key Technical Skill Gaps in Workforce



The results indicate that workforce development efforts must prioritize practical technical competencies alongside theoretical knowledge. As industries adopt advanced equipment, automation systems, and digital technologies, the demand for workers capable of operating, maintaining, and troubleshooting such systems is increasing rapidly.

Training institutions and qualification developers should strengthen practical learning components, simulation-based training, workforce exposure, and industry-based learning opportunities. Curriculum revisions should also incorporate digital literacy, automation fundamentals, and technology-enabled workplace competencies to ensure alignment with future workforce requirements.

L.7 Gaps in Safety Knowledge and Practices

The dominance of risk assessment and hazard identification as key gaps is particularly significant because these competencies form the foundation of effective workplace safety management. Deficiencies in these areas can directly increase the likelihood of incidents, injuries, operational disruptions, and regulatory non-compliance.

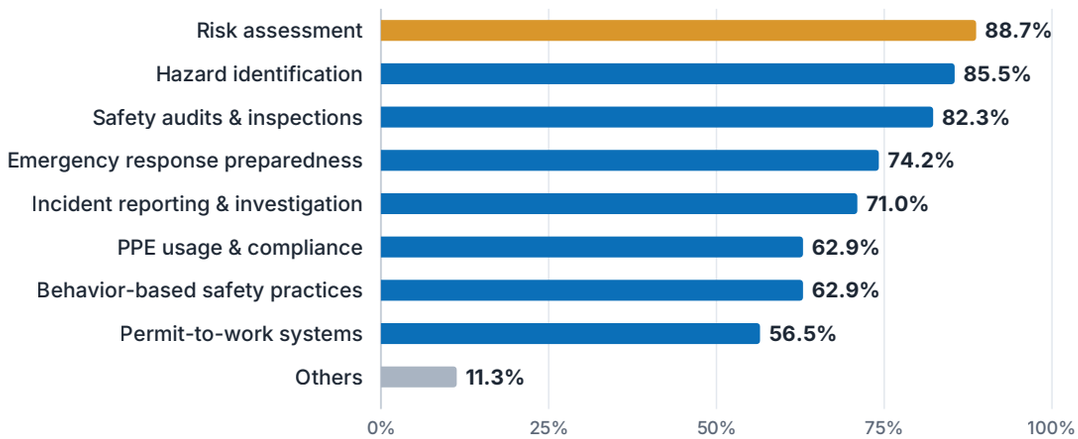
Organizations should prioritize competency-based safety training programs that emphasize practical application of safety principles rather than theoretical awareness alone. Greater focus should also be placed on emergency preparedness, incident investigation, safety leadership, and behaviour-based safety interventions to strengthen overall workplace safety culture.

L.8 Are Employees Adequately Trained in Safety-Critical Areas?

SURVEY Q12

Gaps in safety knowledge and practices

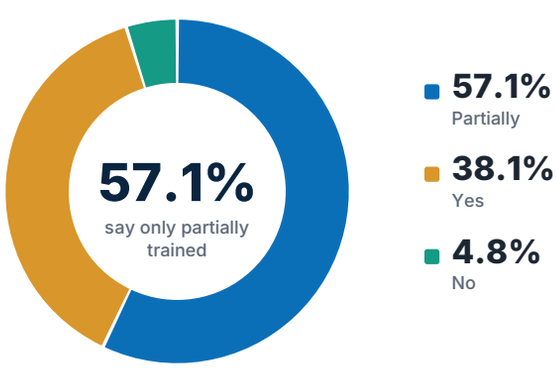
Multiple responses permitted · % of industry experts



SURVEY Q13

Are employees adequately trained in safety-critical areas?

% of industry experts



The findings demonstrate that although organizations recognize the importance of safety training, many employees continue to lack comprehensive competency development in critical safety functions. The high proportion of "partially trained" responses suggests that training programs may not be sufficiently comprehensive, practical, or regularly updated.

The results highlight a significant gap between training delivery and workforce competency outcomes. Employees may be receiving basic safety instruction; however, organizations have concerns regarding the depth, consistency, and effectiveness of existing training programs.

To address this challenge, organizations should adopt structured competency-based training frameworks supported by periodic assessments, refresher programs, workplace simulations, and practical exercises. Greater emphasis on continuous learning and performance evaluation will be essential to ensure that employees remain competent in safety-critical functions throughout their careers.

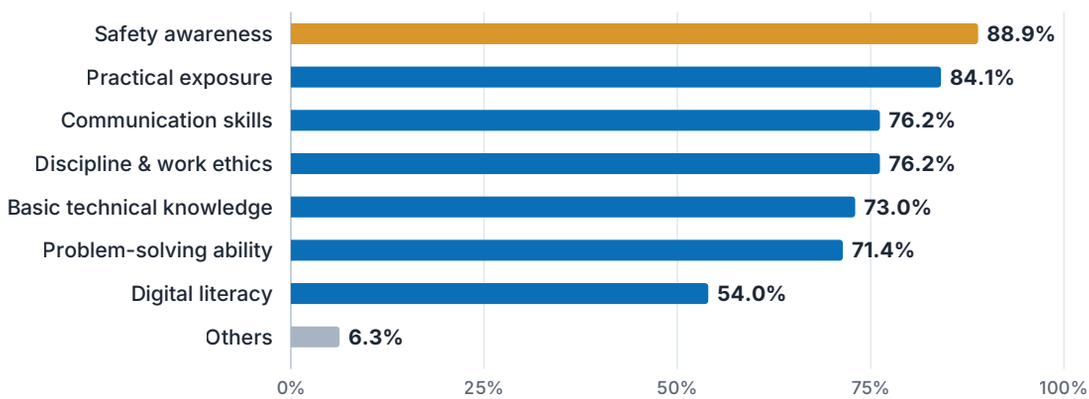
L.9 Skill Gaps Across Workforce Levels

The findings demonstrate that workforce development challenges extend across the entire employee lifecycle and cannot be addressed through entry-level training interventions alone. At the entry level, organizations require workers who possess stronger safety awareness, practical workplace exposure, communication abilities, and job-readiness competencies. The high percentages associated with these deficiencies indicate a disconnect between educational outcomes and industry expectations, highlighting the need for greater industry participation in curriculum design, apprenticeships, internships, and experiential learning programs.

SURVEY Q14

Skill gaps at entry level

Multiple responses permitted · % of industry experts

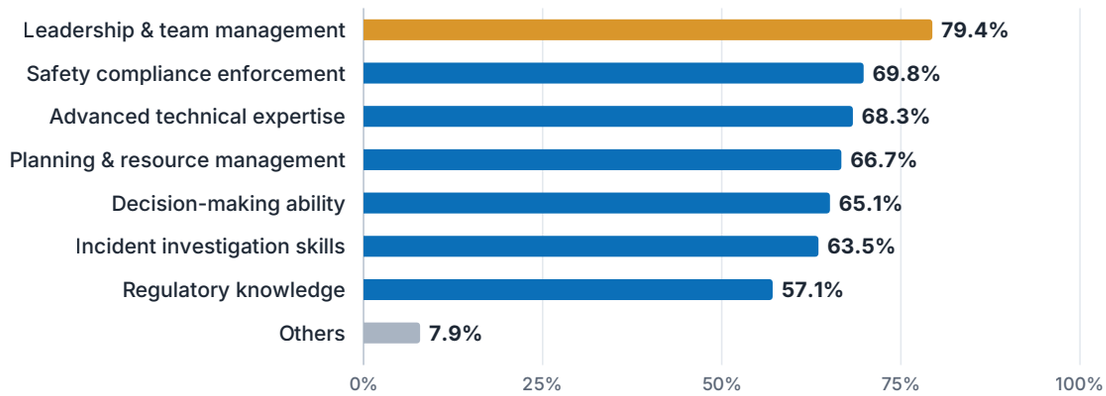


For experienced and supervisory personnel, the findings suggest an increasing need for structured leadership development and advanced competency-building initiatives. As employees progress into supervisory roles, organizations expect them to manage teams, enforce compliance requirements, investigate incidents, make operational decisions, and lead workplace safety initiatives. Consequently, workforce development frameworks should adopt a career-progression approach that combines foundational technical training with continuous professional development, leadership enhancement, advanced safety management, and regulatory compliance programs. Such an approach will strengthen workforce capability across all occupational levels and improve long-term organizational performance and safety outcomes.

SURVEY Q15

Skill gaps at experienced / supervisory level

Multiple responses permitted · % of industry experts

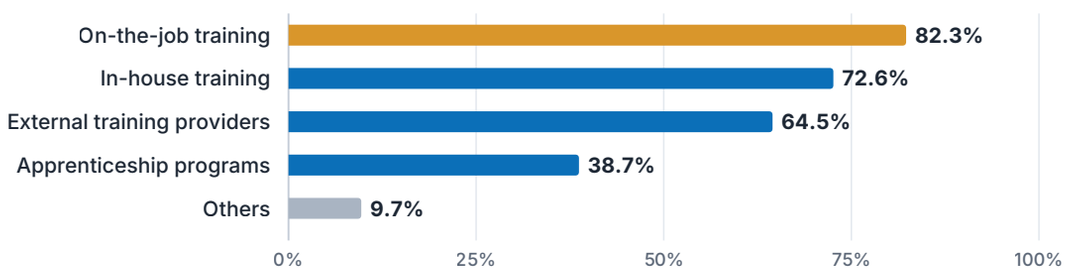


L.10 How Does Your Organization Address Skill Gaps?

SURVEY Q16

How organisations address skill gaps

Multiple responses permitted · % of industry experts



The results demonstrate that most organizations prefer immediate and operationally integrated training solutions that allow employees to acquire skills while performing workplace responsibilities. The strong reliance on on-the-job and in-house training indicates that organizations recognize the importance of contextual learning and practical competency development. However, the comparatively lower adoption of apprenticeship programs suggests that structured long-term workforce development pathways remain underutilized.

The findings highlight that organizations are actively investing in workforce capability development but continue to depend heavily on internal training mechanisms to address competency deficiencies. While on-the-job training provides valuable practical exposure and immediate application of learning, excessive dependence on internal systems may create inconsistencies in training quality, assessment standards, and competency outcomes across organizations.

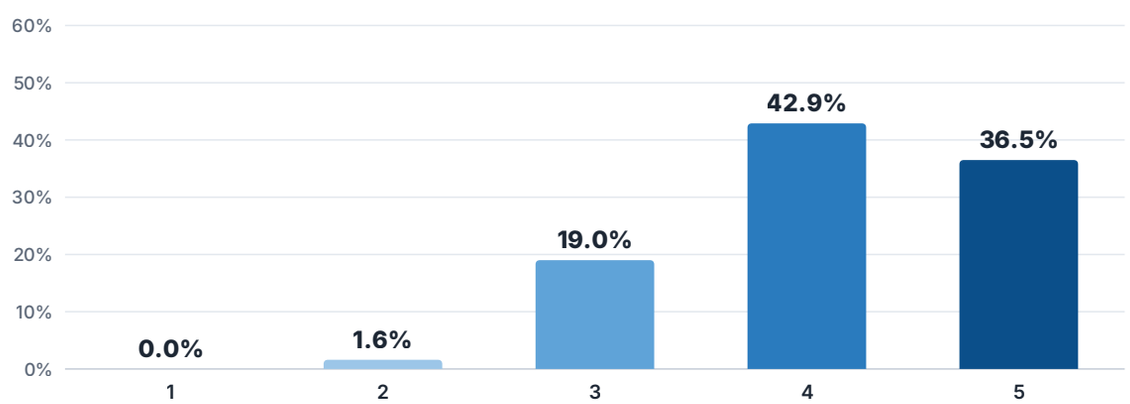
The low utilization of apprenticeship programs represents a significant opportunity for strengthening workforce development efforts. Expanding industry-led apprenticeship models, structured workplace learning, and competency-based training partnerships could help bridge the gap between education and employment while improving workforce readiness. Employers, training providers, sector skill organizations, and certification bodies would also support the development of standardized and scalable approaches for addressing skill shortages across industries.

L.11 Effectiveness of Existing Training Programs

SURVEY Q17

Effectiveness of current training programmes

Rating scale: 1 = least effective, 5 = most effective · % of industry experts



Findings indicate that current training programs are perceived as effective in addressing workforce skill gaps. A combined **80.0% of industry experts** rated existing training programs positively, with **43.0%** describing them as **Effective** and **37.0%** rating them as **Very Effective**. In contrast, only **1.5%** of industry experts considered current training programs **Ineffective**, while the remaining **18.5%** expressed a **Neutral** opinion regarding training effectiveness.

The results demonstrate that organizations recognize the value of training interventions in improving workforce competencies and addressing emerging skill requirements. The high proportion of positive responses suggests that existing training initiatives are contributing meaningfully to workforce development, capability enhancement, and operational performance. However, the presence of neutral responses indicates that opportunities remain for further strengthening training quality, relevance, and practical applicability.

The findings suggest that training programs are playing a significant role in reducing skill deficiencies and improving workforce preparedness. The fact that four out of every five industry experts rated training programs as effective or highly effective reflects strong confidence in workforce development initiatives currently being implemented by organizations, training providers, and industry partners.

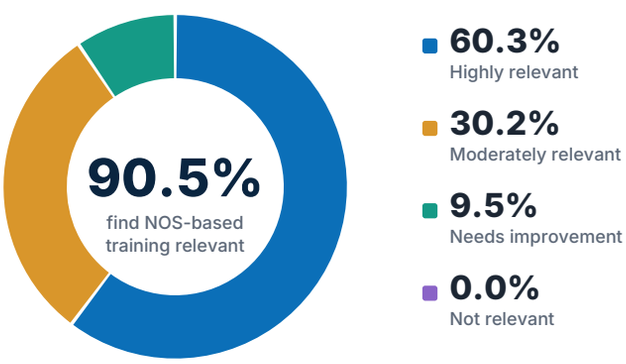
Nevertheless, the 18.5% neutral response rate highlights the need for continuous improvement in training design and delivery. Organizations should focus on enhancing practical learning components, industry-specific case studies, workplace simulations, firsthand exercises, and competency-based assessments to maximize training outcomes. Strengthening alignment between training content and evolving industry requirements will further improve workforce readiness and ensure that training investments translate into measurable improvements in workplace performance, productivity, and safety outcomes.

L.12 Relevance of NOS Based Trainings

SURVEY Q18

Are existing NOS-based trainings relevant?

% of industry experts



The findings suggest that National Occupational Standards have successfully established a foundation for industry-aligned workforce development by providing structured competency benchmarks and standardized learning outcomes. The fact that more than three-fifths of industry experts rated NOS-based trainings as highly relevant indicates that employers recognize their contribution to improving employability, workplace readiness, and occupational competence.

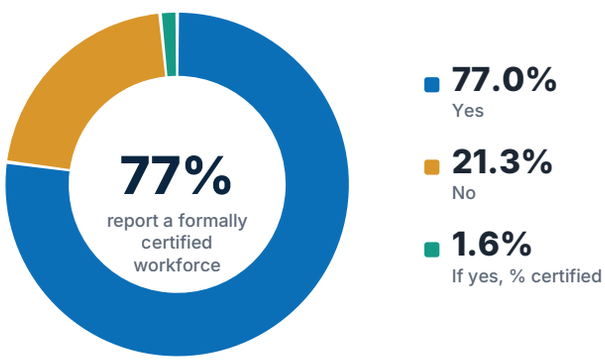
However, the **9.5% of industry experts who indicated that improvement is needed** highlight opportunities for continuous enhancement of NOS-based training programs. Regular review and updating of occupational standards, integration of emerging technologies, inclusion of Industry 4.0 competencies, AI applications, sustainability requirements, and evolving safety practices will be essential to ensure continued relevance. Strengthening industry participation in the periodic revision of standards can further enhance the responsiveness of NOS-based training to changing workforce and industry needs.

L.13 Current Status of Certified Workforce

SURVEY Q19

Are workers in your organisation formally certified?

% of industry experts



This indicates that certification levels vary across organizations and sectors. While some organizations reported prominent levels of workforce certification, others indicated limited certification penetration among employees. Industry experts agreed that certified workers demonstrate higher levels of competency, confidence, compliance awareness, and workplace readiness compared to uncertified personnel.

The Survey also revealed that certification adoption remains constrained by factors such as limited awareness, accessibility challenges, cost considerations, and availability of relevant certification pathways. Several industry experts highlighted the need for broader promotion of competency-based certification systems to increase workforce participation.

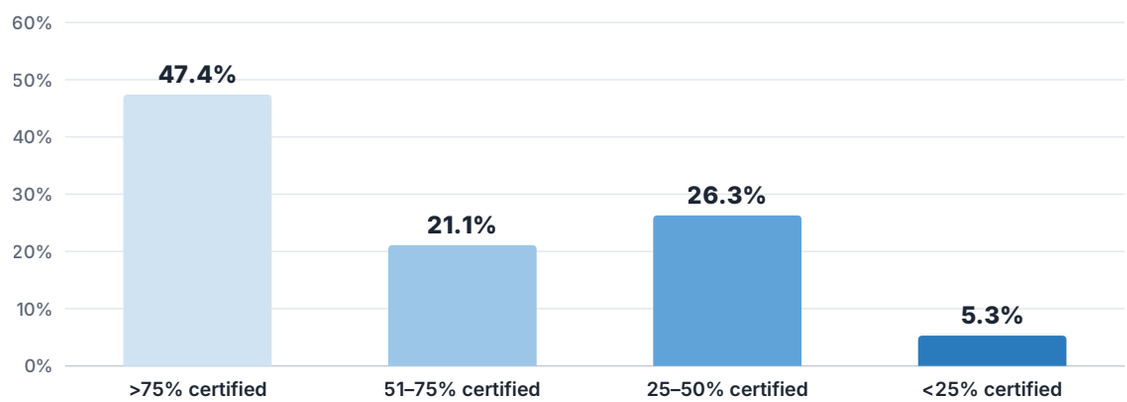
L.14 % of Certified Workforce across organizations

Certification Level	% of Valid Numeric Responses
>75% Certified	47.4%
51–75% Certified	21.1%
25–50% Certified	26.3%
<25% Certified	5.3%

SURVEY FINDING

Percentage of certified employees

Distribution of organisations by share of certified employees (valid numeric responses)



The follow-up responses indicate prominent levels of workforce certification among participating organizations. Of the **19 industry experts who provided quantifiable certification percentages**, **47.4% (9 industry experts)** reported that more than **75% of their workforce is certified**, making this the largest response category. A further **21.1% (4 industry experts)** indicated certification levels between **51% and 75%**, while **26.3% (5 industry experts)** reported certification coverage between **25% and 50%**. Only **5.3% (1 industry expert)** reported certification levels below **25%** of the workforce.

Overall, **68.5% of industry experts (13 out of 19)** reported that more than half of their workforce is certified, demonstrating strong adoption of certification practices among organizations participating in the SSDF survey. The results suggest increasing industry recognition of certifications as a mechanism for validating competencies, improving workforce quality, and strengthening compliance with occupational standards.

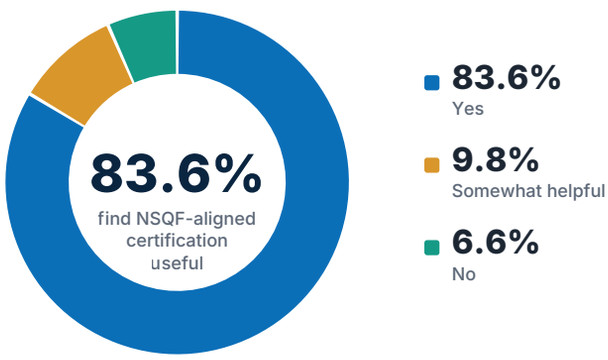
> ***A further 21.1% (4 industry experts) indicated certification levels between 51% and 75% , while 26.3% (5 industry experts) reported certification coverage between 25% and 50% .***

L.15 Industrial Demand & Perspectives: NSQF or non-NSQF

SURVEY Q21

Usefulness of government-approved (NSQF-aligned) certifications

% of industry experts



Findings demonstrated strong stakeholder confidence in the value of government-approved and NSQF-aligned certifications. A substantial 83.6% of industry experts indicated that such certifications are useful, while 9.8% considered them helpful. Only 6.6% of industry experts expressed the view that these certifications are not useful. Overall, 93.4% of industry experts reported a positive perception of NSQF-aligned certifications, highlighting broad acceptance across industry and stakeholder groups.

The overwhelmingly positive response suggests that employers, practitioners, and workforce development stakeholders recognize the role of nationally recognized certifications in validating competencies, supporting workforce mobility, and improving employability outcomes. The findings also indicate growing awareness of structured qualification frameworks and their contribution to standardizing occupational competencies.

The prominent level of support for NSQF-aligned certifications reflects increasing industry emphasis on competency-based workforce development and nationally recognized qualification systems. Organizations value these certifications because they provide a standardized benchmark for assessing workforce capability, facilitate recruitment decisions, and support career progression pathways for employees.

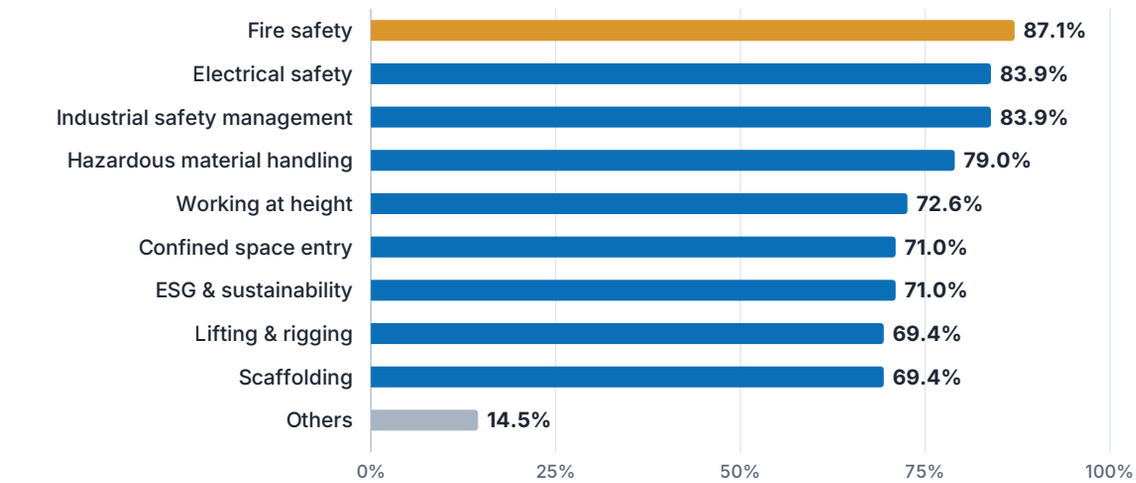
However, the 9.8% of industry experts who considered certifications only helpful, together with the 6.6% who expressed negative perceptions, suggest opportunities for further strengthening awareness, industry alignment, and implementation. Continuous updating of qualification standards, stronger industry participation in qualification development, and wider promotion of certification benefits can further enhance stakeholder confidence and adoption rates.

L.16 Areas of Certification Requirements

SURVEY Q22

Key areas where certification is required

Multiple responses permitted · % of industry experts



The findings clearly demonstrate that stakeholders view certification as a critical risk-control mechanism, particularly in occupations where inadequate competency can lead to serious safety incidents, operational disruptions, environmental impacts, or regulatory non-compliance. The strong emphasis on Fire Safety, Electrical Safety, Industrial Safety Management, and Hazardous Material Handling reflects the high-risk nature of these functions and the need for standardized competency verification.

The emergence of ESG & Sustainability (71.0%) as a major certification area is particularly significant, indicating that industry expectations are expanding beyond traditional occupational safety functions to include environmental stewardship, sustainability practices, and governance responsibilities. This suggests that future qualification frameworks should integrate conventional safety competencies with emerging ESG, sustainability, and compliance requirements.

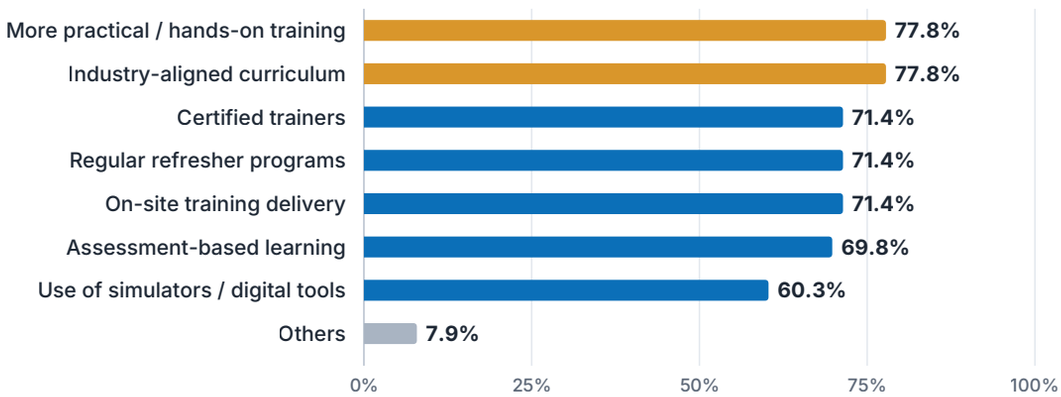
> ***A substantial 83.6% of industry experts indicated that such certifications are useful, while 9.8% considered them helpful.***

L.17 Improvements Required in Training Programs

SURVEY Q23

Improvements required in training programmes

Multiple responses permitted · % of industry experts



The strong emphasis on **practical training (77.8%)** and **industry-aligned curricula (77.8%)** reinforces earlier Survey findings that identified practical exposure and workplace readiness as significant workforce skill gaps. Stakeholders are seeking training models that bridge the gap between classroom learning and actual workplace performance. This suggests that future training programs should place greater emphasis on experiential learning, real-life case studies, workplace simulations, and competency-based assessment methods.

The demand for **certified trainers (71.4%)**, **refresher programs (71.4%)**, and **assessment-based learning (69.8%)** further indicates a need for stronger quality assurance mechanisms within the training ecosystem. Employers increasingly expect training programs not only to deliver knowledge but also to verify competency attainment and support continuous professional development. These findings highlight the importance of strengthening trainer qualifications, introducing structured refresher pathways, and incorporating measurable competency assessments into training delivery models.

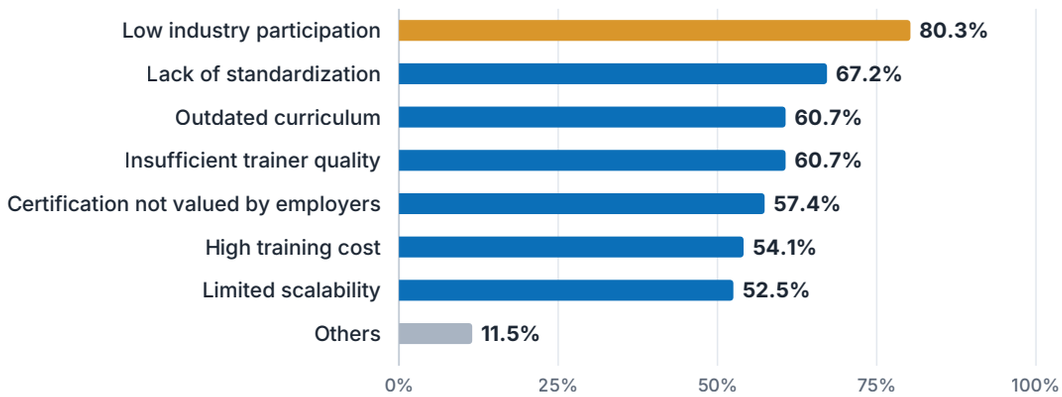
> ***Overall, 93.4% of industry experts reported a positive perception of NSQF-aligned certifications, highlighting broad acceptance across industry and stakeholder groups.***

L.18 Current Challenges & Way Forward-Training Ecosystem

SURVEY Q24

Key concerns in the current and future training ecosystem

Multiple responses permitted · % of industry experts



The finding that **80.3% of industry experts identified low industry participation as the primary concern** is particularly significant. It suggests that training systems may not be adequately aligned with evolving industry needs due to limited employer involvement in curriculum design, qualification development, assessment processes, and workforce planning. Without sustained industry engagement, training programs risk producing graduates whose competencies do not fully match workplace requirements.

Similarly, concerns regarding **lack of standardization (67.2%)**, **outdated curricula (60.7%)**, and **trainer quality (60.7%)** indicate a need for stronger quality assurance mechanisms across the training ecosystem. These findings reinforce earlier Survey results calling for industry-aligned curricula, certified trainers, practical learning approaches, and competency-based assessment frameworks. Addressing these issues will be essential to improving training relevance, workforce employability, and long-term industry confidence in skill development programs.

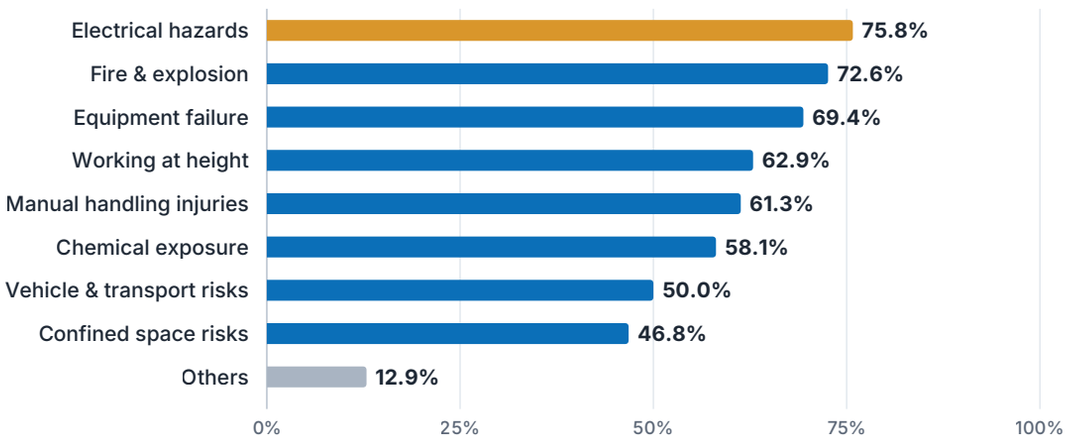
> ***Only 6.6% of industry experts expressed the view that these certifications are not useful.***

L.19 Major Safety Risks across Sectors

SURVEY Q25

Major safety risks across sectors

Multiple responses permitted · % of industry experts



The prominence of **Electrical Hazards (75.8%)**, **Fire & Explosion Risks (72.6%)**, and **Equipment Failure (69.4%)** reflects the critical importance of technical safety controls, preventive maintenance systems, and workforce competency in high-risk industrial environments. These hazards are typically associated with severe incident consequences and therefore require robust safety management systems, specialized training, and certified personnel capable of identifying and mitigating workplace risks.

The significant concern regarding **Working at Height (62.9%)**, **Manual Handling Injuries (61.3%)**, and **Chemical Exposure (58.1%)** further indicates the need for targeted occupational safety interventions. These findings reinforce the importance of certification, hazard identification, risk assessment, and practical safety training. Organizations will need to strengthen competency development programs, emergency preparedness measures, and behaviour-based safety initiatives to effectively manage these risks and improve overall workplace safety performance.

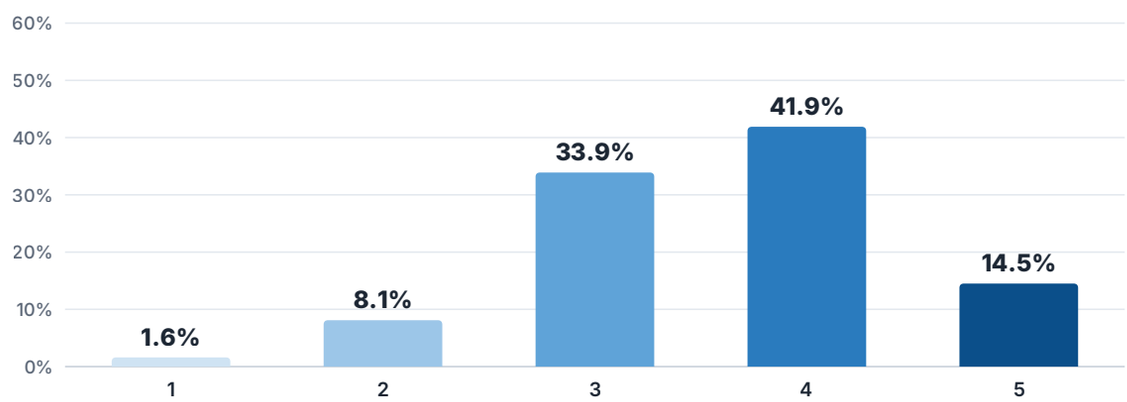
> ***The significant concern regarding Working at Height (62.9%) , Manual Handling Injuries (61.3%) , and Chemical Exposure (58.1%) further indicates the need for targeted occupational safety interventions.***

L.20 Safety Preparedness Level Across Sectors

SURVEY Q26

Safety preparedness level across sectors

Rating scale: 1 = lowest, 5 = highest preparedness · % of industry experts



The distribution of responses indicates that stakeholders view safety preparedness positively, with **56.4% of industry experts rating preparedness at Levels 4 or 5**. This suggests that many organizations have implemented structured safety management systems, training programs, compliance mechanisms, and risk-control measures. The low proportion of industry experts assigning ratings of 1 or 2 further indicates that severe deficiencies in safety preparedness are not widespread among the considered organizations.

However, the fact that one-third of industry experts (**33.9%**) rated preparedness at only **Level 3** suggests that many sectors remain at an intermediate stage of safety maturity. Organizations may have established basic safety processes but still face challenges related to workforce competency, risk assessment practices, emergency preparedness, behavioural safety culture, and adoption of advanced safety technologies. Moving from compliance-based safety management toward initiative-taking and predictive safety systems will be essential to further improve preparedness levels.

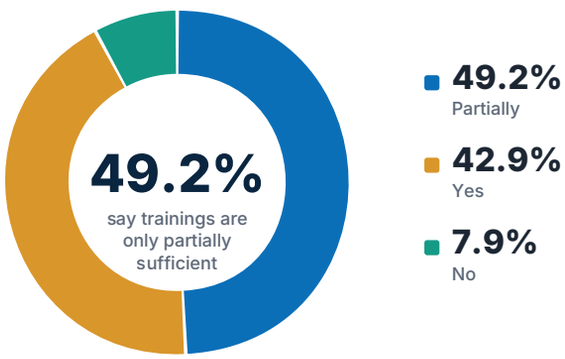
> ***The distribution of responses indicates that stakeholders view safety preparedness positively, with 56.4% of industry experts rating preparedness at Levels 4 or 5 .***

L.21 Are Current Safety Trainings Sufficient?

SURVEY Q27

Are current safety trainings sufficient?

% of industry experts



The high proportion of industry experts selecting **"Partially" (49.2%)** indicates that existing safety training programs may be meeting basic compliance requirements but are not fully addressing evolving workplace risks, technological changes, and competency expectations. Industry experts called for more practical training, industry-aligned curricula, certified trainers, refresher programs, and stronger assessment mechanisms. Together, these responses suggest that organizations are seeking training programs that go beyond awareness-building and focus more directly on demonstrable workplace competency.

The low percentage of industry experts indicating that training is completely insufficient (**7.9%**) suggests that foundational training systems are in place. However, this also highlights the need to strengthen training effectiveness through increased practical exposure, workplace simulations, technology-enabled learning, and role-specific competency development. Continuous improvement of safety training programs will be critical to enhancing workforce preparedness and reducing exposure to high-priority risks such as electrical hazards, fire incidents, equipment failures, and working-at-height activities.

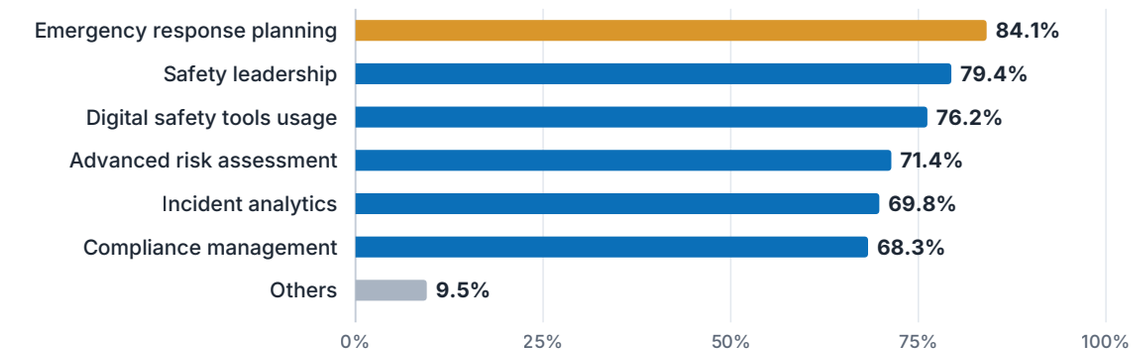
> ***However, the fact that one-third of industry experts (33.9%) rated preparedness at only Level 3 suggests that many sectors remain at an intermediate stage of safety maturity.***

L.22 Safety Competencies Requirement: Current vs Future

SURVEY Q28

Additional safety competencies required

Multiple responses permitted · % of industry experts



The prominence of **Emergency Response Planning (84.1%)** highlights the growing importance of organizational resilience and preparedness in the face of industrial incidents, natural disasters, operational disruptions, and emergency situations. Stakeholders increasingly recognize that effective emergency management requires specialized competencies in crisis response planning, incident command systems, evacuation procedures, business continuity, and emergency communication.

The strong demand for **Safety Leadership (79.4%)** and **Digital Safety Tools Usage (76.2%)** reflects a shift in industry expectations regarding the role of safety professionals. Organizations are no longer seeking safety practitioners solely focused on compliance monitoring but are increasingly looking for leaders capable of driving safety culture, influencing workforce behaviour, managing change, and leveraging digital technologies such as IoT-enabled monitoring systems, safety analytics platforms, artificial intelligence, and predictive risk management tools. These findings reinforce the need for modernized qualification frameworks that integrate leadership, analytics, and digital competencies alongside traditional occupational safety skills.

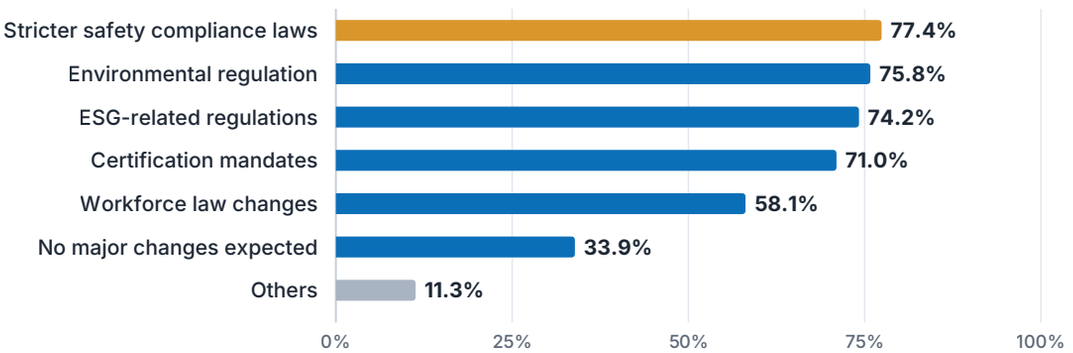
> ***The strong demand for Safety Leadership (79.4%) and Digital Safety Tools Usage (76.2%) reflects a shift in industry expectations regarding the role of safety professionals.***

L.23 Anticipated Regulatory Developments

SURVEY Q29

Expected regulatory changes

Multiple responses permitted · % of industry experts



The expectation of **stricter safety compliance laws (77.4%)** reflects growing recognition that regulators are likely to place greater emphasis on occupational health and safety performance, incident prevention, workforce competency, and organizational accountability. This finding aligns closely with responses identifying safety training, certification, risk management, and competency development as critical priorities for the sector.

Equally significant is the strong expectation of **environmental regulations (75.8%)** and **ESG-related regulations (74.2%)**, indicating that organizations increasingly view sustainability and environmental stewardship as integral components of future business operations. The convergence of safety, environmental, and governance requirements suggests that future workforce development initiatives must prepare professionals to manage integrated HSE-ESG responsibilities rather than treating these domains separately. Furthermore, the expectation of increased **certification mandates (71.0%)** reinforces the need for nationally recognized qualifications, competency frameworks, and certification systems capable of supporting future regulatory compliance requirements.

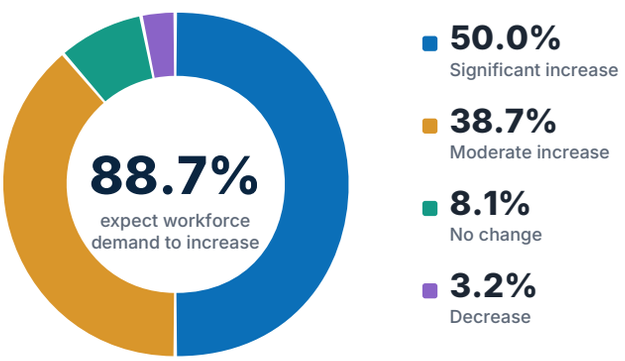
> ***The demand for certified trainers (71.4%) , refresher programs (71.4%) , and assessment-based learning (69.8%) further indicates a need for stronger quality assurance mechanisms within the training ecosystem.***

L.24 Estimated Workforce Demand

SURVEY Q30

Estimated workforce demand

% of industry experts



The finding that nine out of ten industry experts **(88.7%)** anticipate increasing workforce demand suggests that organizations expect substantial growth in competency requirements across occupational safety, health, environment, sustainability, and compliance functions. This growth is likely to be driven by several converging factors, including stricter regulatory requirements, expansion of ESG reporting obligations, increasing adoption of Industry 4.0 technologies, and heightened emphasis on risk management and organizational resilience.

The expectation of workforce expansion also has important implications for skill development planning. As demand increases, organizations will require a larger pipeline of qualified professionals equipped with both traditional safety competencies and emerging skills such as digital safety management, ESG reporting, incident analytics, emergency preparedness, sustainability management, and regulatory compliance. The findings therefore reinforce the need for initiative-taking workforce planning, expanded training capacity, and accelerated development of industry-aligned qualification pathways.

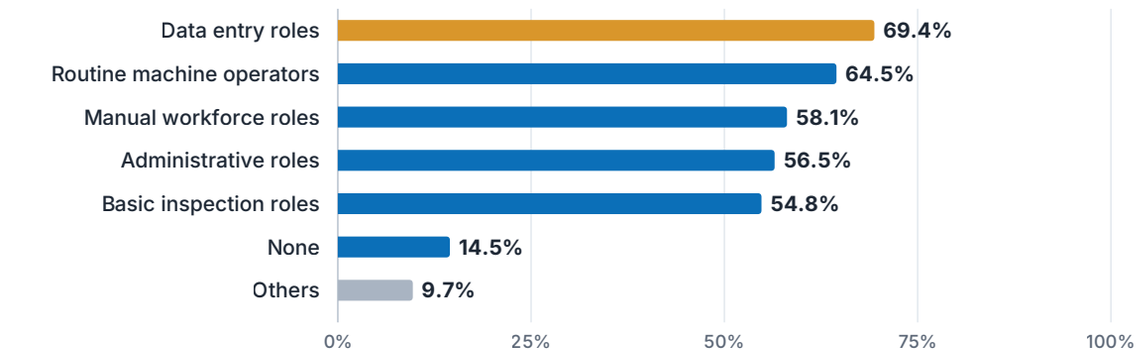
> ***The finding that 80.3% of industry experts identified low industry participation as the primary concern is particularly significant.***

L.25 Automated Skills vs Manpower Requirement

SURVEY Q31

Roles likely to be automated

Multiple responses permitted · % of industry experts



The high percentage of industry experts identifying **Data Entry Roles (69.4%)** and **Routine Machine Operations (64.5%)** as automation-prone reflects global trends in digital transformation, where repetitive and rule-based activities are increasingly being replaced by software systems, robotic process automation (RPA), artificial intelligence, and smart manufacturing technologies. Similarly, the expected automation of **Basic Inspection Roles (54.8%)** indicates growing confidence in technologies such as computer vision, drones, IoT sensors, predictive analytics, and automated monitoring systems.

Importantly, the findings do not necessarily indicate workforce reduction but rather a transformation of job roles. As routine tasks become automated, demand is expected to increase for workers capable of operating, monitoring, maintaining, interpreting, and improving automated systems. Consequently, future workforce development strategies should focus on reskilling and upskilling employees in areas such as digital technologies, data analytics, safety technology management, system supervision, troubleshooting, and decision-making. The findings reinforce the need to prepare the workforce for technology-enabled environments rather than traditional manual or administrative functions.

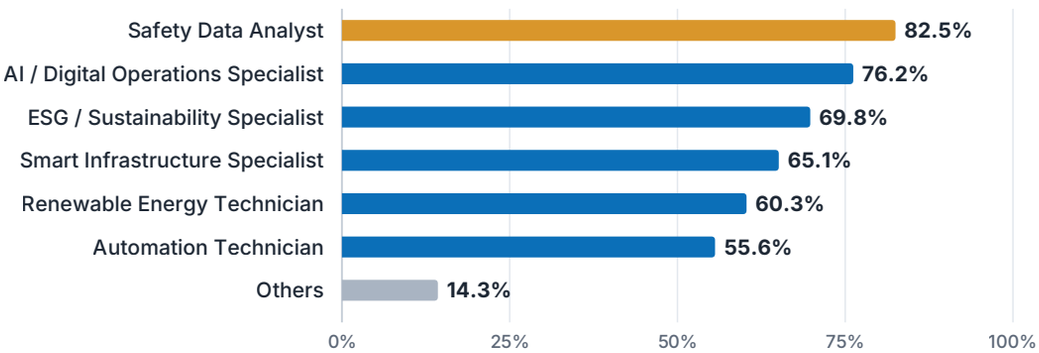
> ***The low percentage of industry experts indicating that training is completely insufficient (7.9%) suggests that foundational training systems are in place.***

L.26 Future Skills & Trends

SURVEY Q32

Emerging job roles

Multiple responses permitted · % of industry experts



The emergence of **Safety Data Analyst (82.5%)** as the highest-ranked future role represents a significant transformation in occupational safety management. Organizations are increasingly moving toward data-driven decision-making, predictive risk assessment, digital monitoring systems, and analytics-based safety performance management. This trend suggests growing demand for professionals who can collect, analyse, interpret, and communicate safety-related data to support initiative-taking risk mitigation and operational excellence.

Similarly, the strong demand for **AI / Digital Operations Specialists (76.2%)** and **ESG / Sustainability Specialists (69.8%)** reflects the convergence of digital transformation and sustainability priorities across industries. Regulatory developments related to ESG compliance, BRSR reporting, environmental performance, and sustainability disclosures are creating entirely new competency requirements that extend beyond traditional occupational safety functions. These findings reinforce the need to modernize qualification frameworks and training programs to include digital technologies, sustainability reporting, artificial intelligence applications, and integrated HSE-ESG management competencies.

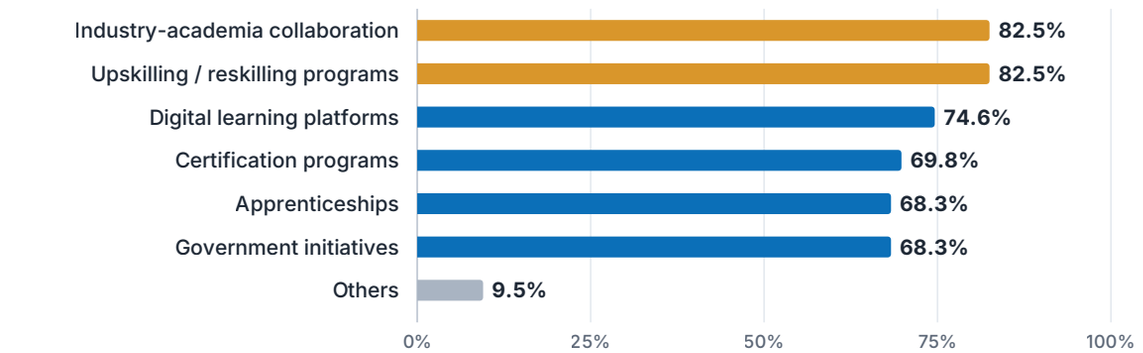
> ***The emergence of Safety Data Analyst (82.5%) as the highest-ranked future role represents a significant transformation in occupational safety management.***

L.27 Bridging the Gap: One Skill at a Time

SURVEY Q33

Strategies to bridge skill gaps

Multiple responses permitted · % of industry experts



The prominence of **Industry-Academia (82.5%)** reflects industry concerns regarding the mismatch between educational outcomes and workplace requirements. Industry experts clearly recognize the need for stronger partnerships between employers, training institutions, universities, and Sector Skill Councils to ensure curricula remain aligned with evolving industry demands, emerging technologies, and regulatory expectations. This can help create more industry-relevant qualifications, improve employability outcomes, and reduce skill shortages.

Similarly, the staunch support for **Upskilling and Reskilling Programs (82.5%)** indicates that organizations view workforce transformation as an ongoing process rather than a one-time intervention. Rapid technological advancements, automation, ESG compliance requirements, and Industry 4.0 adoption are creating new competency needs that existing workers must continuously develop. The substantial support for **Digital Learning Platforms (74.6%)** further suggests that flexible, scalable, and technology-enabled learning solutions will play a crucial role in delivering training efficiently across diverse workforce segments.

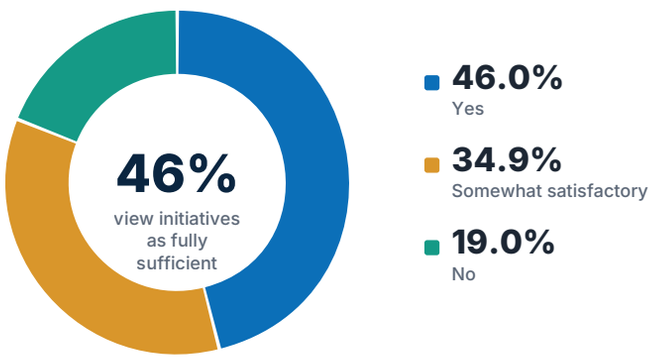
> ***Similarly, the staunch support for Upskilling and Reskilling Programs (82.5%) indicates that organizations view workforce transformation as an ongoing process rather than a one-time intervention.***

L.28 National & International Skilling Programs

SURVEY Q34

Are government initiatives on skill development sufficient?

% of industry experts



The finding that only **46.0%** of industry experts view government initiatives as fully sufficient indicates that although substantial progress has been made through national skill development programs, industry experts continue to identify challenges in translating policy objectives into industry-ready competencies. The sizeable proportion of industry experts selecting **"Somewhat Satisfactory" (34.9%)** suggests that existing initiatives are delivering value but may not be adequately addressing emerging industry needs related to digitalization, ESG compliance, Industry 4.0 technologies, automation, and advanced safety competencies.

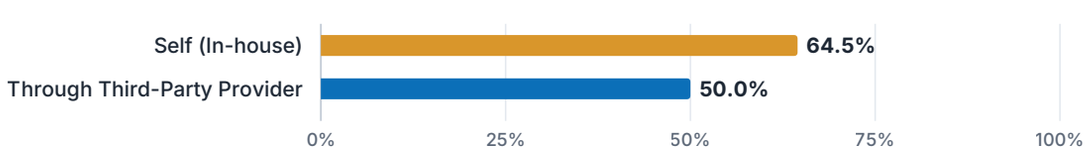
The responses also suggest a need for stronger coordination between government agencies, Sector Skill Councils, training providers, employers, and academic institutions to ensure training programs remain aligned with evolving workforce requirements. Enhancing industry participation in curriculum development, expanding practical training opportunities, increasing awareness of government schemes, and strengthening certification recognition may further improve stakeholder confidence in government-led skill development efforts.

L.29 Training, Assessment, and Certification Approach

SURVEY Q35 · A

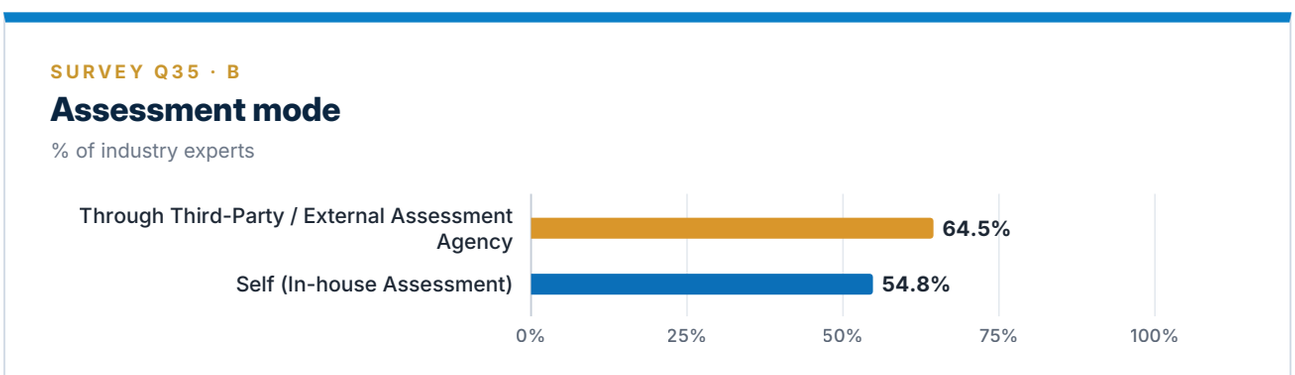
Training mode

% of industry experts



The preference for **in-house training (64.5%)** indicates that organizations increasingly recognize the importance of developing internal capability-building mechanisms that are aligned with their operational realities and workforce requirements. Internal training programs provide greater flexibility, enable contextualized learning, and support continuous workforce development. This preference is particularly relevant in sectors where safety-critical operations, compliance obligations, and organization-specific procedures require tailored training solutions.

However, the fact that **50.0% of industry experts** also value third-party training providers suggests that organizations view external training and certification as an important complement to internal programs. External providers often bring specialized expertise, standardized assessment frameworks, nationally recognized certifications, and access to emerging technologies and best practices. These findings indicate that the most effective workforce development model may be a **hybrid approach**, combining internal training for operational competencies with external certification and specialized skill development for advanced or emerging areas.



The preference for **Third-Party Assessment Agencies (64.5%)** reflects industry demand for impartial, standardized, and credible certification systems that can be recognized across organizations and sectors. Independent assessments help ensure consistency in competency evaluation, improve employer confidence in certified personnel, and strengthen the portability and acceptance of qualifications. This finding aligns with broader industry trends favouring nationally standardized assessment and certification frameworks, particularly in safety-critical occupations where competency assurance is essential.

However, the substantial support for **In-house Assessment (54.8%)** indicates that organizations also value internal mechanisms for monitoring workforce competency and operational readiness. Internal assessments provide flexibility, enable continuous performance evaluation, and allow organizations to address job-specific competency requirements. The findings therefore suggest that the most effective certification ecosystem may involve a **blended assessment approach**, where organizations conduct internal competency evaluations while leveraging accredited third-party agencies for formal certification and independent validation.

SURVEY Q35 · C

Certification mode

% of industry experts



Through Third-Party / Recognized Awarding Body

Self (Internal Certification)

The preference for **Third-Party / Recognized Awarding Bodies (77.8%)** suggests that employers place significant importance on the credibility and portability of certifications. External certifications are perceived as more objective, benchmarked against industry standards, and capable of providing independent validation of workforce competencies. Such certifications often carry greater value for employers, employees, regulators, and clients because they demonstrate compliance with established competency frameworks and quality assurance mechanisms.

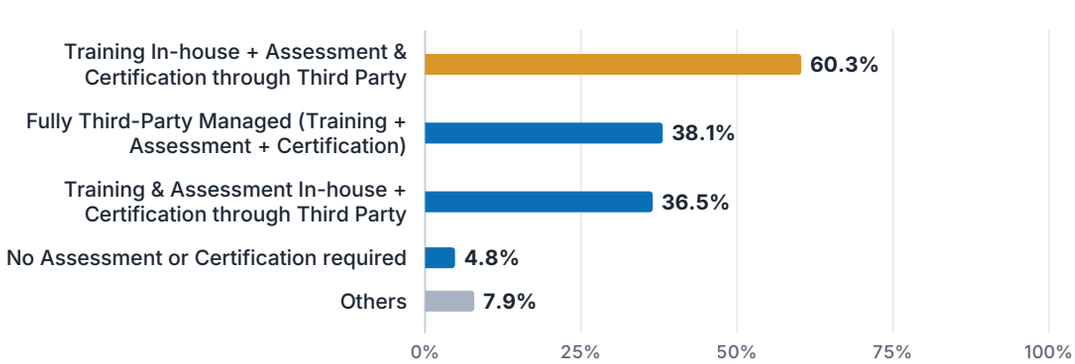
The lower preference for **Internal Certification (22.2%)** does not imply that organizations disregard internal competency development. Rather, it indicates that while internal certification may be useful for organization-specific requirements, it is often viewed as having limited recognition beyond the organization itself. Stakeholders favor certification systems that combine practical workplace competency assessment with external validation to enhance trust, consistency, and employability outcomes.

L.30 Hybrid Model – Training, Assessment, and Certification Approach

SURVEY Q35 · D

Preferred hybrid model

Multiple responses permitted · % of industry experts



The staunch support for **In-house Training combined with Third-Party Assessment and Certification (60.3%)** reflects an emerging industry preference for a balanced workforce development model. Organizations value the flexibility and contextual relevance of internal training programs while simul-

taneously seeking the credibility, objectivity, and industry recognition associated with external assessment and certification systems. This approach allows employers to tailor learning content to operational requirements without compromising the integrity and portability of qualifications.

The findings also indicate that stakeholders view independent certification as a critical quality assurance mechanism. While organizations are willing to invest in internal capability development, they prefer competency validation to be conducted by recognized external bodies to ensure consistency, standardization, and industry acceptance. This model aligns closely with international best practices in competency-based workforce development, where employers deliver workplace-focused training and accredited agencies independently verify competency outcomes.

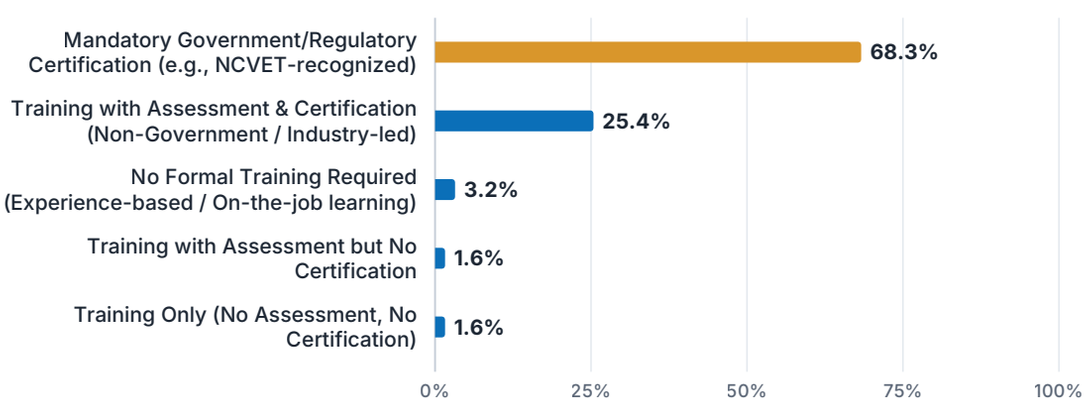
L.31 Safety Skilling Requirement

Preferred Skilling Requirement	Percentage
Mandatory Government/Regulatory Certification (e.g., NCVET-recognized)	68.3%
Training with Assessment & Certification (Non-Government / Industry-led)	25.4%
No Formal Training Required (Experience-based / On-the-job learning)	3.2%
Training with Assessment but No Certification	1.6%
Training Only (No Assessment, No Certification)	1.6%

SURVEY Q36

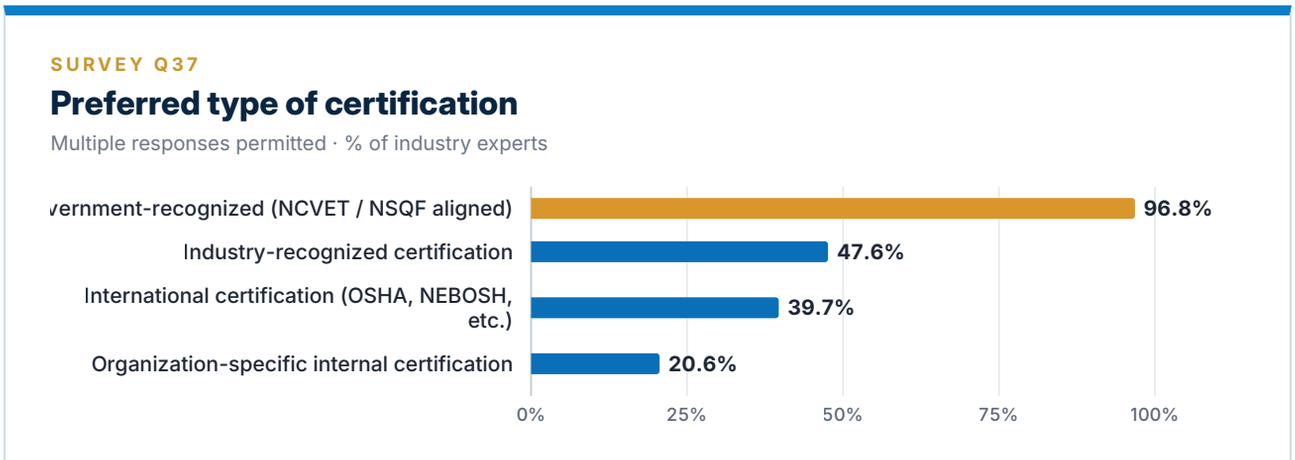
Preferred skilling requirement in safety and skill development

% of industry experts



Organizations overwhelmingly prefer structured skilling pathways with recognized certifications, reflecting the growing importance of compliance, safety assurance, employability, and ESG-driven workforce development.

L.32 Certification Requirement: Government Support or Industry-Led



The results indicate that organizations seek certifications that:

- Are nationally recognized and compliant with regulatory requirements
- Improve employee credibility and employability across industries
- Support standardization of skills and competency assessment
- Enhance compliance with safety, ESG, and workforce development objectives

SSDF has collated these learnings, challenges, and “problem constructs” on offer through our work with local and global clients to experiment, develop and formulate custom-built solutions, as seen through the lens of the environment, health, and safety. Sustainable operations in industries and construction engineering are still something which is considered ‘touch and go’, whereas the international landscape is on another level than ours. With the vision to align with skill-based opportunities, safety potential, and proving ground for candidates to increase their ‘on-the-job’ learning, SSDF over the decade has proven a dependable safety partner, globally.

In short, a versatile 'environment, health and safety' thought leader that global and local industries can count on for answering their EHS concerns. Industrial diversity and its EHS challenges have been translated into peerless services or solutions that are employed each day by millions of users. What has helped us to demonstrate such vital growth and trust within the EHS domain is the spectrum of human capital and its core competence honing the industrial safety and health vision throughout the world.

Integration of fundamental environment, health and safety principles has evolved into a bigger challenge in the past few decades due to rapid industrialization. SSDF aims to be the catalyst that accelerates EHS integration in all human endeavors. At its one end are the corporate-industrial services ensuring safer operations and healthier outcomes. While at the other end there are the advisory, planning, and publication services that cultivate and nurture a responsible mindset. We strive for the implementation of core EHS tenets with the reliability to advance the learning and growth quotient, worldwide.



PART

07

Recommendations: Towards a Future-Ready Workforce

- Recommendations: Towards a Future-ready Workforce

Therefore, the mission of skilling, re-skilling and up-skilling for our youth should go on relentlessly.

SHRI NARENDRA MODI, PRIME MINISTER OF INDIA
Address on World Youth Skills Day, 15 July 2021

PART 07 · RECOMMENDATIONS: TOWARDS A FUTURE-READY WORKFORCE

Recommendations: Towards a Future-ready Workforce

FIVE LEVELS OF ACTION FOR A FUTURE-READY WORKFORCE

- Policy-Level Interventions
- Industry-Level Actions
- Skilling Ecosystem Strengthening
- NSQF and Qualification Development
- Role of Awarding Bodies and Institutions

Policy-Level Interventions

- Accelerate implementation of Labour Codes to promote workforce formalization and social security coverage (Ministry of Labour and Employment)
- Introduce mandatory safety certification frameworks across high-risk sectors such as construction, manufacturing, and energy
- Develop a national skill registry with portable, digitally verifiable credentials aligned to National Skills Qualifications Framework (NSQF)
- Strengthen Workforce Market Information System (LMIS) for real-time demand forecasting and workforce planning
- Provide financial incentives and subsidies for MSMEs to adopt skilling, certification, and safety practices
- Integrate OSHE (Occupational Safety, Health & Environment) and ESG compliance into national industrial and skilling policies

Industry-Level Actions

- Institutionalize mandatory safety induction and refresher training at worksites
- Align internal training programs with **NSQF and industry standards**
- Invest in automation, digital monitoring, and safety technologies
- Establish **in-house skilling academies** or partner with training providers
- Promote a **safety-first culture** through leadership commitment and accountability

- Track and report safety KPIs and workforce productivity metrics

Skilling Ecosystem Strengthening

- Scale up **Recognition of Prior Learning (RPL)** for informal and migrant workers
- Expand access to multi-lingual, modular, and mobile-based training programs
- Increase training infrastructure and certified trainer capacity
- Promote blended learning models (online + practical training)
- Strengthen industry-academia for demand-driven curriculum design
- Focus on **mid-skilled workforce (NSQF Levels 3–6)** through structured career pathways

NSQF and Qualification Development

- Update and align **Qualification Packs (QPs)** with emerging industry needs (AI, automation, green jobs)
- Integrate **OSHE competencies** across all qualifications and job roles
- Develop sector-specific safety qualifications for high-risk industries
- Ensure **periodic revision of NOS/QPs** based on technological advancements
- Introduce micro-credentials and modular certifications for flexibility and scalability
- Strengthen assessment and certification frameworks for quality assurance

Role of Awarding Bodies and Institutions

- Lead standardization of job roles, NOS, and QPs across sectors
- Facilitate industry partnerships and validation of qualifications
- Drive large-scale RPL and certification initiatives
- Support development of training content, trainers, and assessment bodies
- Promote awareness on safety, skilling, and certification among industry and workforce
- Function as a bridge between government, industry, and training ecosystem





PART

Role of Safety Skill Development Foundation (SSDF)

08

- Purpose of establishing these Qualifications

> *By 2025, at least 50% of learners through the school and higher education system shall have exposure to vocational education.*
>
> **NATIONAL EDUCATION POLICY 2020**
> Ministry of Education, Government of India

PART 08 · ROLE OF SAFETY SKILL DEVELOPMENT FOUNDATION (SSDF)

Purpose of establishing these Qualifications

India is experiencing a significant transformation in its workforce structure, driven by technological adoption, industrial expansion, digitalisation, the green transition and changing occupational requirements. Alongside employment growth, a persistent challenge is the alignment of workforce capabilities with evolving industry and workplace requirements.

For safety-critical sectors, this challenge is particularly relevant at technician, supervisory and shop-floor levels, where workers require a combination of technical competence, practical skills and Occupational Safety, Health and Environment (OSHE) capabilities. The availability and adoption of standardised, competency-based safety qualifications therefore remain important for improving workforce readiness and supporting safer and more productive workplaces.

Globally, workforce-market pressures extend beyond conventional unemployment. According to the International Labour Organization (ILO), global unemployment is projected at approximately 186 million people in 2026, while the broader global jobs gap is estimated at 408 million. At the same time, around 2.1 billion workers remain in informal employment, representing nearly 58% of global employment. The ILO also highlights weak and uneven productivity growth and the continued difficulty of moving workers into higher-productivity and more formal employment.

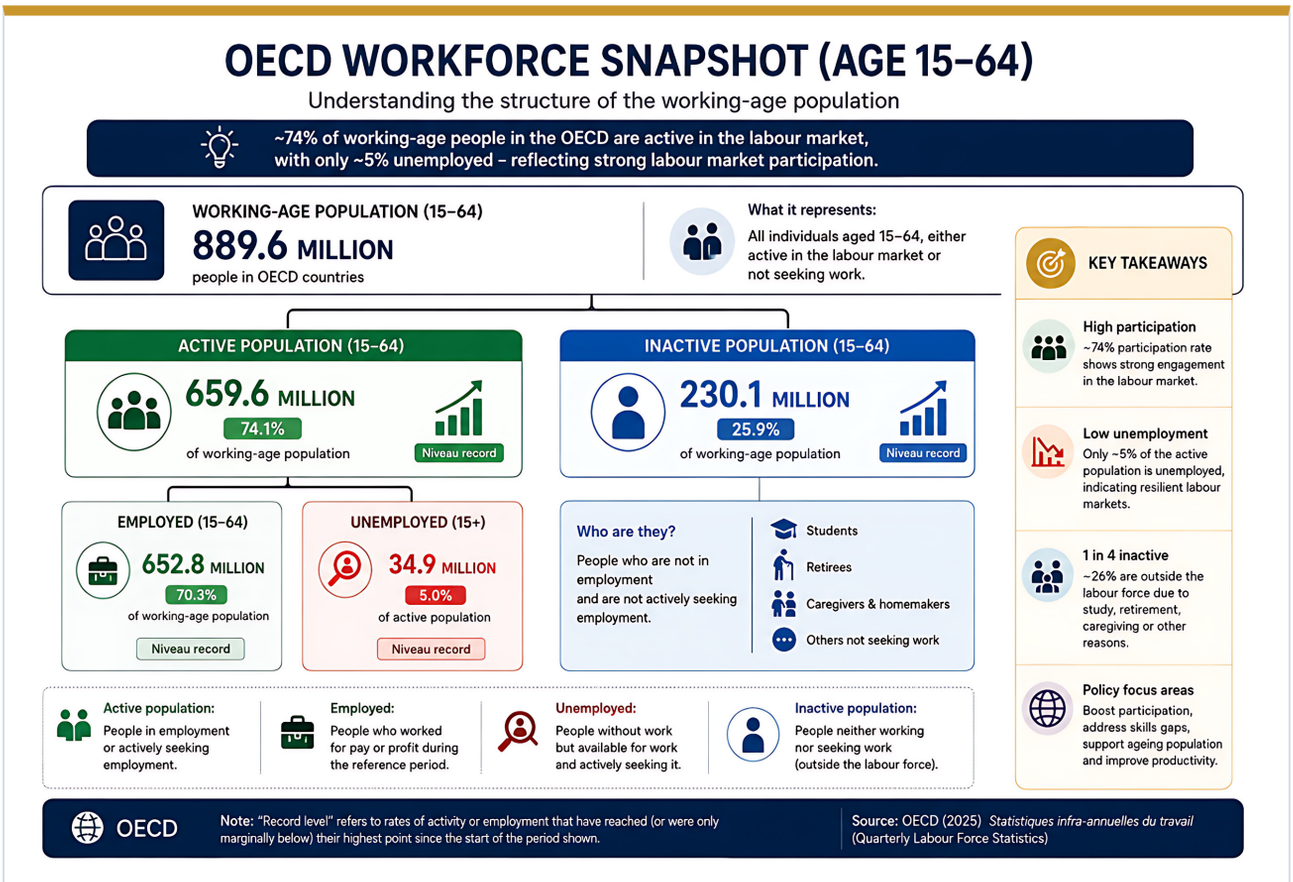
Global Workforce Market Overview (2026)

According to estimates aligned with International Labour Organization trends:

- Global unemployment: ~186 million in 2026; unemployment rate 4.9%
- Global jobs gap: 408 million in 2026—people who want paid work but cannot access it
- Informal employment: approximately 2.1 billion workers, or nearly 58% of global employment

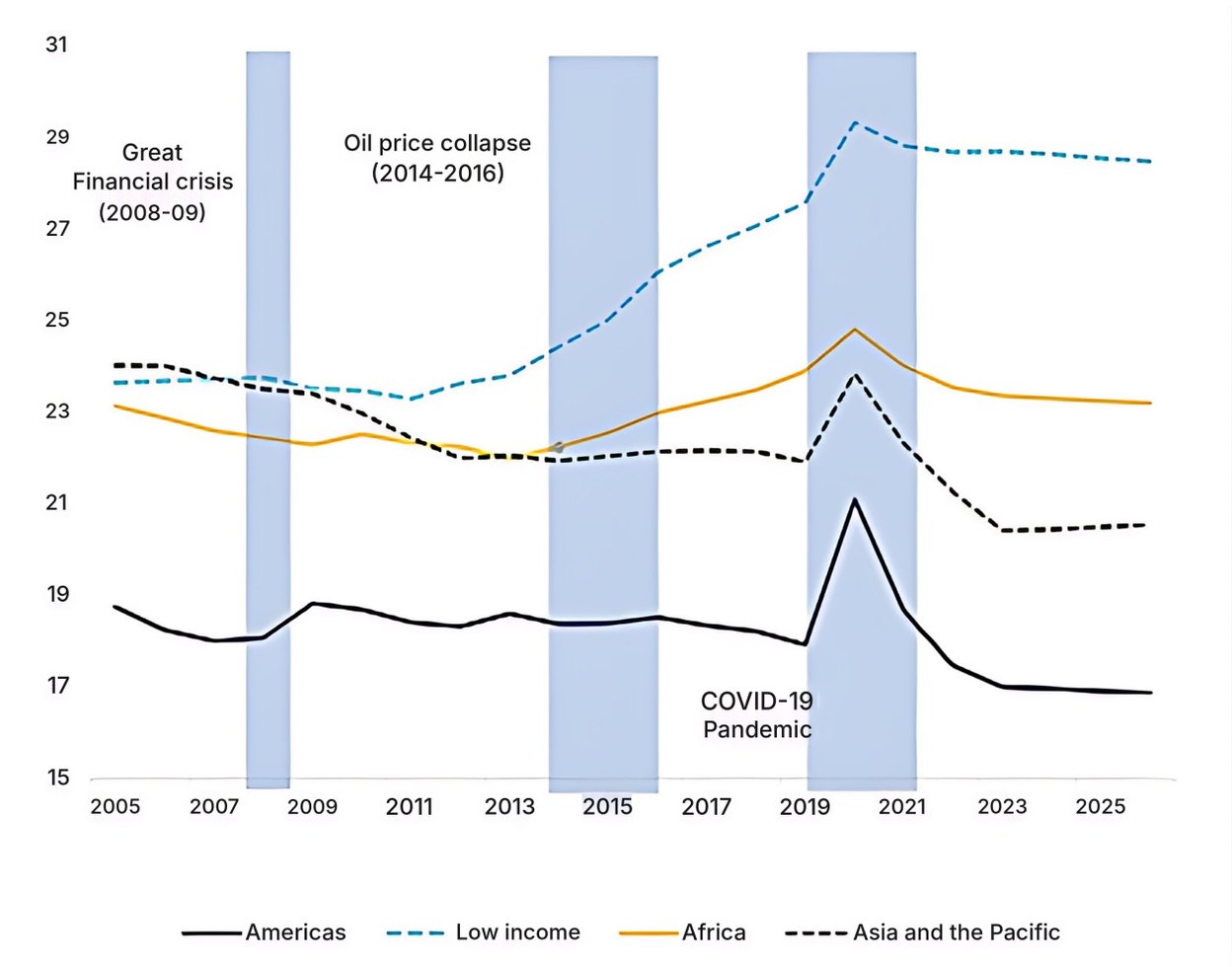
A more critical indicator—workforce underutilization (including underemployment and potential workforce)—affects over **470 million people**, more than twice the unemployment figure.

> ***Key Insight:***
>
> Underutilization is strongly linked to **low-skilled employment**, especially in developing economies, reinforcing the need for **structured vocational and safety-linked career pathways**.



9

9. https://odi.org/en/insights/bolstering-africas-investment-landscape-unlocking-opportunities-for-its-youth/



> ***At the same time, around 2.1 billion workers remain in informal employment, representing nearly 58% of global employment.***

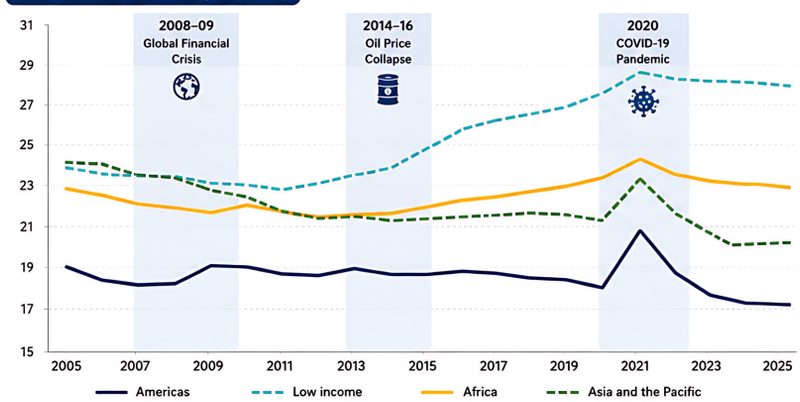


GLOBAL LABOUR SHARE TRENDS (2005–2025)

Diverging paths across regions shaped by global shocks and structural shifts

Labour income share is declining in advanced and Asian economies, while low-income countries show gradual gains.

LABOUR INCOME SHARE (% OF GDP)



REGIONAL TRENDS AT A GLANCE

AMERICAS — OVERALL TREND
- Long-term decline in labour share
- Sharp temporary spike during COVID-19
- Continued downward trend post-2021

LOW-INCOME COUNTRIES — OVERALL TREND
- Rising labour share since mid-2010s
- Strong gains leading up to 2020–21
- Stabilization at elevated levels

AFRICA — OVERALL TREND
- Relatively stable over the period
- Mild increase around 2020
- Slight moderation after 2021

ASIA & THE PACIFIC — OVERALL TREND
- Gradual decline pre-2020
- Temporary COVID-19 spike
- Continued decline in recent years

IMPACT OF GLOBAL SHOCKS

2008–09 Global Financial Crisis	Downward pressure on labour share across most regions
2014–16 Oil Price Collapse	Mixed impact; commodity-exporting regions affected
2020 COVID-19 Pandemic	Artificial spike in labour share due to job losses (denominator effect), not real income gains

KEY TAKEAWAYS

- Labour share is under pressure in advanced and Asian economies.
- Low-income countries are experiencing a catch-up in labour income.
- COVID-19 spike reflects crisis impact, not a structural improvement.
- Sustained policies are needed to ensure inclusive and productive growth.

STRATEGIC IMPLICATIONS

- Invest in skills, innovation and productivity to boost high-quality jobs.
- Strengthen labour protections and bargaining power.
- Promote formalization and reduce informality.
- Design inclusive growth policies to ensure fair distribution of economic gains.

ABOUT THE DATA

Labour income share = Labour compensation (as % of GDP).

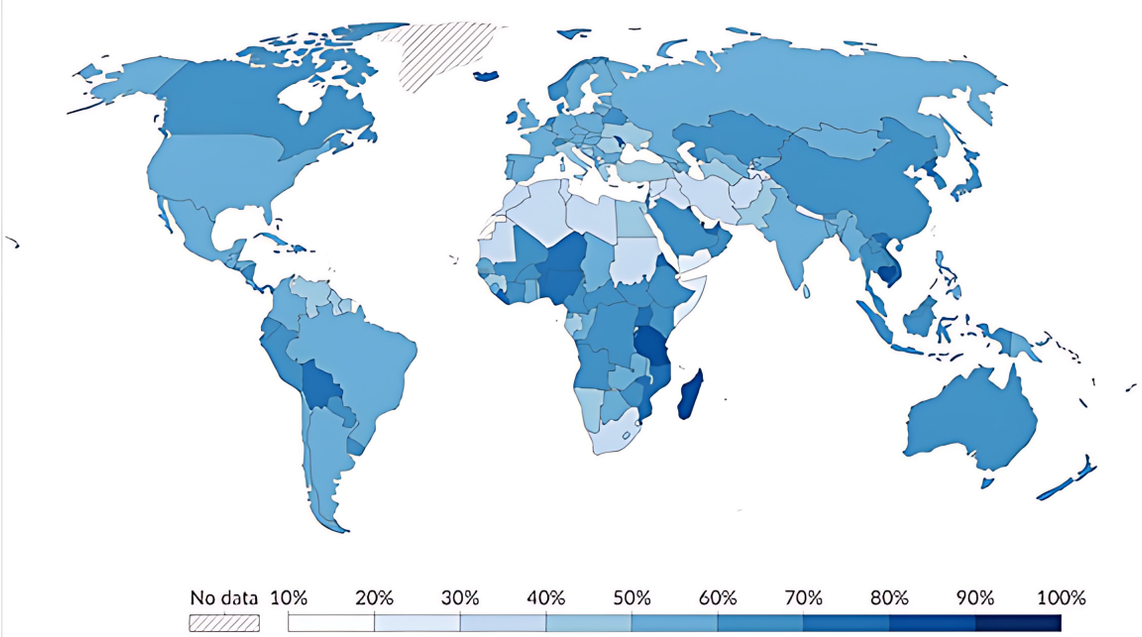
Source: ILO – World Employment and Social Outlook 2024 (Preliminary)

Note: Data for 2024–2025 are estimates.

Employment rate, 2025

Our World in Data

Share of the working-age population (ages 15 and older) who are employed.



Data source: ILO Modelled Estimates, via World Bank (2026)

OurWorldinData.org/work-employment | CC BY

Note: All figures correspond to modeled ILO estimates. Employment is defined in line with the 13th ICLS and includes the production of goods for own use, such as subsistence farming.

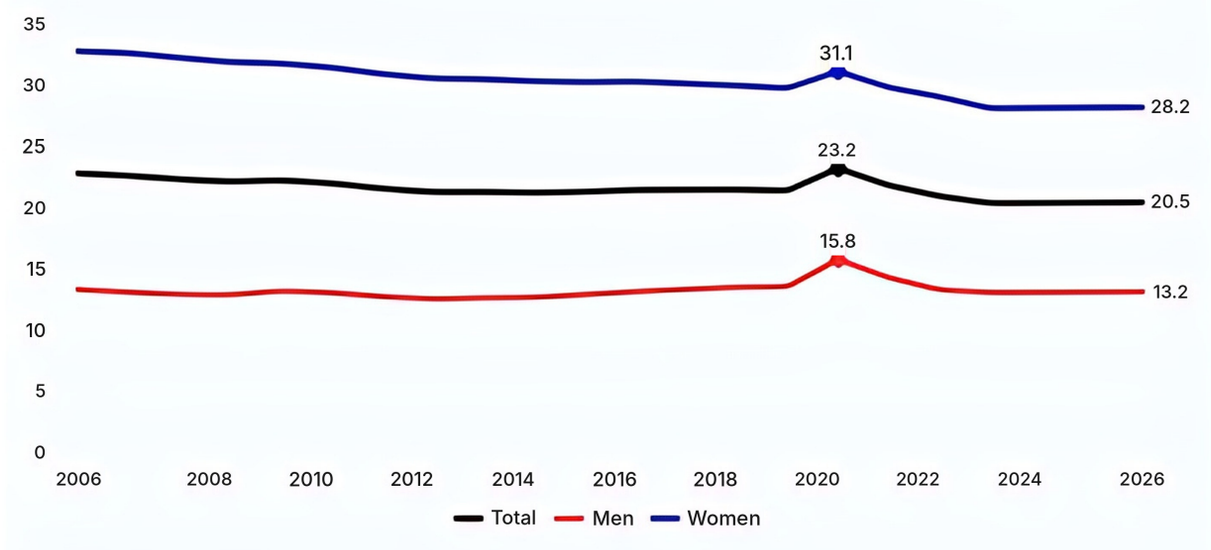
[10]

Youth Employment and Skills Transition

Young people aged 15–24 continue to face significant challenges in transitioning from education and training into productive and decent employment. The latest International Labour Organization (ILO) estimates indicate that 67 million young people were unemployed in 2025, corresponding to a global youth unemployment rate of 12.4%. At the same time, approximately 257 million young people were not in employment, education or training (NEET), representing around 20% of the global youth population. ILO projections indicate that the global youth NEET rate remains around 20% in 2026.

The persistence of high NEET levels highlights challenges in school-to-work transitions, access to decent employment, skills alignment and workforce-market inclusion. While technological change and automation are reshaping occupational tasks, the ILO's recent analysis indicates that young people continue to face broader challenges arising from weak job creation and difficult transitions into the workforce market.

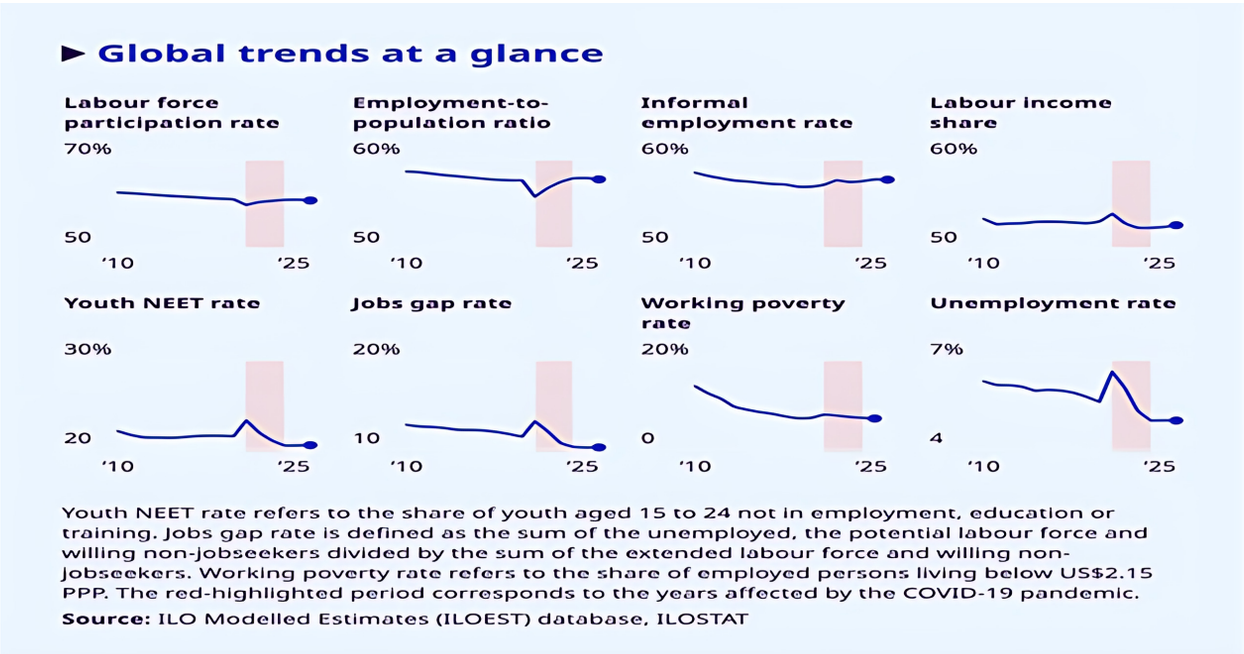
Figure 1.5. Youth not in employment, education or training (NEET), by sex, world, 1991–2026 (percentage)



Source: ILOSTAT, ILO modelled estimates, November 2024.

[11]

10. https://ourworldindata.org/grapher/employment-to-population-ratio
11. https://www.hcamag.com/us/specialization/recruitment/126-youth-unemployment-shows-little-improvement-in-global-market/521090



12

Skill Gap in Safety & EHS Sector (India Focus)

India faces a significant challenge in expanding the availability of industry-relevant, competency-based safety and EHS qualifications, particularly for technicians, supervisors and shop-floor personnel. While India has established formal pathways for safety education and certification, the availability, accessibility and industry adoption of structured safety qualifications remain uneven across sectors and workforce segments.

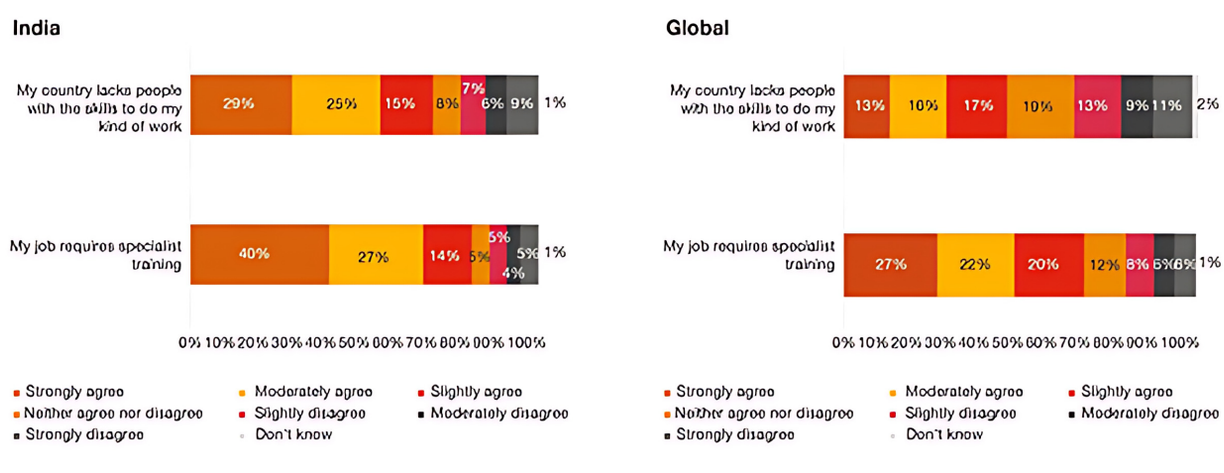
The challenge is particularly important in construction, manufacturing, infrastructure, energy and other safety-critical activities, where workers require practical competencies alongside technical knowledge and regulatory awareness. Existing workforce-skilling systems also need stronger integration of occupational safety, health and environmental competencies with sector-specific technical training.

Available workforce-market evidence indicates that formal training does not reach a large proportion of India's workforce, while informal and workplace-based learning remains important. Consequently, the priority is not simply to increase the number of formally trained workers, but to recognise existing competencies, provide accessible pathways to certification, and strengthen continuous upskilling and OSHE capability development.

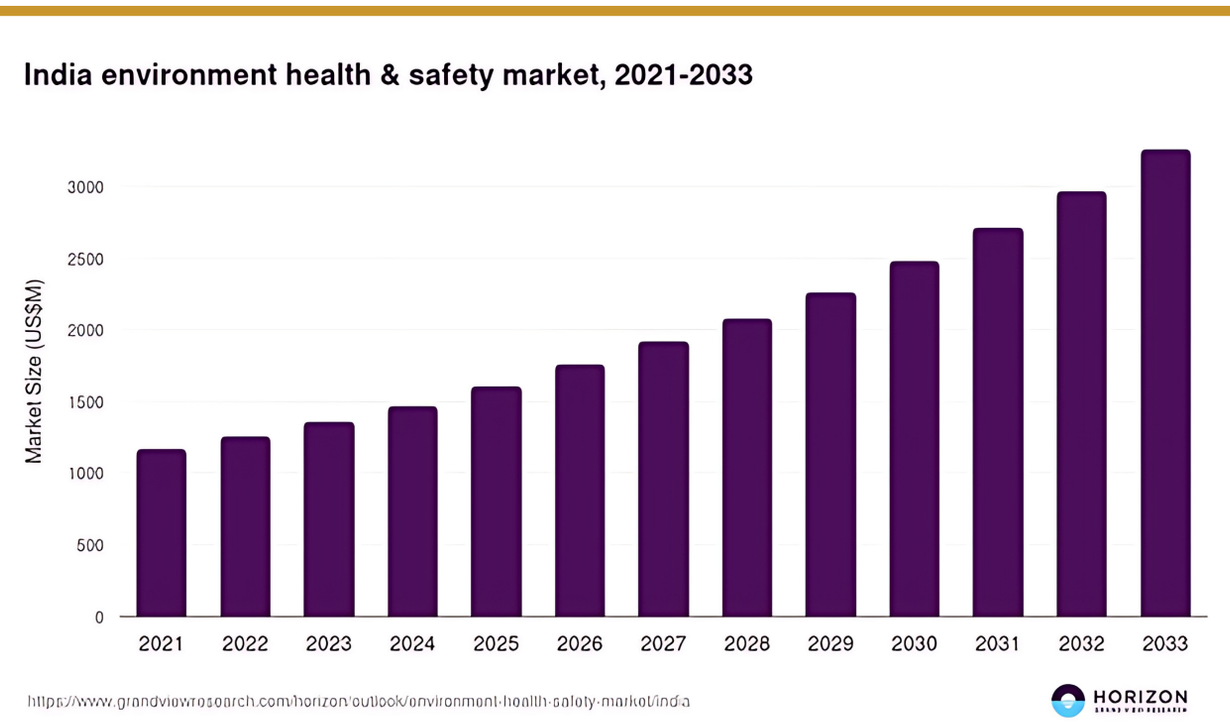
12. https://www.ilo.org/data-and-statistics

Key Challenge

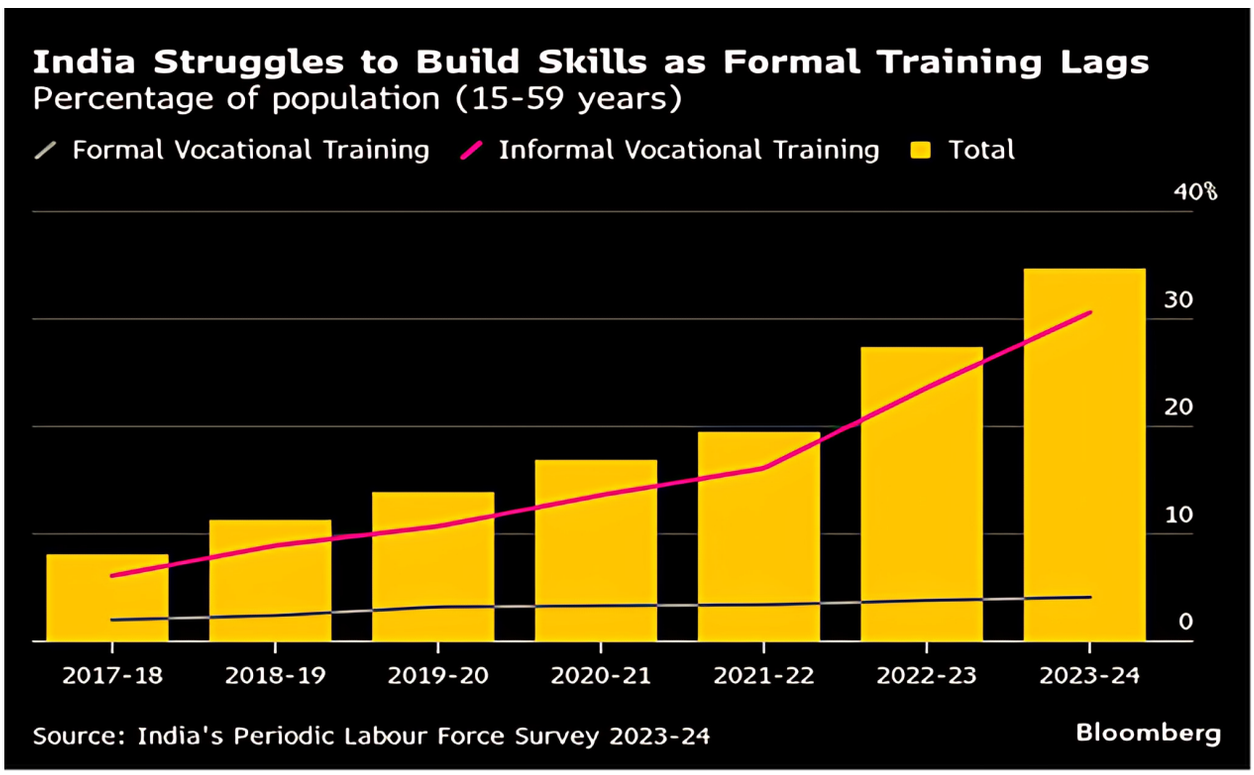
The most significant gap is at the technician, supervisory and shop-floor levels, where practical skills, hazard awareness and safe operating practices directly influence workplace risk. Addressing this gap requires scalable competency-based qualifications, Recognition of Prior Learning (RPL), practical assessment, industry-aligned curricula and accessible safety certification pathways.



13



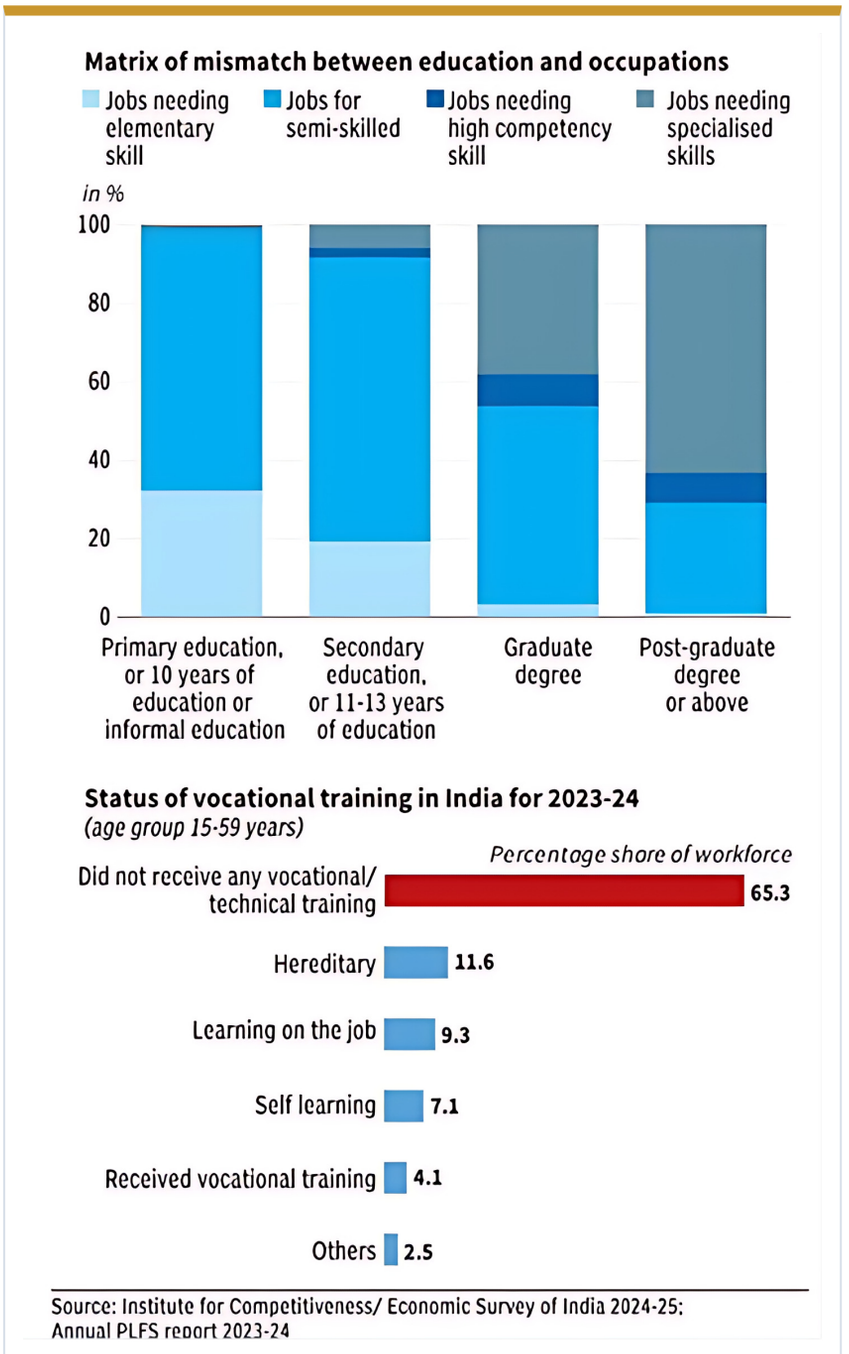
13. https://www.pwc.in/what-indias-workforce-think-about-work today.html



14

This gap is further influenced by the structure and accessibility of international safety-training and certification pathways. Organisations such as **NEBOSH and IOSH** provide internationally recognised safety qualifications and training, while **OSHA** serves primarily as a regulatory and workplace-safety authority in the United States. However, access to internationally recognised safety programmes can remain challenging for sections of the workforce, particularly **technicians, shop-floor workers and workers in informal or small-enterprise settings.**

14. https://www.linkedin.com/posts/radheshyam-jadhav-1626215b_datastory-datastories-radheshyamjadhav-activity-7307798842576400384-DBEA/



Structural Challenges in Vocational Education

The international safety-training landscape includes well-established organisations and certification frameworks such as NEBOSH and IOSH, while the U.S. Occupational Safety and Health Administration (OSHA) provides regulatory standards, guidance and training resources in the United States. These institutions have contributed significantly to the development and recognition of occupational safety competencies.

Key Accessibility Challenges:

- Cost and affordability: Certification and associated training costs can be difficult for low-income and informal workers to absorb
- Entry requirements: Some advanced programmes require prior education, experience or safety knowledge
- Limited localisation: International programmes may require adaptation to Indian regulatory, industrial and workplace contexts
- Language and delivery barriers: Availability of training in accessible regional languages and flexible formats remains important for shop-floor workers
- Workplace accessibility: Shift patterns, travel requirements and time away from work can restrict participation
- Limited technician-level pathways: There is a need for scalable competency-based qualifications specifically designed around practical workplace safety functions

Strategic Need for New Qualifications

Given India's workforce ambitions under national skilling initiatives, there is a strong need to build a **scalable, inclusive, and industry-aligned safety qualification ecosystem**.

Key design principles should include:

- Target **low- and semi-skilled workers**, not just managerial roles
- Integrate practical, simulation-based learning approaches
- Align with global standards while ensuring local accessibility and affordability
- Address emerging risks from automation, infrastructure expansion, and ESG compliance

How SSDF is fulfilling these gaps

The Survey identified several critical workforce challenges, including skill shortages, certification requirements, emerging competency needs, and demand for practical training. SSDF is actively addressing these gaps through the development of industry-aligned Qualification Packs, National Occupational Standards, certification pathways, and competency-based training frameworks designed to meet current and future industry requirements.

In addition to supporting government-recognized certification systems, SSDF works with industry stakeholders to identify emerging skill needs and develop future-focused qualifications in areas such as occupational safety, sustainability, ESG, digital technologies, and Industry 4.0. Through partnerships with employers, training providers, and subject matter experts, SSDF continues to strengthen workforce capability, improve employability, and support safer and more productive workplaces.



PART

09

SSDF Proposition & Strategic Intervention Framework

- Creating a Future for Generations to Come

A safe and healthy working environment.

ADOPTED AS A FUNDAMENTAL PRINCIPLE AND RIGHT AT WORK
International Labour Conference, June 2022

PART 09 · SSDF PROPOSITION & STRATEGIC INTERVENTION FRAMEWORK

Creating a Future for Generations to Come

SSDF Proposition

The **Safety Skill Development Foundation (SSDF) is a "Not for Profit"** organization under Section 8 of the Companies Act 2013 and recognized as an **Awarding Body under National Council for Vocational Education and Training (NCVET), Ministry of Skill Development & Entrepreneurship, Government of India**. SSDF was set up with a vision to create an industry-need based skill ecosystem for safety professionals for industries by developing internationally acceptable **National Occupational Standards (NOS),** Training Delivery Systems, Assessment & Certification process in line with **National Skill Qualification Framework (NSQF)** of Government of India and in line with **New Education Policy of Government of India, to meet skill demands of industries and keep the safety professional globally & technologically competent.**

A prosperous synchronicity between superior training and centralized certification shall give the necessary impetus to the safety movement in India.

This would allow a massive rise in employment as well as put India on the world map as the skill and competency development center.

For achieving sustainability, SSDF shall ensure optimum neutrality, transparency, and authenticity in its operations through a myriad of independent (apex body/government) reviews, audits, and support. This will allow SSDF to sustain as well as continue to create many more qualifications/certifications for future generations to come.

> ***This will allow SSDF to sustain as well as continue to create many more qualifications/certifications for future generations to come.***



A glimpse of the operational model of SSDF

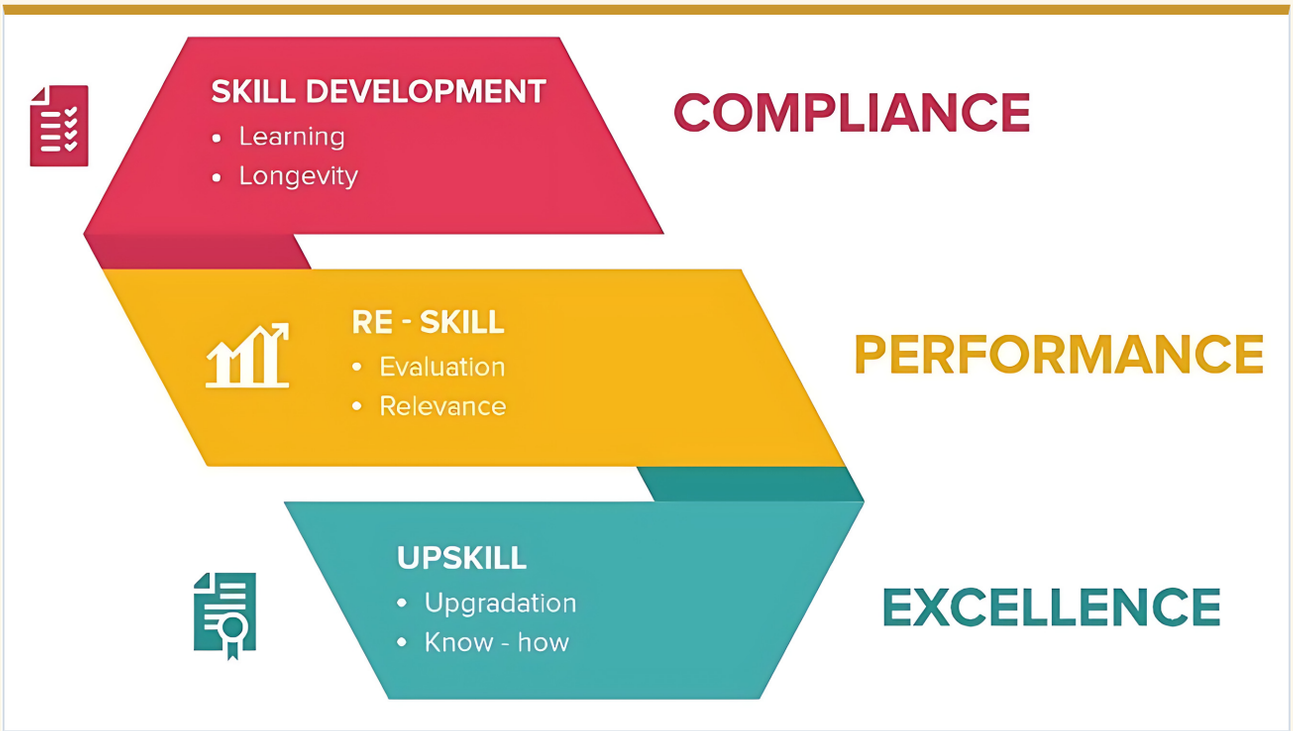


SSDF serves as a strategic enabler of workforce development by bridging the gap between industry requirements and workforce capabilities. Through the development of nationally recognized qualifications, competency standards, certification systems, and industry-driven training frameworks, SSDF supports organizations in building a skilled, compliant, and future-ready workforce.

As industries increasingly adopt digital technologies, sustainability practices, and advanced safety systems, SSDF's role extends beyond traditional skill development to encompass emerging domains such as ESG, BRSR compliance, digital safety management, Industry 4.0 applications, and future workforce planning. This positions SSDF as a key partner in supporting national skilling objectives, workforce transformation, and sustainable industrial growth.

SSDF works with training professionals, institutes, and agencies for developing skill-based certifications that will involve the process as shown in the chart above.

SSDF continues to work with various training partners in India and overseas to achieve the following training goals.



- Bringing 'safety vision' and occupational well-being that industrial-construction workplaces strive to achieve
- Increasing employee engagement, which has a direct impact on productivity, retention, and customer satisfaction
- Enhance employee potential — reskilling, upskilling, and competency validation (periodic assessments and refresher training based on workplace needs)
- Building a "growth mindset" within employees and across the organization. A growth mindset yields ever-higher levels of performance where people learn from their mistakes and actively seek challenges
- Improving motivation among employees
- Cultivating leadership and emotional intelligence

Commonly used metrics for evaluation are provided below:

- Increased productivity
- Less supervision
- Reduction of errors & accidents
- Creation of stable talent pool
- Uncover employee potential
- Job satisfaction
- Reduction of turnover and absenteeism
- Address employee weakness
- Increased consistency

- Team spirit
- Reduction in learning time
- Skill development
- Optimum resource utilization





PART

Implementation Roadmap

10

- Implementation Roadmap

> *This information can help to shape policies and practices to create healthier and safer workplaces.*
>
> **GUY RYDER, THEN DIRECTOR-GENERAL, INTERNATIONAL LABOUR ORGANIZATION**
> On the WHO/ILO Joint Estimates, September 2021

PART 10 · IMPLEMENTATION ROADMAP

Implementation Roadmap



Key Enablers for Implementation

01

Policy Alignment & Governance

Convergence between skill development, workforce laws (OSH Code 2020), and industrial policies is critical to avoid fragmentation and ensure uniform implementation across sectors.

02

Institutional Coordination

Strong coordination between ministries (MSDE, Labour, Industry) and Sector Skill Councils is required for seamless execution and standardization.

03

Public–Private Funding Models

Blended financing through government schemes, CSR funding, and industry contributions can ensure scalability and sustainability of EHS skilling programs.

04

Outcome-Based Financing

Shift towards performance-linked funding tied to certification, placement, and safety outcomes to improve program effectiveness.

05

Robust Data & Monitoring Systems

Development of centralized dashboards to track workforce training, certification levels, incident rates, and compliance metrics.

06

Digital Integration

Use of digital platforms for training delivery, assessment, certification tracking, and real-time safety monitoring.

07

Industry Ownership & Accountability

Active participation of industries in curriculum design, training delivery, and ensuring workplace safety compliance.

08

Standardization & Quality Assurance

Establishment of national standards for EHS training, certification, and assessment to ensure consistency and credibility.



Way Forward: Strategic Direction

01

Integrated Workforce Development Model

Align skill development with safety standards, technological advancements, and policy frameworks to create a holistic workforce ecosystem.

02

Safety-First Work Culture

Transition from compliance-driven safety to a culture-driven approach, embedded at all organizational levels.

03

Technology-Led Transformation

Adoption of AI, IoT, and data analytics for predictive safety, real-time risk monitoring, and workforce optimization.

04

Future Skills Integration

Incorporate digital, green, and safety skills into mainstream education and vocational training systems.

05

Scalable Skilling Ecosystem

Expand access to training through digital platforms, regional centres, and industry-led initiatives.

06

Formalization of Workforce

Increase certification and formal training penetration, especially among informal workers.

07

Global Competitiveness

Align Indian EHS standards with global benchmarks to position India as a supplier of skilled and safety-compliant workforce.

08

Continuous Learning & Reskilling

Promote lifelong learning systems to keep pace with evolving industry and technological changes.





PART

Synopsis & Way Forward

11

- Synopsis & Way Forward
- Abbreviation
- References List

Today it is important that learning does not stop with your earning.

SHRI NARENDRA MODI, PRIME MINISTER OF INDIA
Address on World Youth Skills Day, 15 July 2021

PART 11 · SYNOPSIS & WAY FORWARD

Synopsis & Way Forward

India stands at a pivotal stage where its demographic advantage, economic expansion and industrial transformation present significant opportunities for employment and productivity growth. Around 11–12 million young people enter India's workforce market each year, increasing the importance of creating not only jobs, but also a workforce equipped with relevant skills, recognised qualifications and workplace safety competencies.

A substantial skills mismatch persists across the workforce market, particularly as industries adopt new technologies, expand infrastructure and transition towards more advanced and sustainable production systems. Informality remains a major structural feature of employment: NITI Aayog's analysis of PLFS 2023–24 data estimates that nearly 87% of employed workers were informally employed, using its stated definition of informal employment. This highlights the need to expand access to formal skilling, recognised certification, social protection and structured upskilling pathways, while recognising that informality does not necessarily imply a lack of skills.

At the same time, emerging areas such as renewable energy, digital infrastructure, advanced manufacturing, logistics and technology-enabled services are reshaping occupational requirements and increasing demand for digital, technical, sustainability and integrated Environment, Health and Safety (EHS) competencies. The World Economic Forum estimates that around 63% of Indian workers may require training by 2030, reinforcing the importance of continuous reskilling and upskilling.

Findings from the Safety Skill Development Foundation (SSDF) survey indicate:

- Rising demand for skilled and certified professionals
- Strong preference for government-recognised certifications
- Growing importance of practical training, digital skills and ESG competencies
- Emergence of new roles influenced by Industry 4.0, technological change and evolving regulatory requirements
- Continued need for accessible, industry-relevant safety and EHS qualifications

However, gaps remain in the accessibility and reach of competency-based certification and vocational training, particularly for shop-floor workers, technicians, supervisors and workers in informal or small-enterprise settings. Barriers may include cost, limited training infrastructure, geographical accessibility, lack of localised delivery and insufficient availability of standardised, industry-aligned qualifications.

Conclusion: Addressing India's skill and safety gap requires a coordinated, multi-stakeholder approach involving government, industry, training and assessment institutions, qualification bodies and employers. Key interventions should include NSQF-aligned competency-based skilling, Recog-

nition of Prior Learning (RPL), accessible and portable digital certification, practical workplace training, industry participation in curriculum design, and stronger integration of occupational safety and health competencies across skill pathways.

By strengthening the link between skills, certification, employability and workplace safety, India can better convert its demographic advantage into productive human capital and support the development of a more skilled, resilient and safety-conscious workforce.

> ***The World Economic Forum estimates that around 63% of Indian workers may require training by 2030, reinforcing the importance of continuous reskilling and upskilling.***



Competent inspection and permit systems keep high-risk work under control

PART 11 · SYNOPSIS & WAY FORWARD

Abbreviation

SSDF	Safety Skill Development Foundation
QP	Qualification Pack
NSQF	National Skill Qualification Framework
EHS	Environment, Health, and Safety
USD	United States Dollar
IoT	Internet of Things
GDP	Gross Domestic Product
UK	United Kingdom
US	United States
ISO	International Organization for Standardization
OHS	Occupational Safety and Health
FDI	Foreign Direct Investment
GCC	Gulf Cooperation Council
WBG	World Bank Group
ILO	International Labour Organization
ITI	Industrial Training Institute
NGO	Non-Governmental Organization
USA	United States of America
NSSO	National Sample Survey Office.
NEBOSH	UK-based National Examination Board in Occupational Health and Safety
IOSH	UK-based Institution of Occupational Safety and Health
BSC	British Safety Council
CITB	Construction Industry Training Board
CSP	Certified Safety Professional
OSHA	Occupational Safety and Health Administration
PTW	Permit to Work
BOCW	Building and Other Construction Workers Act
CV	Curriculum Vitae
W.H.O.	World Health Organization
ROI	Return on Investment
EHSF	Environment, Health, Safety and Fire
BBS	Behavior Based Safety
HIRA	Hazard Identification and Risk Assessment
NSC	National Safety Council
SDG	Sustainable Development Goals
NEET	National Eligibility cum Entrance Test
PMKVY	Pradhan Mantri Kaushal Vikas Yojana
AART	Advanced Animation and Rendering Techniques
SOP	Standard Operating Procedure
LOTO	Lock-Out Tag-Out
NCVET	National Council for Vocational Education and Training
JHA	Job Hazard Analysis
ALARP	As Low as Reasonably Practicable
PDCA	Plan-Do-Check-Act Cycle
O&M	Operations and Maintenance
OPITO	Offshore Petroleum Industry Training Organization
H2S	Hydrogen Sulfide
HAZOP	Hazard and Operability Study
CFL	Compact Fluorescent Light
ETP	Effluent Treatment Plant
STP	Sewage Treatment Plant
TPI	Third Party Inspection
EOT Crane	Electric Overhead Travel Crane
TECSOK	Technical Consultancy Services Organization of Karnataka

KIADB	Karnataka Industrial Areas Development Board
MSME	Ministry of Micro, Small & Medium Enterprises
KSSIDC	Karnataka State Small Industries Development Corporation
DIC	District Industries Centers
SISI	Small Industries Service Institute
NSIC	National Small Industries Corporation
SIDBI	Small Industries Development Bank of India
KSFC	Karnataka State Financial Corporation
OSHE	Occupational Safety, Health, and Environment
EHS	Environment, Health, and Safety
NSQF	National Skills Qualification Framework

PMKVY	Pradhan Mantri Kaushal Vikas Yojana
RPL	Recognition of Prior Learning
ESG	Environmental, Social and Governance
ITI	Industrial Training Institute
SSC	Sector Skill Council
PLI	Production Linked Incentive
AI	Artificial Intelligence
VR/AR	Virtual Reality / Augmented Reality
GDP	Gross Domestic Product
MSDE	Ministry of Skill Development and Entrepreneurship
AB	Awarding Body
AA	Assessment Agency
TP	Training Partners
SME	Subject Matter Expert

> ***Align Indian EHS standards with global benchmarks to position India as a supplier of skilled and safety-compliant workforce.***



Right equipment, right training: personal protective equipment is the last line of defence

PART 11 · SYNOPSIS & WAY FORWARD

References List

1. International Labour Organization (ILO) (2026). *World Employment and Social Outlook 2026*. Geneva: ILO.
   ILO WESO Reports
   https://www.pib.gov.in/PressReleasePage.aspx?PRID=2297093&lang=1&reg=48&
2. International Labour Organization (ILO) (2025). *Global Wage Report*. Geneva: ILO.
   ILO Wage Report
3. International Labour Organization (ILO) (2024). *Women and Men in the Informal Economy*. Geneva: ILO.
   ILO Informal Economy Report
4. OECD (2026). *Economic Outlook – India*. Paris: OECD.
   OECD Economic Outlook
5. International Monetary Fund (IMF) (2025). *India: Staff Country Report*. Washington, DC: IMF.
   IMF India Reports
6. Government of India (2026). *Periodic Labour Force Survey (PLFS) 2025–26*. MoSPI.
   PLFS Official Page
7. Government of India (2024). *PLFS Annual Report 2023–24*. MoSPI.
   MoSPI Reports
8. Ministry of Labour and Employment (2026). *Employment Outlook Report*.
   Ministry of Labour Reports
9. Economic Survey of India (2022–23). Government of India.
   Economic Survey
10. World Economic Forum (2025). *Future of Jobs Report*. Geneva: WEF.
    WEF Future of Jobs
11. National Skill Development Corporation (NSDC) (2025). *Skill Gap Reports*.
    NSDC Skill Reports
12. Ministry of Skill Development & Entrepreneurship (MSDE). *NSQF Framework*.
    NSQF Framework
13. International Labour Organization (ILO) (2026). *Skills Systems & Future of Work*.
    ILO Skills & Future of Work
14. World Bank (2026). *India Development Update*. Washington, DC.
    World Bank India Update
15. World Bank (2026). Manufacturing-Led Growth & Global Value Chains.
    World Bank Publications
16. NITI Aayog (2026). *Industrial Growth* Strategy.
    NITI Aayog Reports

17. Deloitte India (2022). *Industry 4.0 Outlook*.
Deloitte Insights

18. International Energy Agency (IEA) (2025). *World Energy Outlook*.
IEA Outlook

19. International Renewable Energy Agency (IRENA) (2023). *World Energy Employment Report*.
IRENA Reports

20. World Bank (2026). *Logistics Performance Index Report*.
LPI Report

21. KPMG India (2023). *Logistics & E-commerce Outlook*.
KPMG Insights

22. Ministry of Electronics & IT (MeitY). *Digital Economy Reports*.
MeitY Reports

23. International Labour Organization (ILO) (2026). *Migration & Workforce Market Trends*.
ILO Migration

24. World Bank (2024–2026). *Migration and Development Briefs*.
World Bank Migration

25. International Labour Organization (ILO). *Occupational Safety and Health Standards*.
ILO OSH

26. Directorate General Factory Advice Service & Workforce Institutes (DGFASLI), India.

27. https://www.worldbank.org/en/news/video/2026/01/08/india-country-economic-memorandum?
DGFASLI

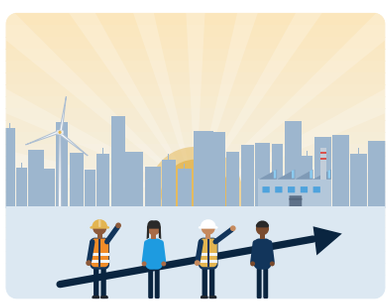
28. Occupational Safety and Health Administration (OSHA).
OSHA

29. National Examination Board in Occupational Safety and Health (NEBOSH).
NEBOSH

30. Institution of Occupational Safety and Health (IOSH).
IOSH

31. Ministry of Skill Development and Entrepreneurship. (2025). *Skill roadmap for India's economic growth and competitiveness*. Government of India. competitiveness.in

32. Ministry of Statistics and Programme Implementation. (2025). *Periodic Labour Force Survey (PLFS) annual report*. Government of India / Press Information Bureau. pib.gov.in



Sources of quotations used in this publication

1. Prime Minister's Office, Government of India – Text of PM's address on World Youth Skills Day, 15 July 2021 (narendramodi.in / pmindia.gov.in).
2. Constitution of India, Article 42 – Provision for just and humane conditions of work and maternity relief.
3. World Health Organization – "WHO/ILO: Almost 2 million people die from work-related causes each year", news release, 17 September 2021 (who.int).
4. International Labour Organization – "Nearly 3 million people die of work-related accidents and diseases", 26 November 2023 (ilo.org).
5. United Nations – Sustainable Development Goal 8, Target 8.8.
6. World Economic Forum – The Future of Jobs Report 2025, Chapter 3: Skills outlook (weforum.org).
7. Ministry of Education, Government of India – National Education Policy 2020.
8. International Labour Conference, 110th Session (June 2022) – amendment to the ILO Declaration on Fundamental Principles and Rights at Work.



Hands-on, competency-based training builds a job-ready safety workforce

A MESSAGE FROM THE CHAIRMAN AND THE CHIEF EXECUTIVE OFFICER

A Note of Gratitude

To our stakeholders: We are grateful to industry leaders, employers, safety professionals, academicians, representatives of government bodies, Sector Skill Councils, Awarding Bodies, Training Partners, Assessment Agencies and their professionals for generously sparing time for participation in the survey and efforts in giving us the valuable feedback. Their participation in the survey and in consultations, forms the evidence base on which, this report stands.

To the SSDF team: We are grateful to our researchers, subject matter experts, content developers, coordinators and support staff for their efforts and dedication. This report reflects months of dedicated work in designing the survey, reaching out to respondents, validating data, analysing findings and refining every chapter. Your commitment, patience and attention to detail made the completion of this study possible.

> *A safe workplace is built by many hands. We look forward to continuing this partnership as we work together to close the skill gaps identified in this report and to build a safe, skilled and future-ready workforce for India.*



Mr. J. K. Anand
CHAIRMAN
Founder and Director, SSDF
jkanand@ssdfindia.org



Col. Anand Kumar Singh
CHIEF EXECUTIVE OFFICER
SSDF
aksingh@ssdfindia.org

SAFETY SKILL DEVELOPMENT FOUNDATION

Corporate Office: D-507, Light House, Town Square, Sector 82A, Vatika India Next, Gurugram-122004, Haryana

+91 124-3634989 info@ssdfindia.org www.ssdfindia.org