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**Landscape Analysis of the Labour Market of the Freight Logistics
Sector in India**

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Landscape Analysis of the Labour Market of the Freight Logistics Sector in India

ABSTRACT

The freight logistics sector plays a crucial role in India's economy due to its linkages with the rest of the economy, acting as a backbone for various sectors. With the sector rapidly evolving due to technological integration, there is an increasing demand for skilled workers. This report examines employment trends, skill levels, and gaps across the freight logistics sector and its sub-sectors in India, aligning with the goals of PM Gati Shakti and the Logistics Sector Skill Council to promote workforce expansion and skill development. Using data from the Periodic Labour Force Survey (PLFS) and qualitative interviews with various stakeholders in the sector, the report provides insights into employment performance, composition, quality, and skill gaps from 2017-18 to 2022-23 and projections through 2030 at national, state, and sub-sector levels.

Employment patterns show a growing demand for skilled labour. However, challenges remain, as informal employment and limited vocational training are prevalent. The analysis reveals significant skill gaps, especially in the road transport sub-sector, which employs the highest number of workers yet has the highest proportion of untrained labour. The study projects that the freight logistics sector will experience strong growth, with employment expected to rise from 7 million in 2017-18 to 15 million by 2029-30 with a CAGR of 6.18 %. The road transport sub-sector will remain dominant, while the air and rail sectors will grow slower. States such as Maharashtra, Tamil Nadu, Uttar Pradesh, and emerging states like Bihar and Haryana are expected to lead employment growth in the sector. Expanding formal vocational training programs is crucial to bridge the skill gap, especially as 5.33 million workers may still be untrained by 2029-30. The report suggests targeted policies to enhance skills across road, air, water, and rail transport, reduce regional disparities, and strengthen the logistics sector's role as a driver of employment generation and economic growth.

Chapter 1

INTRODUCTION

One of the significant challenges faced by the Indian economy for the past several decades has been that employment growth was low, even during periods of high economic growth (Kannan & Raveendaran, 2009). More recent years show that the unemployment rate among educated youth has been particularly high (Bairagya, 2018). India's structural transformation has bypassed the industrial sector, transitioning directly from agriculture to services (Soni & Subrahmanya, 2024). The agricultural sector continues to employ 42 per cent of the workforce in 2019, while its contribution to the overall GDP has continuously declined from 40 per cent in 1980 to 15 per cent in 2019 (Alonso & MacDonald, 2024). For inclusive growth and a lower unemployment rate in the Indian economy, the shift in output toward the services sector must be matched by a similar shift in employment, making this a critical priority for policymakers going forward.

The logistics sector is a service-oriented market that plays a critical role in the Indian economy by intertwining consumption, production, and delivery processes. It encompasses all supply chain activities such as transport, inventory management, flow of information, and customer service, operating 24/7 throughout the year. With the logistics sector supporting most of the industrial activity, its growth would subsequently lead to the growth of the export of Indian goods by enhancing service delivery and customer satisfaction and creating a plethora of job opportunities (Logistics Sector Skill Council, n.d.). India ranks 38 out of 139 countries on the World Bank's Logistics Performance Index Report 2023. India plans to improve its position to the 25th position. The Government of India has undertaken steps towards the development of the logistics sector in the country, e.g., launching the PM Gati Shakti National Master Plan for Multi-modal Connectivity in 2021, followed by the National Logistics Policy in 2022, focusing on coordinated and integrated planning by the various subsectors and associated ministries within logistics sector for improved efficiency and outcomes.

A significant obstacle to the transition of employment from agriculture to non-agricultural sectors, including services, is the persistent skills gap among the workforce (Singh, Mehta & Singh, 2024). Furthermore, skilling and reskilling initiatives in India have not adapted sufficiently to meet the evolving needs of the labour market in terms of both scale and relevance (Pilz & Regel, 2021). Moreover, the endogenous growth model has long emphasized the role of human capital in driving economic growth. However, the challenge remains to provide equitable access to skill development opportunities and to enhance labour productivity across sectors. Bridging this gap through well-targeted, comprehensive skilling programs is crucial for promoting inclusive growth and addressing unemployment. With the objective of training a skilled workforce at the entry level and upskilling the existing logistics workforce, the Logistics Sector Skill Council was established. This council is a joint initiative by the Ministry of Skill Development and Entrepreneurship (MSDE)/National Skill Development Corporation and the Confederation of Indian Industry (CII), aimed at fulfilling the growing need for a well-trained, efficient talent pool in the logistics sector.

The logistics sector, being highly labour-intensive, has the potential to accommodate a broad spectrum of skills while offering significant opportunities to integrate advanced technologies such as blockchain, Artificial Intelligence, and green mobility. Thus, the logistics sector is strategically important in achieving the 2030 Agenda for Sustainable Development Goals related to promoting inclusive and sustainable economic growth, along with ensuring full, productive employment and decent work.

Purpose of the Study

This study examines employment trends and skill levels covering the landscape of India's freight logistics sector and its sub-sectors, aligning with the mission and vision of PM Gati Shakti and the Logistics Sector Skill Council. The report supports their objectives of workforce expansion and skill development within the logistics industry. After analyzing the characteristics and components of the freight logistics labour market in India, we project future employment and skill gaps till 2030 at the national, state, and sub-sectoral levels to aid in strategic planning for the sector. The report integrates data analysis from secondary sources, primarily the Periodic Labour Force Survey (PLFS), along with qualitative interviews from key stakeholders in the logistics industry.

The pan-India employment data is from the PLFS, the official data source from the Ministry of Statistics and Program Implementation (MoSPI). The National Survey Organisation (NSO) within MoSPI conducts the annual nationwide survey, which is representative of employment patterns at the state and All India levels. The PLFS started its surveys in 2017-18, and the latest data up to 2022-23 is used based on the individual (or unit) level data. An individual's employment status is based on the usual status definition (primary and subsidiary status). PLFS data provides the five-digit code for the individual (surveyed) and this is matched with their respective sector of employment based on the codes and job description in Tables 1 and 2. This data is then used to determine the trend, regional pattern, and characteristics of those employed in the freight logistics sector. Full details of the methodology are provided in Appendix A.

Defining the Freight Logistics Sector

The logistics sector's National Industrial Classification (NIC) 2008 codes (NIC 2-Digit) range from 49 to 53. This report exclusively focuses on the freight logistics sector and its various sub-sectors. The final column in the table (Table 1) mentions the NIC 5-digit industries that do not belong to the freight logistics sector and are excluded from the analysis. The freight logistics sector, for the report, is defined using the NIC-2008 at the NIC 5-digit level, as follows:

Table 1: Identification of Freight Logistics Sector Based on National Industrial Activity Codes (NIC)

2-Digit	3-Digit	4-Digit	5-Digit	Description of the 5-digit NIC code
Division 49 Land transport and transport via pipelines	Group 491 Transport via railways	4911 Passenger rail transport	49110 Passenger rail transport	Excluded from the analysis
		4912 Freight rail transport	49120 Freight rail transport	This class includes freight transport by inter-urban, suburban, and urban railways This class excludes: - storage and warehousing, see 5210 - freight terminal activities, see 5221 - cargo handling, see 5224
Division 49 Land transport and transport via pipelines Division 49 Land transport and transport via pipelines	Group 492 Other land transport	4921 Urban or suburban passenger land transport	49211 Urban or suburban passenger bus transport (excluding chartered bus) 49212 Urban or suburban tramways 49213 Urban or suburban underground or elevated railways 49219 Other urban or suburban passenger transport n.e.c.	Excluded from the analysis
		4922 Other passenger land transport	49221 Long-distance bus services 49222 Charters, excursions, and other occasional coach services 49223 Rental of private cars with driver 49224 Taxi operation 49225 Operation of school buses and buses for transport of employees 49226 Passenger	Excluded from the analysis

			transport by man- or animal-drawn vehicles	
			49229 Other non-urban passenger land Transport n.e.c	
		4923 Freight transport by road	49231 Motorised Road freight transport 49232 non-motorised road freight transport	Included in the analysis
	Group 493 Transport via pipeline	4930 Transport via pipeline	49300 Transport via pipeline	This class includes transport of gases, liquids, water slurry and other commodities via pipelines including operation of pump stations
Division 50 Water transport	Group 501 Sea and coastal water transport	5011 Sea and coastal passenger water transport	50111 Sea and coastal ferry service 50112 Sea and coastal water cruise, water taxis and other sightseeing boats 50113 Sea and coastal long distance water transport 50119 Other Sea and coastal water transport n.e.c.	Excluded from the analysis
		5012 Sea and coastal freight water transport	50120 Sea and coastal freight water transport	This class includes transport of freight overseas and coastal waters, whether scheduled or not, transport by towing or pushing of barges, oil rigs etc. This class excludes: - storage of freight, see 5210 - harbour operation and other auxiliary activities such as docking, pilotage, lighterage, vessel salvage, see 5222 - cargo handling, see 5224
	Group 502 Inland water transport	5021 Inland passenger water transport	50211 River ferry service 50212 River cruise, water taxi, boat services 50213 Long distance river water transport	Excluded from the analysis

			50219 Other inland water transport n.e.c.	
		5022 Inland freight water transport	50220 Inland freight water transport	This class includes transport of freight via rivers, canals, lakes and other inland waterways, including inside harbours and ports
Division 51 Air transport	Group 511 Passenger air transport	5110 Passenger air transport	51101 Passenger airways 51102 Helicopter services 51109 Other passenger air-transport n.e.c	Excluded from the analysis
	Group 512 Freight air transport	5120 Freight air transport	51201 Freight air transport services	Included in the analysis
			51202 Launching of satellites and space vehicles and space transport	Excluded from the analysis
Division 52 Warehousing and support activities for transportation	Group 521 Warehousing and storage	5210 Warehousing and storage	52101 Warehousing of refrigerated (cold storage)	Included in the analysis
			52102 Warehousing non-refrigerated	Included in the analysis
			52109 Storage and warehousing n.e.c.[Includes general merchandise warehouses and warehousing of furniture, automobiles, gas and oil, chemicals, textiles etc. Also included is storage of goods in foreign trade zones]	Included in the analysis
	Group 522 Support activities for transportation	5221 Service activities incidental to land transportation	52211 Car parking including motorcycle and bicycle parking	Included in the analysis
			52212 Support service at railway stations, bus stations, bridges etc.	Included in the analysis

			52213 Switching and shunting	Included in the analysis
			52219 Other land transport services n.e.c	Included in the analysis
		5222 Service activities incidental to water transportation	52220 Service activities incidental to water transportation	Included in the analysis
		5223 Service activities incidental to air transportation	52231 Activities related to air transport of passengers, animals, or freight	Included in the analysis
			52232 Firefighting and fire-prevention services at airports	Included in the analysis
		5224 Cargo handling	52241 Cargo handling incidental to land transport	Included in the analysis
			52242 Cargo handling incidental to water transport	Included in the analysis
			52243 Cargo handling incidental to air transport	Included in the analysis
				5229 Other transportation support activities
52292 Activities of shipping cargo agents	Included in the analysis			
52293 Activities of movers and packers	Included in the analysis			
52294 Weighing of goods	Included in the analysis			
Division 53 Postal and courier activities	Group 531 Postal activities	5310 Postal activities This class includes national postal activities	53100 Postal activities	Included in the analysis

Continued...

	Group 532 Courier activities	5320 Courier activities This class includes courier activities not operating under a universal service obligation	53200 Courier activities	Included in the analysis
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Note: Authors' own compilation

Source: National Industrial Classification 2008

Table 2 below provides the concordance of NIC codes with PM Gati Shakti's four sectors (or four engines out of seven engines for growth)¹, namely road, rail, water, and air. Employment and skill gaps are provided for the freight logistics sector and the four sub-sectors of road, rail, water, and air. The last column of the table shows the classification based on nine Logistics Sector Skill Council (LSC) subsectors.

Table 2: Concordance with NIC-codes, LSC Sub-Sector and PM Gati Shakti Sectors

<i>Sector -PM Gati Shakti</i>	<i>NIC - Sub-sector</i>	<i>NIC-5-digit codes</i>	<i>LSC Sub-sector</i>
Road	Trucking and related services: fleet management, network optimisation, route planning, etc.	49231 Motorised Road freight transport	Land transportation
		49232 non-motorised road freight transport	Land transportation
	Warehousing related to in-land distribution, whether inbound or outbound	52101 Warehousing of refrigerated (cold storage)	Cold chain logistics solutions
		52102 Warehousing non-refrigerated	Warehousing
		52109 Storage and warehousing n.e.c.[Includes general merchandise warehouses and warehousing of	Warehousing

Continued...

¹ Source: https://ne.pmgatishakti.gov.in/DoNER/about_pmgati

		furniture, automobiles, gas and oil, chemicals, textiles etc. Also included is storage of goods in foreign trade zones]	
	Services bundled around road transportation and warehousing: Courier, Cold chain, packaging, etc.	52241 Cargo handling incidental to land transport	Courier and express services
		52211 Car parking including motorcycle and bicycle parking	Courier and express services
		52219 Other land transport services n.e.c	Courier and express services
		53100 Postal activities	Courier and express services
		53200 Courier activities	Courier and express services
		52291 Activities of travel agents and tour operators	Courier and express services
		52293 Activities of movers and packers	Courier and express services
		52294 Weighing of goods	Courier and express services
Rail	Railway cargo transportation	49120 Freight rail transport	Rail logistics
	Rail-side container depots, Inland container depots and multimodal warehouses	52213 Switching and shunting	Rail logistics
	Services bundled around rail transportation and warehousing	52212 Support service at railway stations, bus stations, bridges etc.	Rail logistics
Water	Coastal shipping and inland water transportation	50120 Sea and coastal freight water transport	EXIM logistics-freight forwarding and customs clearance
		50220 Inland freight water transport	Inland waterways and marine services

Continued...

	Container freight stations, inland container depots, and port-based warehousing and storage	52242 Cargo handling incidental to water transport	Port terminals-ICD and CFS operations
		52220 Service activities incidental to water transportation	Port terminals-ICD and CFS operations
	Freight forwarding, freight consolidation, NVOCC, customs clearance	52292 Activities of shipping cargo agents	EXIM logistics-freight forwarding and customs clearance
Air	Air cargo and freight operations	51201 Freight air transport services	Air cargo operations
	Air cargo transshipment warehouse near airports	52243 Cargo handling incidental to air transport	Air cargo operations
	Express and courier services, freight forwarding and customs clearance	52231 Activities related to air transport of passengers, animals or freight	Air cargo operations

Source: Authors' own compilation

Logistics Sector: An Overview

Table 3 reports the gross value added (GVA at Constant (2011-12) Prices) at basic prices for the logistics sector² (Transport, storage, communication & services related to broadcasting) during 2017-18 to 2021-22. The logistics sector GVA grew at 2.55 percent CAGR during 2017-18 to 2021-22. The logistics sector maintained a 6 per cent share in total GVA from 2017-18 to 2022-23. Table 3 shows that the GVA of the logistics sector ranges between 6.6% and 5.7% during the last half a decade, with the dip in the share happening during the lockdown periods from COVID-19. Though the recovery after that in 2021-22 has been good for the logistics sector, the share of this sector has yet to reach the pre-COVID levels. It should also be noted that the GVA of this sector has been growing during the pre-COVID years, but the share of this sector marginally declined from 6.65 percent in 2017-18 to 6.51 percent in 2019-20.

² National Accounts Statistics does not provide disaggregated industry-wise information on GVA within the logistics sector. So, we could not estimate the GVA figures for the freight logistics sector as defined in chapter 1 section (Defining the Freight Logistics Sector).

Table 3: Gross Value Added (in Rupees Crores at Constant 2011-12) and the Share of Logistics Sector in Total GVA, 2017-18 to 2021-22

<i>Year</i>	<i>Logistics Sector</i>	<i>All Sectors</i>	<i>Share of Logistics in Total GVA</i>
2017-18	800244.74	12034170.51	6.65%
2018-19	830976.68	12733797.77	6.53%
2019-20	861191.97	13236100.41	6.51%
2020-21	719182.60	12681482.19	5.67%
2021-22	885092.02	13798024.93	6.41%

Source: National Account Statistics 2023 (MOSPI), Authors' own compilation

A comparison of the freight logistics sector employment with the remaining sectors of the economy in Table 4 shows that there is a slight annual increase in the pre-pandemic years, but unlike 'others' and total, there is a slight dip in employment in 2020-21 but the recovery in the post-pandemic year has been substantial with far higher employed in this sector of about 9.4-9.5 million in 2021-22 to 2022-23 compared to earlier the years of 2017-2019 of about eight million. As similar changes are also observed in other employment and hence total employment, the share of freight sector employment in the freight logistics sector in the overall economy fluctuated slightly, starting at 1.99% in 2017-18, peaking at 2.22% in 2021-22, and ending at 2.08% in 2022-23. Thus, overall, the freight sector employment share in total employment is stable around 2%.

Table 4: Employment (in millions) in the Freight Logistics Sector and the Rest of the sectors of the Economy 2017-18 to 2022-23 (All Age Groups)

<i>Year</i>	<i>Other</i>	<i>Freight logistics</i>	<i>Total</i>	<i>Share of Freight logistics in Overall Economy</i>
2017-18	354.27	7.18	361.45	1.99%
2018-19	357.62	7.89	365.50	2.16%
2019-20	398.40	8.49	406.89	2.09%
2020-21	402.65	8.41	411.06	2.05%
2021-22	415.63	9.43	425.06	2.22%
2022-23	447.32	9.50	456.82	2.08%

Source: Authors' compilation using PLFS 2017-18 to 2022-23

Table 5 shows that from 2017-18 to 2022-23, employment in the passenger logistics sector remained stable at 11 million, increasing to 12 million in 2022-23, while the freight logistics sector saw a rise from 7 million in 2017-18 to 10 million in 2022-23. The total employment in the logistics sector grew from 18 million to 22 million from 2017-18 to 2021-22, respectively. The share of freight logistics in the overall logistics sector increased from 39% to 43% from 2017-18 to 2021-22, respectively, peaking at 46% in 2021-22.

Table 5: Employment (in millions) in the Passenger and Freight Logistics Sector 2017-18 to 2022-23 (All Age Groups)

<i>Year</i>	<i>Passenger Logistics</i>	<i>Freight Logistics</i>	<i>Total</i>	<i>Share of Freight logistics in the Overall logistics Sector</i>
2017-18	11.09	7.18	18.27	39.30%
2018-19	10.75	7.89	18.64	42.31%
2019-20	11.49	8.49	19.98	42.48%
2020-21	11.02	8.41	19.42	43.28%
2021-22	10.98	9.43	20.41	46.21%
2022-23	12.38	9.50	21.88	43.43%

Source: Authors' compilation using PLFS 2017-18 to 2022-23

The rest of the report is organised into four chapters. Chapter 2 examines employment estimates, including their composition and quality, both at aggregate and disaggregated levels, using data from the PLFS 2017-18 to 2022-23. Chapter 3 presents projections of gross value added, employment, and skill gaps at both the aggregate and disaggregated levels till 2030. Chapter 4 highlights findings on skill gaps based on a primary survey of various stakeholders, while Chapter 5 concludes with policy recommendations.

Chapter 2

EMPLOYMENT IN THE FREIGHT LOGISTICS SECTOR

In this chapter, we delve deeper into the composition and characteristics of employment in the freight logistics sector in India. Having discussed the total employment in the freight logistics sector in India from 2017-18 to 2022-23 in the previous chapter, we next consider the socio-demographic composition and job characteristics of the employed in the freight logistics sector.

Employment by Age

Table 6 below shows that employment in the freight logistics sector has increased in the 15-59 years segment, but the rate of increase is higher in the 25-59 years, resulting in a decreasing share of the 15–24-year-olds. In 2020-21 and 2021-22, largely coinciding with lockdowns and related to the impact of the pandemic period, the employment of 15-24 years declined and that of the 60 and above increased. By 2022-23, this seems to have been corrected, and the employment increased more for the former age group than for the elderly. What happened to this displaced labour among the young and in what forms of employment activities did the elderly 'substitute' for them seems difficult to explain.

Table 6: Age-Group-Wise Employment in Freight Logistics and Share, 2017-2023

<i>Year</i>	<i>15-24</i>		<i>25-59</i>		<i>≥60</i>		<i>Total</i> <i>(Lakhs)</i>
	<i>Numbers</i> <i>(Lakhs)</i>	<i>Share</i> <i>(%)</i>	<i>Numbers</i> <i>(Lakhs)</i>	<i>Share</i> <i>(%)</i>	<i>Numbers</i> <i>(Lakhs)</i>	<i>Share</i> <i>(%)</i>	
2017-18	10.8	15.0	58.6	81.6	2.3	3.2	71.8
2018-19	11.2	14.2	64.9	82.3	2.7	3.5	78.9
2019-20	12.6	14.9	69.9	82.4	2.3	2.7	84.9
2020-21	11.1	13.2	69.7	82.9	3.3	3.9	84.1
2021-22	11.8	12.5	78.1	82.9	4.4	4.6	94.3
2022-23	12.1	12.8	80.0	84.2	2.9	3.0	95.0

Source: Authors' own compilation using PLFS

Table 7 indicates the distribution of the freight logistics sector of the youth (15-29 years) workers into further sub-groups of age across 2017-2023. For the youth, there was a marginal decline in all the age groups in 2020-21 and recovered in most age groups, but the share of youth in the freight logistics sector seems to be lower in the post-pandemic period, and one must see if the marginal recovery in 2022-23 will continue further. It would be difficult to infer whether the withdrawal of the young from the freight logistics sector in recent years is because the young are unwilling to continue for long due to difficult working conditions and lower remuneration and that the skill among the 30 and above years workers along with their experience is sufficient for the kind of economic activity in this sector and those willing to supply at the going wages are absorbed. This can perhaps be better understood based on how the skill levels are changing over time and so are the real wages. A primary survey of firms to understand the demand side conditions and the workers' working conditions to further explore this will also be helpful.

Table 7: Youth Age-wise Freight Logistics (in Lakhs)

<i>Year</i>	<i>15-17</i>	<i>18-21</i>	<i>22-25</i>	<i>26-29</i>	<i>Total</i>	<i>% Youth</i>
2017-18	0.7	3.8	9.2	8.3	22.0	30.9
2018-19	0.2	4.5	9.7	8.4	22.8	29.0
2019-20	0.5	5.1	9.3	11.1	25.9	30.7
2020-21	0.3	4.8	9.2	10.2	24.5	29.4
2021-22	0.5	4.2	11.3	10.2	26.1	27.9
2022-23	0.6	4.6	10.2	11.7	27.0	28.6

Source: Authors' own compilation using PLFS

Employment by Gender and Rural/Urban Sector

The rural-urban and male-female classification in Table 8 below shows this is a highly male-dominated labour market. Among men, more than 50% are employed in rural areas, while it's the reverse for women, with a higher number of women in urban (about 3-4% share) than in rural (less than 2% share).

Table 8: Sector and Gender-Wise Freight Logistics (in Lakhs)

<i>Year</i>	<i>Rural Male</i>		<i>Rural Female</i>		<i>Urban Male</i>	<i>Urban Female</i>	
2017-18	41.7	0.7	(1.7)		28.5	0.9	(3.2)
2018-19	47.0	0.4	(0.9)		30.3	1.2	(4.0)
2019-20	50.5	0.5	(1.0)		32.8	1.1	(3.4)
2020-21	52.0	1.0	(1.9)		30.0	1.0	(3.3)
2021-22	60.4	0.9	(1.5)		32.0	0.9	(2.8)
2022-23	61.6	0.6	(1.0)		31.5	1.3	(4.1)

Note: Values in brackets are the share (in percent) of women in the rural and urban labour markets respectively.

Source: Authors' own compilation using PLFS

Employment by Educational Level

Given that the logistics labour market is dominated by rural and older people, we could expect the average education levels to be lower as high-skilled jobs are largely in urban areas, and in a developing country, the younger population is expected to have slightly higher education levels than the older age groups. Table 9 below shows that the majority of the employed are with middle school and lower level of education. Below primary as well as middle school educated have similar numbers and shares. What is important to note is that compared to 2017-18, the number of below primary (including illiterate) may have gone up by 2022-23, but their share has declined (values not reported here) as the largest increase has been among secondary educated followed by graduates and the middle education level remains large at about 26-27 lakhs in the recent years.

Table 9: Education level of Employed in the Freight Logistics (in Lakhs)

<i>Year</i>	<i>Illiterate</i>	<i>Below primary</i>	<i>Primary</i>	<i>Middle</i>	<i>Secondary</i>	<i>Higher secondary</i>	<i>Diploma</i>	<i>Graduate</i>	<i>Post graduate</i>	<i>Edu without formal</i>
2017-18	10.9	4.5	10.7	20.1	11.7	7.1	0.9	4.7	1.0	0.1
2018-19	12.8	3.6	12.3	21.5	11.1	8.5	1.1	6.2	1.3	0.3
2019-20	10.8	4.1	13.0	22.4	14.8	9.2	1.3	8.0	1.1	0.3
2020-21	12.1	5.2	13.6	22.6	13.5	8.3	1.1	6.3	1.2	0.2
2021-22	11.1	5.3	13.6	26.9	15.4	11.4	1.5	7.3	1.9	0.0
2022-23	11.1	4.7	14.5	26.4	14.0	12.3	1.5	8.6	1.8	0.1

Source: Authors' own compilation using PLFS

Employment by the Vocational Training Status

Though the educational qualification shows more of low educated among the employed, it may be useful to understand if some vocational training is also important for those employed. In the PLFS data, the information on vocational training can be further classified into two categories: Non-formal vocational training and formal vocational training. From Table 10, one can observe that the share of individuals with no vocational training has decreased significantly from 78.41 percent in 2017-18 to 43.89 percent in 2022-23, indicating a growing engagement in vocational training, especially a shift towards non-formal vocational training. The increase in formal vocational training is moderate, with a slight decline in formal vocational training from 4.77 percent to 4.21 percent in 2022-23. This highlights the importance and requirement, hence, acceptance of formal vocational training in the workforce. These trends indicate a positive trend towards upskilling and reskilling within the population, which might be due to the policy initiatives and the requirement of skilled workers.

Table 10: Types of Vocational Training and Employment (in lakhs)

<i>Year</i>	<i>No vocational training</i>	<i>Share (%)</i>	<i>Non-formal vocational</i>	<i>Share (%)</i>	<i>Formal vocational</i>	<i>Share (%)</i>
2017-18	56.3	78.41	14.1	19.64	1.4	1.95
2018-19	58.2	73.76	18.3	23.19	2.4	3.04
2019-20	61.3	72.20	20.6	24.26	2.9	3.42
2020-21	54.4	64.68	26.1	31.03	3.5	4.16
2021-22	54.3	57.58	35.5	37.65	4.5	4.77
2022-23	41.7	43.89	49.3	51.89	4.0	4.21

Source: Authors' own compilation using PLFS

Tables 11 and 12 show the number and share of the employed across the sector in which the formal training was taken. The top fields where freight logistics workers are formally vocationally trained include Information Technology, mechanical engineering - capital goods, and automotive sectors (Table 12). The tourism sector, one of the worst-hit sectors owing to the pandemic, has seen a significant decline in the pandemic years (2019-21). However, it is slightly picking up, which is evident from the 1.25 percent increase in 2022-23. The automotive sector has experienced fluctuations, with a notable dip in 2019-20, then an increase from 2020-22, and then a dip in 2022-23. One of the possible reasons

could be the supply chain disruptions. The agriculture sector has remained stable with slight fluctuations, while other fields, such as the aerospace, artisan, media, and security sectors, have seen only minimal growth. The share of workers vocationally trained in logistics is low and fluctuating, ranging from about 6.67 percent in 2018 to 2019 and dropping to merely 0.38 percent in 2022 and 2023. This fluctuation could result from the COVID-19 pandemic and the associated lockdowns.

Table 11: Form of Training Among the Formally Vocationally Trained (in Thousands)

Sector	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Aerospace/Aviation	0.00	2.90	2.17	4.78	1.34	7.25
Agriculture/Food Processing	0.00	0.00	1.71	0.00	0.00	1.19
Allied manufacturing (Gems/Jewellery etc)	0.00	0.00	1.67	0.00	0.00	0.00
Artisans/Handicrafts	0.00	0.00	0.00	0.00	3.48	2.85
Automotive	25.01	67.19	36.52	99.75	130.90	62.45
Beauty & Wellness	0.00	0.00	0.00	0.00	2.95	0.00
Chemical engineering/Petrochemicals etc	0.00	4.08	0.00	0.00	0.00	0.00
Civil engineering	7.31	1.66	3.62	4.13	3.22	10.34
Electrical & Electronics	3.18	15.86	42.82	42.09	34.27	51.88
Healthcare and Life Sciences	5.84	0.00	0.00	0.00	0.00	7.09
Hospitality & Tourism	5.07	2.92	0.00	2.33	1.71	5.00
Iron & steel/mining, infra building etc	1.57	1.28	4.97	0.00	0.00	0.00
IT-ITeS	33.40	43.64	58.66	77.12	89.87	89.25
Logistics	0.00	15.91	1.98	0.96	18.81	1.53
Mechanical engineering-Capital Goods	20.95	14.78	13.97	16.16	8.36	15.14
Media, mass communication, entertainment	0.00	0.00	0.71	0.00	0.00	0.00
Office & business-related work	3.74	21.46	14.98	11.30	1.82	5.56
Security	0.00	2.82	0.52	0.00	0.00	5.56
Telecom	4.60	0.00	0.44	0.00	0.00	1.42
Textiles and Handlooms	0.00	0.73	8.13	0.00	1.75	0.00
Childcare	2.21	0.00	0.00	0.00	0.00	0.00
Other	26.11	43.31	99.50	95.32	149.75	133.38
Total	138.99	238.54	292.37	353.94	448.23	399.89

Source: Authors' own compilation using PLFS

**Table 12: Distribution of the Form of Training Among the Vocational Trained
(in per cent)**

Sector	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Aerospace/Aviation	0.00	1.22	0.74	1.35	0.30	1.81
Agriculture/Food Processing	0.00	0.00	0.58	0.00	0.00	0.30
Allied manufacturing (Gems/Jewellery etc)	0.00	0.00	0.57	0.00	0.00	0.00
Artisans/Handicrafts	0.00	0.00	0.00	0.00	0.78	0.71
Automotive	17.99	28.17	12.49	28.18	29.20	15.62
Beauty & Wellness	0.00	0.00	0.00	0.00	0.66	0.00
Chemical engineering/Petrochemicals etc	0.00	1.71	0.00	0.00	0.00	0.00
Civil engineering	5.26	0.70	1.24	1.17	0.72	2.59
Electrical & Electronics	2.29	6.65	14.65	11.89	7.65	12.97
Healthcare and Life Sciences	4.20	0.00	0.00	0.00	0.00	1.77
Hospitality & Tourism	3.65	1.22	0.00	0.66	0.38	1.25
Iron & steel/mining, infra building etc	1.13	0.54	1.70	0.00	0.00	0.00
IT-ITeS	24.03	18.29	20.06	21.79	20.05	22.32
Logistics	0.00	6.67	0.68	0.27	4.20	0.38
Mechanical engineering-Capital Goods	15.07	6.20	4.78	4.57	1.87	3.79
Media, mass communication, entertainment	0.00	0.00	0.24	0.00	0.00	0.00
Office & business-related work	2.69	9.00	5.12	3.19	0.41	1.39
Security	0.00	1.18	0.18	0.00	0.00	1.39
Telecom	3.31	0.00	0.15	0.00	0.00	0.36
Textiles and Handlooms	0.00	0.31	2.78	0.00	0.39	0.00
Childcare	1.59	0.00	0.00	0.00	0.00	0.00
Other	18.79	18.16	34.03	26.93	33.41	33.35
Total	100	100	100	100	100	100

Source: Authors' own compilation using PLFS

We next consider in Table 13 below the duration of the training among those who were vocationally trained and employed in the freight logistics sector. In the short term (less than three months), the share increased to 29.17 percent in 2019-20, but there has been a varying change over this period up to 2022-23. The medium term (3-24 months) has noticeable fluctuations. The 6-12 month and 12-18 month category has increased to 12.5 per cent. One possible reason is that medium-term training programs are comprehensive and can lead to improved efficiency in the productivity of the freight logistics sector. The long-term program, greater than 24 months, has shown a decline from 2018-22 and then an increase to 15% in 2022-23 indicating prolonged training periods for workers to develop a skilled workforce.

Table 13: Workers by the Duration of Training (in Lakhs)

<i>Year</i>	<i>Less than 3 months</i>		<i>Between 3 and 6 months</i>		<i>Between 6 and 12 months</i>		<i>Between 12 and 18 months</i>		<i>Between 18 and 24 months</i>		<i>Greater than 24 months</i>	
	<i>Nos. (lakhs)</i>	<i>Share (%)</i>	<i>Nos. (lakhs)</i>	<i>Share (%)</i>	<i>Nos. (lakhs)</i>	<i>Share (%)</i>	<i>Nos. (lakhs)</i>	<i>Share (%)</i>	<i>Nos. (lakhs)</i>	<i>Share (%)</i>	<i>Nos. (lakhs)</i>	<i>Share (%)</i>
2017-18	0.01	0.71	0.3	21.43	0.4	28.57	0.3	21.43	0.02	1.43	0.4	28.57
2018-19	0.7	29.17	0.5	20.83	0.4	16.67	0.3	12.50	0.1	4.17	0.4	16.67
2019-20	0.5	17.24	0.6	20.69	0.3	10.34	0.9	31.03	0.1	3.45	0.5	17.24
2020-21	1.4	40.00	0.5	14.29	0.5	14.29	0.4	11.43	0.1	2.86	0.6	17.14
2021-22	2.0	44.44	1.0	22.22	0.3	6.67	0.3	6.67	0.4	8.89	0.5	11.11
2022-23	1.5	37.50	0.8	20.00	0.5	12.50	0.5	12.50	0.1	2.50	0.6	15.00

Source: Authors' own compilation using PLFS

The human capital theory states that the productivity of human beings can be enhanced through greater education and skill training. As the logistics sector is fast evolving, there is a greater need for training programs to equip the employees with the necessary skill set. The training can be internally provided by the companies or outsourced for an external one that can be part-time or full-time and the details of the employed on these aspects are shown in Table 14 below. It is observed that a very small proportion of on-the-job training happens, and the post-pandemic year of 2021-22 saw somewhat higher number, with a significant peak in 2021-22 at 0.42 percent share, followed by a drop to 0.21 percent in 2022-23. For the outside part-time training, there is an increasing trend from 2017 to 2022, followed by a decrease to 1.47 % in 2022-23. A general upward trend could be observed for the outside full-time training. There is an increase in this form of training in 2022-23. Due to the change in the market conditions of the freight logistics sector and the need for upskilling, firms are perhaps preferring to hire full-time trained individuals for the proper enhancement of the skills of the workers, but even these numbers are not significantly high at 2.3 lakhs in 2022-23.

Table 14: Type of Training: on the Job/Outside (in lakhs)

<i>Year</i>	<i>On the job</i>	<i>Outside-part time</i>	<i>Outside-full time</i>
2017-18	0.1 (0.14)	0.3 (0.42)	0.9 (1.25)
2018-19	0.1 (0.13)	0.9 (1.14)	1.4 (1.77)
2019-20	0.1 (0.12)	0.9 (1.06)	1.9 (2.24)
2020-21	0.2 (0.24)	1.4 (1.66)	1.9 (2.26)
2021-22	0.4 (0.42)	2.3 (2.44)	1.8 (1.91)
2022-23	0.2 (0.21)	1.4 (1.47)	2.3 (2.42)

Note: Values in brackets are the share (in per cent) of the type of training received.

Source: Authors' own compilation using PLFS

Type of Employment

India's labour market is broadly classified into (a) wage earners who are further classified into regular workers (48.77 percent) and casual labourers (17.18 percent) and (b) self-employed who are then classified into own account workers (31.37 percent) and employers (2.74 percent). Table 15 shows that in the freight logistics sector, regular workers constitute about 43-49%, and their numbers have increased from 33.4 lakhs in 2017-18 to 42 lakhs in 2022-23. A sudden increase in employment in 2021-22 to about 46 lakhs is to be noted, which is also observed among casual workers, whose numbers have risen from about 13 lakhs to 16.6 lakhs during this period. In contrast to this, the number of own-account workers and employers has increased marginally over this period. However, an important observation in 2022-23 is a large decline in numbers and shares (down to 44.58 percent from 48.77 percent in the previous year) of the regular workers, which own account workers take over (share going up to 31.37 percent in 2022-23 from 27.36 percent in 2021-22). More of the regular workers are likely to be protected under minimum wages as well as under other social security benefits provided by employers, but these are not likely for the own account workers or the casual workers. Thus, if this pattern of a larger share of less protected workers is going to increase in the logistics sector, then the quality of jobs seems to be declining and some regulations for the firms have to be put in place to control for this.

Table 15: Worker Characteristics in the Logistics Sector in Lakhs

<i>Year</i>	<i>Regular worker</i>	<i>Casual worker</i>	<i>Own account worker</i>	<i>Employer</i>
2017-18	33.4 (46.51)	12.2 (16.99)	21 (29.25)	1.6 (2.23)
2018-19	38.6 (48.99)	15.6 (19.77)	19.7 (24.97)	1.7 (2.15)
2019-20	36.9 (43.52)	11.4 (13.43)	27.4 (32.27)	1.5 (1.77)
2020-21	38.1 (45.27)	11.6 (13.79)	28.7 (34.13)	1.4 (1.66)
2021-22	46.0 (48.77)	16.2 (17.18)	25.8 (27.36)	2.5 (2.65)
2022-23	42.4 (44.58)	16.6 (17.47)	29.8 (31.37)	2.6 (2.74)

Note: Values in brackets are the share (in per cent) of the worker characteristics in each year

Source: Authors' own compilation using PLFS

We next consider the occupations of those employed in the freight logistics sector along with the distribution of those workers across the occupations (based on one-digit NCO, 2015 classification), shown in Table 16. The table on occupations is ordered in decreasing order of the numbers of occupations in 2017-18. Plant and machinery operators are the largest in numbers at 37.4 lakhs and are increasing steadily at a high rate to 54 lakhs by 2022-23. The subsequent highest employment is in occupations that are classified as elementary occupations, ranging between 15 to 19 lakhs during this period, but there is variability in their numbers during this period, and no clear trend is observed. The third

highest occupation in this employment is the manager ranging between 5.7 lakhs and 9.6 lakhs with the lowest number in the most recent year indicating a reduction in managerial positions or a shift in the employment structure. However, even during the pandemic periods, their numbers showed only a marginal decline, and their numbers increased till 2020-21 and then decreased to 5.7 lakhs with a sharp reduction in their share from about 17 percent to 11.2 percent in 2022-23.

On the other hand, in 2022-23, the number of professionals (17.54 percent), skilled agriculture workers (30.64 percent), plant and machinery operators (19.85 percent), and elementary operations (18.08 percent) has shown an increase compared to the previous year. This suggests that the demand for basic labour roles is increasing. Furthermore, in 2022-23, there is a decrease in the number of associate professionals (20.51 per cent), clerks (16.97 percent), service workers (22.67 percent), and craft workers (7.94 percent) compared to the previous year in 2021-22.

Table 16: Worker Occupations (In Lakhs) and Their Distribution (%)

<i>Occupations (NCO)</i>	<i>2017- 18</i>	<i>2018- 19</i>	<i>2019- 20</i>	<i>2020- 21</i>	<i>2021-22</i>	<i>2022-23</i>
Plant & machine operator	37.4 (13.75)	38.5 (14.15)	44.1 (16.21)	46.2 (16.99)	51.8 (19.04)	54.0 (19.85)
Elementary occupations	15.3 (14.87)	18.8 (18.27)	16.9 (16.42)	15.7 (15.26)	17.6 (17.1)	18.6 (18.08)
Managers	7.9 (15.58)	9.6 (18.93)	9.4 (18.54)	9.6 (18.93)	8.6 (16.96)	5.7 (11.24)
Clerks	4.5 (15.31)	4.9 (16.67)	4.7 (15.99)	4.2 (14.29)	6.1 (20.75)	4.9 (16.67)
Skilled agriculture	2.0 (11.56)	1.4 (8.09)	2.5 (14.45)	2.8 (16.18)	3.2 (18.5)	5.3 (30.64)
Service workers	1.8 (12.0)	2.4 (16.0)	2.3 (15.33)	1.6 (10.67)	3.6 (24.0)	3.4 (22.67)
Raft workers	1.2 (19.05)	0.9 (14.29)	1.0 (15.87)	1.8 (28.57)	0.9 (14.29)	0.5 (7.94)
Associate professionals	1.1 (14.1)	1.4 (17.95)	0.9 (11.54)	1.0 (12.82)	1.8 (23.08)	1.6 (20.51)
Professionals	0.6 (10.53)	1.0 (17.54)	1.2 (21.05)	1.1 (19.3)	0.8 (14.04)	1.0 (17.54)

Note: Values in brackets are the share (in per cent) of the worker occupations

Source: Authors' own compilation using PLFS

About 90% of India's employment is informal; they do not have proper job contracts or social security protection. Table 17 presents the formal and informal sector employment numbers and shares. In 2017-18, the share of formal sector employment was closer to the national average of about 10%, but by 2021-22, the share had increased to about 13%, and the employment peaked at 10.9 lakh though a decline in the following year in 2022-23 seems to be a matter of concern. The share of formal employment has fluctuated from 2017-18 to 2022-23, peaking at 11.7 lakhs (12.45 percent) in 2021-22 and

then slightly decreasing to 10.9 lakhs (11.43 percent) in 2022-23. Though it has reduced, it is better than 2017-2021. The share of informal employment remains significantly higher than formal employment, although it has decreased slightly over the years. It peaked in 2017-18 and 2020-21 (the pandemic period). A transition must occur from informal to formal employment to improve the labour market conditions and economic development.

Table 17: Formal/Informal Employment (in Lakhs) and its Share (%)

<i>Year</i>	<i>Formal employment</i>	<i>Share (%)</i>	<i>Informal employment</i>	<i>Share (%)</i>
2017-18	6.5	9.07	65.3	90.93
2018-19	9.2	11.72	69.6	88.28
2019-20	8.9	10.47	76	89.53
2020-21	8.2	9.79	75.8	90.21
2021-22	11.7	12.45	82.5	87.55
2022-23	10.9	11.43	84.2	88.57

Source: Authors' own compilation using PLFS

If we further analyse the nature of informality based on what characterises them, then from Table 18, one can observe that the number of workers without a written contract has remained high, compared to the other types of job contracts, indicating that a significant portion of the workforce is still engaged in informal employment. However, it has decreased to 49 lakhs in 2022-23 from 52.2 lakhs in 2021-22. The categories of written job contracts shown in Table 18 are as provided in the PLFS data set. The share of workers with short-term written contracts (≤ 1 year) has gradually increased, peaking in 2021-22 at 2.6 lakhs (2.76 percent) and slightly decreasing to 2.4 lakhs (2.53%) in 2022-23. This suggests a growing trend towards formalizing short-term employment. The number of workers with medium-term contracts (> 1 & ≤ 3 years) has fluctuated, peaking in 2021-22 at 1.9 lakhs (2.01%) and decreasing to 1.2 lakhs (1.26%) in 2022-23, indicating some variability in the use of medium-term contracts. The share of workers with long-term contracts (> 3 years) has steadily increased, peaking in 2022-23 at 8.2 lakhs (8.63%). This suggests a trend towards more stable and long-term employment arrangements.

So far, we have considered the worker characteristics the next Table 19 shows the firm or employer/enterprise characteristic in terms of the number of workers employed by them in the context of regular and casual workers, and the remaining would be largely for the own account workers and to a very small extent of the employer/entrepreneur. Considering that about 20-30% of the workers are own account, and 12-17 % are casual labourers, we observe that the share of enterprises with less than six workers is the largest among all the other types of firm size based on the number of workers. At the same time, many regular workers work in firms with less than six workers. This is also typical of India's labour market characteristics, and the logistics sector is also aligning with smaller enterprises. The rise of start-ups, e-commerce, and small businesses could align with logistics. The share of enterprises with 6 to 10 workers and more than 20 workers has fluctuated, peaking at 13.3 lakhs (14.1 percent) in 2021-22 and 10 lakhs (12.67 percent) in 2018-19, respectively, with a slight decrease to 10.2 lakhs (10.74 percent) and 10.9 lakhs (11.47 percent) in 2022-23.

Table 18: Type of Written Job Contract (In Lakhs)

<i>Year</i>	<i>No written contract</i>	<i>Written ≤1 year</i>	<i>Written >1 & ≤3 years</i>	<i>Written >3 years</i>
2017-18	41.8 (58.2)	0.9 (1.25)	0.5 (0.7)	3.6 (5.01)
2018-19	47.1 (59.7)	1.5 (1.9)	1.2 (1.52)	5.1 (6.46)
2019-20	45.0 (53.0)	1.7 (2.0)	1.0 (1.18)	5.1 (6.01)
2020-21	43.9 (52.2)	2.2 (2.62)	0.7 (0.83)	5.1 (6.06)
2021-22	52.2 (55.4)	2.6 (2.76)	1.9 (2.01)	7.5 (7.95)
2022-23	49.0 (51.6)	2.4 (2.53)	1.2 (1.26)	8.2 (8.63)

Note: Values in brackets are the share (in per cent) of the type of job contract

Source: Authors' own compilation using PLFS

Table 19: Type of Enterprise based on number of workers per enterprise (In Lakhs)

<i>Year</i>	<i><6 workers</i>	<i>>=6 & <10 workers</i>	<i>>=10 & <20 workers</i>	<i>>=20 workers</i>	<i>Not known</i>
2017-18	46.9 (65.32)	6.7 (9.33)	3.1 (4.32)	6.7 (9.33)	6.2 (8.64)
2018-19	50.8 (64.39)	8.7 (11.03)	4.6 (5.83)	10.0 (12.67)	3.0 (3.8)
2019-20	55.8 (65.72)	9.4 (11.07)	3.4 (4.0)	9.4 (11.07)	3.5 (4.12)
2020-21	58.4 (69.44)	9.0 (10.7)	3.3 (3.92)	8.4 (9.99)	1.9 (2.26)
2021-22	61.1 (64.79)	13.3 (14.1)	5.6 (5.94)	11.2 (11.88)	3.1 (3.29)
2022-23	67.0 (70.53)	10.2 (10.74)	5.6 (5.89)	10.9 (11.47)	1.3 (1.37)

Source: Authors' own compilation using PLFS

Employment in Sub-Sectors of Freight Logistics

In order to formulate policies for increasing the employment and working conditions for both the workers and the enterprises involved in such activities, we now consider the employment pattern in the sub-sectors of freight logistics. These sub-sectors are classified based on the medium of mobility of the freights and are also referred to as the PM Gati Shakti sectors, as shown in Table 2 of chapter1.

In Table 20, the share of workers in the road sector is the highest compared to the other sub-sectors and has consistently increased till 2021-22 before slightly decreasing to 89.6 lakhs (94.32 percent) in 2022-23. This dominance reflects the critical role of road transport in providing last-mile delivery. The share of the workforce in the rail and water sectors has remained stable, with minor fluctuations, with an increase in the workforce to 2.4 lakhs (2.53 percent) and 1.7 lakhs (1.79 percent) in 2022-23, respectively, compared to its previous year. The workforce engaged in the air sector is the lowest compared to the

other sub-sectors. However, employment has increased in 2022-23 (1.4 lakhs or 1.47 percent) compared to the previous years from 2017-2022.

Table 20: Employment (In Lakhs) and its Distribution across PM-Gati Shakti Sectors

<i>Year</i>	<i>Road</i>	<i>Share (%)</i>	<i>Rail</i>	<i>Share (%)</i>	<i>Water</i>	<i>Share (%)</i>	<i>Air</i>	<i>Share (%)</i>
2017-18	67.9	94.57	1.4	1.95	1.8	2.51	0.7	0.97
2018-19	73.9	93.66	1.6	2.03	2.6	3.30	0.7	0.89
2019-20	80.3	94.58	2.3	2.71	1.4	1.65	0.8	0.94
2020-21	80.8	96.08	1.5	1.78	1.3	1.55	0.5	0.59
2021-22	89.9	95.33	2.2	2.33	1.4	1.48	0.8	0.85
2022-23	89.6	94.32	2.4	2.53	1.7	1.79	1.4	1.47

Source: Authors' own compilation using PLFS

State-wise Employment in Freight Logistics Sector

Lastly, we look at regional or state-level employment and its distribution (which will be largely correlated with the working-age adult population), as shown in Table 21. States like Rajasthan, West Bengal, Uttar Pradesh, Tamil Nadu, and Maharashtra have consistently increased the workforce in the freight logistics sector over these years. Interestingly, this includes the more developed states like Tamil Nadu and Maharashtra in terms of their per capita GSDP, and the remaining states have lower per capita GSDP. This means that employment has increased, perhaps in lower and higher skills, assuming that the better-developed states would have more medium and high-skill workers. This was observed when the worker characteristics were analysed based on their education level. States and UTs like Punjab, Haryana, Delhi, Bihar, Jharkhand, Odisha, Gujrat, Andhra Pradesh, Karnataka, Kerala, and Telangana exhibit fluctuations in their values. States and UTs like Jammu and Kashmir, Himachal Pradesh, Chandigarh, Uttarakhand, Sikkim, Arunachal Pradesh, Nagaland, Manipur, Assam, Tripura, Meghalaya, Goa, Lakshadweep, Puducherry, Andaman and Nicobar, and Chhattisgarh, generally show a decreasing trend in the workforce. This may be possibly due to terrain and other economic challenges, lower industrial activities, and migration to other states for jobs in these states.

Table 21: State-wise Number (Lakhs) of Workers and Share in Freight Logistics

<i>States</i>	<i>2017-18</i>	<i>2018-19</i>	<i>2019-20</i>	<i>2020-21</i>	<i>2021-22</i>	<i>2022-23</i>
Jammu & Kashmir	1.01 (1.41)	0.95 (1.20)	0.87 (1.03)	0.95 (1.13)	1.26 (1.34)	1.10 (1.16)
Himachal Pradesh	0.76 (1.06)	0.81 (1.03)	0.48 (0.57)	1.07 (1.27)	1.09 (1.15)	1.12 (1.18)
Punjab	2.19 (3.05)	2.70 (3.43)	5.73 (6.75)	2.59 (3.08)	1.85 (1.96)	1.72 (1.80)
Chandigarh	0.08 (0.11)	0.03 (0.04)	0.01 (0.01)	0.01 (0.01)	0.04 (0.04)	0.02 (0.02)
Uttarakhand	0.69 (0.96)	0.75 (0.96)	0.29 (0.34)	0.49 (0.58)	0.59 (0.62)	0.34 (0.36)
Haryana	2.26 (3.15)	1.76 (2.24)	1.46 (1.72)	2.38 (2.83)	2.14 (2.26)	2.51 (2.64)

Delhi	0.97 (1.35)	0.56 (0.70)	1.42 (1.67)	0.65 (0.78)	0.70 (0.75)	1.07 (1.12)
Rajasthan	3.86 (5.38)	6.00 (7.61)	6.89 (8.12)	5.59 (6.65)	6.13 (6.50)	6.29 (6.61)
Uttar Pradesh	6.46 (9.00)	6.32 (8.01)	5.99 (7.05)	7.64 (9.09)	7.52 (7.97)	7.68 (8.08)
Bihar	1.93 (2.69)	3.19 (4.05)	4.35 (5.13)	4.65 (5.53)	3.50 (3.71)	4.34 (4.56)
Sikkim	0.01 (0.01)	0.03 (0.03)	0.01 (0.01)	0.01 (0.01)	0.02 (0.02)	0.01 (0.01)
Arunachal Pradesh	0.11 (0.15)	0.13 (0.16)	0.04 (0.05)	0.04 (0.05)	0.03 (0.03)	0.04 (0.04)
Nagaland	0.08 (0.11)	0.04 (0.05)	0.06 (0.07)	0.03 (0.03)	0.07 (0.07)	0.11 (0.11)
Manipur	0.14 (0.19)	0.12 (0.15)	0.15 (0.17)	0.11 (0.14)	0.13 (0.14)	0.15 (0.15)
Mizoram	0.02 (0.03)	0.01 (0.01)	0.02 (0.02)	0.06 (0.07)	0.06 (0.06)	0.04 (0.04)
Tripura	0.11 (0.15)	0.08 (0.10)	0.13 (0.15)	0.15 (0.18)	0.12 (0.13)	0.22 (0.23)
Meghalaya	0.03 (0.04)	0.04 (0.05)	0.01 (0.02)	0.19 (0.22)	0.17 (0.18)	0.20 (0.21)
Assam	0.86 (1.20)	0.42 (0.53)	1.31 (1.54)	1.43 (1.70)	0.96 (1.01)	1.78 (1.87)
West Bengal	6.29 (8.76)	9.10 (11.53)	9.07 (10.69)	10.09 (12.00)	12.08 (12.81)	10.34 (10.88)
Jharkhand	2.04 (2.84)	1.91 (2.43)	2.60 (3.06)	2.82 (3.36)	3.42 (3.63)	3.60 (3.79)
Odisha	2.42 (3.37)	3.09 (3.91)	3.60 (4.24)	2.50 (2.98)	4.89 (5.18)	3.39 (3.56)
Chhattisgarh	1.2 (1.67)	1.49 (1.89)	1.47 (1.73)	1.72 (2.04)	1.82 (1.93)	2.57 (2.70)
Madhya Pradesh	3.52 (4.90)	3.40 (4.31)	5.32 (6.27)	5.30 (6.30)	5.20 (5.52)	6.12 (6.44)
Gujarat	5.54 (7.72)	3.42 (4.33)	3.78 (4.45)	4.38 (5.21)	5.02 (5.33)	5.57 (5.86)
Daman and Diu	0.01 (0.01)	0.01 (0.01)	0.03 (0.03)	0.03 (0.04)	0.05 (0.05)	0.14 (0.14)
Dadra & Nagar Haveli	0.03 (0.04)	0.05 (0.06)	0.01 (0.02)	0.01 (0.02)	0.00 (0.00)	0.00 (0.00)
Maharashtra	7.37 (10.26)	8.08 (10.24)	7.37 (8.69)	7.21 (8.57)	9.02 (9.57)	9.89 (10.41)
Andhra Pradesh	7.03 (9.79)	6.20 (7.85)	4.46 (5.25)	3.67 (4.36)	5.78 (6.13)	5.59 (5.88)
Karnataka	3.76 (5.24)	6.49 (8.22)	5.01 (5.90)	5.24 (6.23)	5.24 (5.56)	5.33 (5.61)
Goa	0.12 (0.17)	0.14 (0.17)	0.20 (0.24)	0.19 (0.23)	0.21 (0.22)	0.11 (0.11)
Lakshadweep	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.01 (0.01)	0.01 (0.01)
Kerala	2.30 (3.20)	2.52 (3.19)	2.54 (3.00)	2.71 (3.23)	2.46 (2.61)	3.08 (3.24)
Tamil Nadu	7.13	7.37	8.62	7.97	10.59	8.69

	(9.93)	(9.34)	(10.15)	(9.48)	(11.24)	(9.15)
Puducherry	0.09 (0.13)	0.08 (0.10)	0.03 (0.03)	0.02 (0.02)	0.05 (0.05)	0.14 (0.14)
Andaman & Nicobar	0.05 (0.07)	0.04 (0.05)	0.09 (0.11)	0.03 (0.04)	0.03 (0.03)	0.04 (0.04)
Telangana	1.33 (1.85)	1.59 (2.01)	1.45 (1.71)	2.14 (2.55)	2.07 (2.19)	1.73 (1.82)
Total	71.80 (100)	78.88 (100)	84.86 (100)	84.07 (100)	94.29 (100)	95.03 (100)

Note: Values in brackets are share of states in total employment (in percent) in a specific year

Source: Authors' own compilation using PLFS

Chapter 3

EMPLOYMENT AND SKILL GAP PROJECTIONS IN THE FREIGHT LOGISTICS SECTOR

Building on the employment estimates discussed for the period 2017-18 to 2022-23 in the previous chapter, this chapter presents employment forecasts for the freight logistics sector and its various subsectors through 2030, using quantitative modelling techniques.

The forecasting process begins with projecting the Gross Value Added (GVA) of the logistics sector for the period 2023-24 to 2029-30, based on the overall GVA trends of the country from 2017-18 to 2022-23. These GVA projections for the logistics sector are then used to estimate employment in the freight logistics sector. The forecasts are generated using linear regression models, with further details on the methodology outlined in Appendix A.

Gross Value Added Projections in the Logistics Sector

Table 3 in Chapter 1 shows the trend in GVA for the logistics sector. The projections indicate a stable growth rate for the logistics sector. Table 22 shows a steady increase in projected GVA (indicated by an asterisk *) through the years leading up to 2030 and is expected to reach Rs. 17,36,159 crores by 2029-30 with a CAGR of 6.67 % from 2017-18 to 2029-30. Post-Covid recovery from 2022-23 onwards predicts strong year-over-year (YoY) growth for the logistics sector.

Table 22: Projections of GVA up to 2029-30

<i>Year</i>	<i>GVA at Constant (2011-12) Prices (in Rupees Crore)</i>	<i>YoY growth (%)</i>
2017-18	8,00,245	-
2018-19	8,30,977	3.84%
2019-20	8,61,192	3.64%
2020-21	7,19,183	-16.49%
2021-22	8,85,092	23.07%
2022-23*	9,13,862	3.25%
2023-24*	10,06,485	10.14%
2024-25*	11,06,498	9.94%
2025-26*	12,14,297	9.74%
2026-27*	13,30,670	9.58%
2027-28*	14,55,912	9.41%
2028-29*	15,90,911	9.27%
2029-30*	17,36,159	9.13%

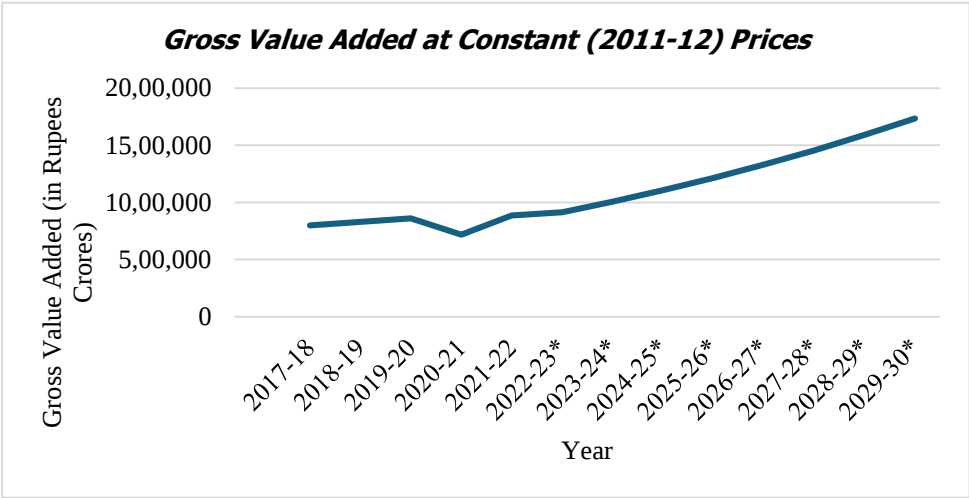
Note: *represents linear regression-based projected values.

Source: Authors' own compilation

From Figure 1, it is evident that there is a consistent increase in GVA from 2017-18 through 2019-20. The sector's GVA peaked at Rs. 8,61,192 crores in the fiscal year 2019-20. However, 2020-21 experienced a significant decline in GVA to Rs. 7,19,183 crores, which is observed as a distinct trough. This dip in GVA during 2020-21 can be attributed to the impact of the COVID-19 pandemic on the logistics sector. Following this

slump, there was a recovery, with GVA increasing to Rs. 8,85,092 crores in 2021-22. The upward trend continued into 2022-23 with a GVA of Rs. 9,13,862 crores. These forecasts suggest that the logistics sector will continue to expand in the coming years.

Figure 1: GVA at constant prices for the years 2017-18 to 2029-30



Source: Authors’ own compilation

Employment Projection for the Freight Logistics Sector

Table 23 presents the observed or actual employment values for the period 2017-18 to 2022-23, followed by the forecasted values (indicated by an asterisk *) from 2023-24 to 2029-30. Employment in the freight logistics sector shows a steady increase from 7.2 million in 2017-19 to 10 million in 2022-23. Employment projections continue growing, reaching 15 million by 2029-30. The projections suggest a consistent upward trend, with employment increasing by approximately 1 million each year. Overall, the projected total employment in the sector is expected to nearly double by 2029-30 with a CAGR of 6.18 %, indicating a strong expansion of the freight logistics sector across India.

With a pandemic period of about 18 months, the actual employment grew from 7.2 million to a little less than 10 million in a gap of 5 years. Assuming that there will be no major disruptions and that the logistics sector will grow faster in the less developed regions due to higher investments in road, rail, and air in recent years and the more developed regions may be able to invest in high-skill and high technology aspects of this sector the projected employment reaching 15 million by 2029-30 seems plausible. As the projections based on the previous five years assume that the growth in GVA of this sector will continue to absorb labour in the same rate, at least this much of job creation should happen in the coming years. With a more focussed approach towards additional investments to improve the quality of output in the traditional aspects of this sector and in newer technology and innovations, on the other hand, alongside better training and skilling, the freight logistics sector shows the potential to generate inclusive growth with employment.

Table 23: Employment Forecasts for the Freight Logistics Sector in India till 2030

<i>Year</i>	<i>Employment (in millions)</i>
2017-18	7.2
2018-19	7.9
2019-20	8.5
2020-21	8.4
2021-22	9.4
2022-23	9.5
2023-24 *	10.4
2024-25 *	11.1
2025-26 *	11.8
2026-27 *	12.5
2027-28 *	13.2
2028-29 *	14.0
2029-30 *	14.8

Note: * represents linear regression forecasts of employment numbers

Source: Authors' own estimates using PLFS Analysis

Table 24 shows the year-over-year (YoY) percentage change in employment for the freight logistics sector from 2017-18 to 2029-30. There was a significant increase of 12.16% in 2021-22, followed by a slight decrease of 0.79% in 2022-23. The projected data indicates a general trend of positive growth. This indicates the nature of employment in the freight logistics sector and suggests potential skill gaps that may need to be addressed through targeted training and education programs to meet the sector's evolving demands. A positive change in employment signals an increase in demand, possibly indicating the pre-condition under which skills shortages are likely to occur (ILO & OECD, 2023).

Table 24: Indicator on Skill-Gap for the Freight Logistics Sector: Employment (% change YoY)

<i>Year</i>	<i>Employment (% change YoY)</i>
2017-18	-
2018-19	9.84%
2019-20	7.59%
2020-21	-0.94%
2021-22	12.16%
2022-23	0.79%
2023-24 *	9.27%
2024-25 *	6.48%
2025-26 *	6.27%
2026-27 *	6.08%
2027-28 *	5.92%
2028-29 *	5.77%
2029-30 *	5.65%

Note: * represents linear regression forecasts of employment numbers.

Source: Authors' compilation

Employment Projections for Freight Logistics Subsectors

Table 25 provides a detailed breakdown of employment in the freight logistics sector across four Subsectors of PM Gati-Shakti (Road, Rail, Water, Air) from 2017-18 to 2029-30. The 2017-18 to 2022-23 figures are actual employment estimates, while the figures from 2023-24 onwards are projections, indicated by an asterisk (*). From Table 25, one can observe that employment in road transport shows a steady increase from 6.8 million in 2017-18 to 9 million in 2022-23. The projections also indicate a continued growth, reaching 13.45 million by 2029-30. Similarly, projections indicate a gradual increase in the workforce for the rail sector and air transport, reaching 0.59 million and 0.34 million, respectively, by 2029-30, and a slight increase in water transport, reaching 0.20 million by 2029-30. Table 26 provides disaggregated employment numbers across the nine Logistics Sector Skills Council subcategorization during 2017-18 to 2029-30. Land Transport, Warehousing, Courier, Rail freight, and Exim freight forwarding sectors are projected to show strong employment growth till 2030.

Table 25: Employment Forecasts for the Sub-Sectors of Freight Logistics in India Up to 2030

	<i>Actual And Forecasted Employment (In Millions)</i>				
<i>Year</i>	<i>Road</i>	<i>Rail</i>	<i>Water</i>	<i>Air</i>	<i>Total</i>
2017-18	6.8	0.1	0.2	0.1	7.2
2018-19	7.4	0.2	0.3	0.1	7.9
2019-20	8.0	0.2	0.1	0.1	8.5
2020-21	8.1	0.1	0.1	0.1	8.4
2021-22	9.0	0.2	0.1	0.1	9.4
2022-23	9.0	0.2	0.2	0.1	9.5
2023-24 *	9.8	0.3	0.1	0.1	10.4
2024-25 *	10.4	0.3	0.2	0.2	11.0
2025-26 *	10.9	0.4	0.2	0.2	11.7
2026-27 *	11.6	0.4	0.2	0.2	12.4
2027-28 *	12.2	0.5	0.2	0.3	13.1
2028-29 *	12.8	0.5	0.2	0.3	13.8
2029-30 *	13.4	0.6	0.2	0.3	14.6

Note: * represents linear regression forecasts of employment numbers

Source: Authors' own estimates using PLFS Analysis

Table 26: Employment Forecasts for the LSC Subsectors (in Lakhs)

<i>LSC Sectors</i>	<i>2017-18</i>	<i>2018-19</i>	<i>2019-20</i>	<i>2020-21</i>	<i>2021-22</i>	<i>2022-23</i>	<i>2023-24 *</i>	<i>2024-25 *</i>	<i>2025-26 *</i>	<i>2026-27 *</i>	<i>2027-28 *</i>	<i>2028-29 *</i>	<i>2029-30 *</i>
Land transportation	55.3	58.2	63.5	65.3	68.1	69.7	77.7	82.7	87.9	93.3	98.8	104.5	110.4
Cold storage	0.6	1.2	0.3	0.7	0.6	1.1	0.9	1.0	1.0	1.1	1.1	1.2	1.3
Warehousing	1.7	3.2	3.5	2.6	4.7	4.6	4.1	4.3	4.6	4.9	5.2	5.4	5.8
Courier	10.0	10.8	12.5	11.7	15.4	13.5	15.0	16.0	17.0	18.1	19.1	20.2	21.4
Rail freight	1.4	1.6	2.3	1.5	2.2	2.4	2.3	2.5	2.6	2.8	3.0	3.1	3.3
Exim freight forwarding	1.1	1.7	1.0	1.1	1.0	1.2	1.5	1.6	1.7	1.8	1.9	2.0	2.1
Inland waterways & marine	0.2	0.3	0.1	0.1	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Port terminals	0.4	0.7	0.3	0.2	0.3	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7
Air cargo	0.6	0.5	0.7	0.5	0.7	1.2	0.9	0.9	1.0	1.0	1.1	1.1	1.2
Total	71.3	78.2	84.4	83.6	93.1	94.2	103.0	109.7	116.6	123.6	131.0	138.5	146.3

Note: * represents projections.

Source: Authors' contribution.

State-wise Employment Projections

Table 27 presents state-wise employment estimates and projections for the freight logistics sector in India from 2017-18 to 2029-30. States like Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal, and Rajasthan show significant growth in employment over the period. Maharashtra leads with a projected increase from 7.4 lakh in 2017-18 to 14.2 lakh in 2029-30, while Tamil Nadu's employment is expected to rise from 7.1 lakh to 14.6 lakh. The emerging states include Bihar, Haryana, and Karnataka, which show consistent upward trends. Bihar's employment is projected to increase from 1.9 lakh in 2017-18 to 6.3 lakh in 2029-30. Employment in Northeastern states remain relatively low, with minor fluctuations. However, states like Assam show a noticeable increase from 0.9 lakh in 2017-18 to 1.9 lakh in 2029-30. Union territories like Chandigarh, Puducherry, and Daman & Diu show minimal changes, with employment figures remaining relatively stable throughout the period.

Table 27: State-wise Employment Projections (in Lakhs)

	<i>2017-18</i>	<i>2018-19</i>	<i>2019-20</i>	<i>2020-21</i>	<i>2021-22</i>	<i>2022-23</i>	<i>2023-24 *</i>	<i>2024-25 *</i>	<i>2025-26 *</i>	<i>2026-27 *</i>	<i>2027-28 *</i>	<i>2028-29 *</i>	<i>2029-30 *</i>
<i>States</i>													
Jammu & Kashmir	1.0	1.0	0.9	1.0	1.3	1.1	1.3	1.3	1.4	1.5	1.6	1.7	1.8
Himachal Pradesh	0.8	0.8	0.5	1.1	1.1	1.1	1.1	1.2	1.2	1.3	1.4	1.5	1.5
Punjab	2.2	2.7	5.7	2.6	1.9	1.7	3.5	3.7	3.9	4.2	4.4	4.7	4.9
Chandigarh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Uttarakhand	0.7	0.8	0.3	0.5	0.6	0.3	0.7	0.7	0.8	0.8	0.8	0.9	0.9
Haryana	2.3	1.8	1.5	2.4	2.1	2.5	2.6	2.7	2.9	3.1	3.3	3.5	3.7
Delhi	1.0	0.6	1.4	0.7	0.7	1.1	1.1	1.2	1.3	1.3	1.4	1.5	1.6
Rajasthan	3.9	6.0	6.9	5.6	6.1	6.3	7.1	7.5	8.0	8.5	9.0	9.5	10.1
Uttar Pradesh	6.5	6.3	6.0	7.6	7.5	7.7	8.5	9.1	9.6	10.2	10.8	11.5	12.1
Bihar	1.9	3.2	4.4	4.7	3.5	4.3	4.4	4.7	5.0	5.3	5.7	6.0	6.3
Sikkim	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arunachal Pradesh	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nagaland	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Manipur	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Mizoram	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Tripura	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Meghalaya	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Assam	0.9	0.4	1.3	1.4	1.0	1.8	1.4	1.5	1.5	1.6	1.7	1.8	1.9
West Bengal	6.3	9.1	9.1	10.1	12.1	10.3	11.5	12.3	13.1	13.9	14.7	15.5	16.4
Jharkhand	2.0	1.9	2.6	2.8	3.4	3.6	3.3	3.5	3.7	4.0	4.2	4.5	4.7
Odisha	2.4	3.1	3.6	2.5	4.9	3.4	4.0	4.3	4.6	4.8	5.1	5.4	5.7
Chhattisgarh	1.2	1.5	1.5	1.7	1.8	2.6	2.1	2.2	2.3	2.5	2.6	2.8	2.9
Madhya Pradesh	3.5	3.4	5.3	5.3	5.2	6.1	5.8	6.2	6.6	7.0	7.4	7.9	8.3

Gujarat	5.5	3.4	3.8	4.4	5.0	5.6	5.7	6.1	6.4	6.8	7.2	7.7	8.1
Daman and Diu	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Dadra & Nagar Haveli	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maharashtra	7.4	8.1	7.4	7.2	9.0	9.9	10.0	10.6	11.3	12.0	12.7	13.4	14.2
Andhra Pradesh	7.0	6.2	4.5	3.7	5.8	5.6	6.8	7.2	7.7	8.2	8.6	9.1	9.7
Karnataka	3.8	6.5	5.0	5.2	5.2	5.3	6.4	6.8	7.2	7.6	8.1	8.6	9.0
Goa	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Lakshadweep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kerala	2.3	2.5	2.5	2.7	2.5	3.1	3.2	3.4	3.6	3.8	4.1	4.3	4.5
Tamil Nadu	7.1	7.4	8.6	8.0	10.6	8.7	10.3	10.9	11.6	12.3	13.0	13.8	14.6
Puducherry	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Andaman & Nicobar	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Telangana	1.3	1.6	1.5	2.1	2.1	1.7	2.1	2.2	2.4	2.5	2.7	2.8	3.0
Total	71.8	78.9	84.9	84.1	94.3	95.0	103.8	110.6	117.5	124.7	132.0	139.7	147.5

Source: Authors' contribution.

Note: * represents projections.

Skill Gap in the Freight Logistics Sector

Table 28 presents the year-over-year (YoY) percentage change in employment for various sub-sectors of the freight logistics sector in India from 2017-18 to 2029-30. The road sector and rail sector projections show a decline in YOY. The Water sector initially declined but showed recovery from 2027-28 onwards. The Air sector has the highest volatility. These trends indicate dynamic employment shifts across sub-sectors, highlighting potential areas for targeted skill development and workforce planning to address emerging needs in the freight logistics sector (ILO & OECD, 2023).

**Table 28: Percentage Change in Employment for the
Sub-Sectors of the Freight Logistics Sector in India
till 2030**

<i>Employment (% change YoY)</i>				
<i>Year</i>	<i>Road</i>	<i>Rail</i>	<i>Water</i>	<i>Air</i>
2017-18	-	-	-	-
2018-19	9%	16%	48%	-9%
2019-20	9%	43%	-46%	23%
2020-21	1%	-37%	-8%	-38%
2021-22	11%	51%	5%	51%
2022-23	0%	10%	20%	78%
2023-24*	9%	18%	-10%	1%
2024-25*	6%	15%	3%	20%
2025-26*	6%	14%	4%	18%
2026-27*	6%	13%	5%	16%
2027-28*	5%	12%	6%	15%
2028-29*	5%	11%	7%	14%
2029-30*	5%	11%	7%	13%

Note: * represents forecasts

Source: Authors' compilation

Skill Gap Projections for Freight Logistics Subsectors

Table 29 presents the subsector-wise projections of the number of workers without vocational training in the freight logistics sector till 2030. It also shows the year-wise percentage of these untrained workers relative to the total workforce in the sector. The share of workers without vocational training is projected to steadily decline from 78% in 2017-18 to an estimated 36% by 2029-30. This indicates a positive trend toward upskilling of the workforce, especially between 2021-22 and 2022-23, where there was a sharp drop in untrained workers from 58% to 44%. A significant portion of the employment and untrained workers is concentrated in the road subsector sector. While the road sector remains dominant, the number of untrained workers in the road and water subsector is gradually declining. In the air and rail subsectors, the number of untrained workers is projected to increase slightly in future years. By 2029-30, there are projected to be around 5.33 million untrained workers across all subsectors, especially in the road subsector sector.

Table 29: Skill-Gap (Workers without Formal or Informal Vocational Training) (in Millions)

<i>Year</i>	<i>Road</i>	<i>Rail</i>	<i>Water</i>	<i>Air</i>	<i>Total</i>	<i>% of the Total Workforce in the Freight Logistics sector</i>
2017-18	5.30	0.12	0.15	0.06	5.63	78%
2018-19	5.45	0.14	0.18	0.04	5.82	74%
2019-20	5.81	0.16	0.11	0.05	6.13	72%
2020-21	5.19	0.12	0.09	0.04	5.44	65%
2021-22	5.13	0.18	0.09	0.04	5.43	58%
2022-23	3.82	0.17	0.10	0.09	4.17	44%
2023-24 *	4.53	0.19	0.08	0.08	4.88	47%
2024-25 *	4.50	0.22	0.07	0.10	4.89	44%
2025-26 *	4.50	0.24	0.06	0.12	4.92	42%
2026-27 *	4.51	0.26	0.06	0.14	4.97	40%
2027-28 *	4.56	0.29	0.05	0.16	5.06	38%
2028-29 *	4.63	0.32	0.05	0.19	5.18	37%
2029-30 *	4.72	0.34	0.05	0.21	5.33	36%

Source: Authors' estimates based on PLFS.

Note: * represents linear regression forecasts of employment numbers.

Table 30 presents the projected estimates of the number of workers without any vocational training disaggregated by the nine LSC subsectors. The skill gap is dominated by the land transportation and courier services, which together account for a significant portion of untrained workers. Other subsectors such as warehousing, cold storage, rail freight, and air cargo exhibit smaller, yet notable, gaps, especially warehousing, which saw a rise from 1.5 lakh in 2017-18 to 3.4 lakh in 2021-22.

Table 30: Subsector-wise Skill-Gap (Workers without Formal or Informal Vocational Training) (in Lakhs)

<i>Year</i>	<i>2017-18</i>	<i>2018-19</i>	<i>2019-20</i>	<i>2020-21</i>	<i>2021-22</i>	<i>2022-23</i>	<i>2023-24 *</i>	<i>2024-25 *</i>	<i>2025-26 *</i>	<i>2026-27 *</i>	<i>2027-28 *</i>	<i>2028-29 *</i>	<i>2029-30 *</i>
Land transporta tion	42.0	41.9	44.9	40.4	36.2	24.9	34.6	34.6	34.8	35.2	35.8	36.6	37.7
Cold storage	0.5	1.1	0.2	0.5	0.4	1.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Warehous ing	1.5	1.9	2.7	1.9	3.4	3.2	2.3	2.3	2.3	2.3	2.4	2.4	2.5
Courier	8.6	9.2	10.0	8.7	10.5	8.6	8.5	8.5	8.6	8.7	8.8	9.0	9.3
Rail freight	1.2	1.4	1.6	1.2	1.8	1.7	1.4	1.4	1.4	1.4	1.4	1.4	1.5
Exim freight forwardin g	0.9	1.1	0.8	0.8	0.7	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Inland waterway s & marine	0.2	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Port terminals	0.4	0.4	0.3	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Air cargo	0.5	0.4	0.5	0.3	0.3	0.8	0.4	0.4	0.5	0.5	0.5	0.5	0.5
Total	55.8	57.6	61.1	53.9	53.5	41.1	48.8	48.8	49.2	49.7	50.6	51.7	53.2

Source: Authors' estimates based on PLFS.

Note: * represents projections.

State-wise Skill Gap Projections

We present the estimates of state-wise skill gap projection till 2030 in Table 31. The skill gap across Indian states shows significant variation. The states with high freight logistics employment, like Maharashtra, Tamil Nadu, Uttar Pradesh, and West Bengal, consistently report the highest number of workers without vocational training, peaking at over 6 lakhs in some years. Gujarat and Andhra Pradesh also display notable gaps, fluctuating over the years. The overall trend indicates a projected increase in the skill gap across most states.

Table 31: State-wise Skill-Gap (Workers without Formal or Informal Vocational Training) (in Lakhs)

<i>State</i>	<i>2017-18</i>	<i>2018-19</i>	<i>2019-20</i>	<i>2020-21</i>	<i>2021-22</i>	<i>2022-23</i>	<i>2023-24 *</i>	<i>2024-25 *</i>	<i>2025-26 *</i>	<i>2026-27 *</i>	<i>2027-28 *</i>	<i>2028-29 *</i>	<i>2029-30 *</i>
Jammu & Kashmir	0.6	0.5	0.3	0.4	0.5	0.4	0.5	0.4	0.2	0.4	0.5	0.6	0.5
Himachal Pradesh	0.6	0.3	0.3	0.5	0.4	0.3	0.5	0.2	0.2	0.4	0.4	0.4	0.4
Punjab	2.0	1.9	5.0	1.8	1.1	1.0	1.7	1.6	4.0	1.6	1.0	1.2	2.0
Chandigarh	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Uttarakhand	0.4	0.7	0.2	0.5	0.5	0.2	0.4	0.6	0.2	0.4	0.4	0.3	0.4
Haryana	2.0	1.2	1.1	1.5	1.2	1.2	1.8	1.0	0.9	1.4	1.1	1.5	1.4
Delhi	0.8	0.3	0.7	0.4	0.4	0.5	0.7	0.3	0.6	0.4	0.4	0.6	0.5
Rajasthan	3.2	4.3	4.3	3.7	4.3	3.3	2.8	3.6	3.5	3.4	4.0	4.0	3.8
Uttar Pradesh	4.7	5.0	3.7	4.4	3.7	3.5	4.1	4.2	3.0	4.1	3.5	4.4	4.1
Bihar	1.9	3.2	4.3	4.6	3.3	2.2	1.7	2.7	3.4	4.2	3.1	2.7	3.2
Sikkim	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arunachal Pradesh	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1
Nagaland	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1
Manipur	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Mizoram	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Tripura	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1
Meghalaya	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1
Assam	0.8	0.4	1.1	1.2	0.5	0.5	0.7	0.3	0.9	1.1	0.5	0.6	0.7
West Bengal	5.4	6.4	5.6	5.4	5.1	3.2	4.7	5.4	4.5	4.9	4.7	3.9	5.0
Jharkhand	1.9	1.4	1.9	2.0	2.6	1.5	1.6	1.2	1.5	1.9	2.5	1.9	1.9
Odisha	1.8	2.3	3.2	2.1	3.1	1.8	1.5	2.0	2.6	1.9	2.9	2.2	2.3
Chhattisgarh	0.5	0.3	0.3	0.4	0.3	0.3	0.5	0.2	0.2	0.4	0.3	0.4	0.4
Madhya Pradesh	1.8	2.4	3.5	3.5	3.1	2.1	1.6	2.0	2.8	3.2	2.9	2.6	2.7
Gujarat	4.6	2.6	2.7	2.8	3.7	3.3	4.0	2.2	2.2	2.6	3.4	4.1	3.3
Daman and Diu	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dadra & Nagar Haveli	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maharashtra	6.8	5.7	5.7	5.5	5.1	5.9	5.9	4.8	4.5	5.1	4.8	7.4	5.8
Andhra Pradesh	3.3	3.5	2.7	1.7	3.9	3.0	2.9	3.0	2.1	1.6	3.7	3.7	3.0
Karnataka	3.4	5.0	3.6	3.0	2.3	1.7	2.9	4.2	2.9	2.8	2.2	2.1	3.0
Goa	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1
Lakshadweep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kerala	2.0	2.2	1.6	1.6	0.8	1.1	1.7	1.9	1.3	1.5	0.8	1.3	1.5
Tamil Nadu	6.0	6.7	7.9	5.4	6.6	3.6	5.2	5.6	6.4	5.0	6.1	4.5	5.9
Puducherry	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
A & N Island	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Telangana	1.2	1.3	1.0	1.2	1.2	0.9	1.0	1.1	0.8	1.1	1.1	1.1	1.1
Total	56.3	58.2	61.3	54.4	54.3	41.7	48.8	48.9	49.2	49.7	50.6	51.8	53.3

Source: Authors' estimates based on PLFS.

Note: * represents projections.

Chapter 4

PRIMARY SURVEY ANALYSIS OF SKILL GAP

This chapter analyses the interview responses from different stakeholders to understand the skill gap in the industry. A skill gap study for the logistics sector in India was conducted through a primary survey involving employers (CII members), sub-sector industry associations, and youth. The survey aimed to understand workforce dynamics, career aspirations, training and certification patterns, the impact of emerging technologies, skill supply gaps, and future collaboration plans. It gathered insights from across 20 Indian states.

Industry View

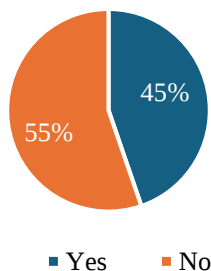
This section discusses the findings from the employers' responses to the questionnaire provided in Appendix C. Figure 2 shows that 21 out of the 64 individuals who responded to the survey (55 percent) did not identify any changes in performance from up-skilling the human resources. However, 45 percent of the individuals anticipate challenges in up-skilling human resources. One of the reasons might be the dynamic environment of fast-changing skill needs due to technological advancements and integration into the logistics sector. Other reasons might include developing new products, changes in rules and regulations, maintaining competitiveness, etc. This might lead to an expectation from these individuals that the skills and training are necessary.

Apprenticeship schemes are key to the skill development of individuals. 27 out of 64 respondents who have responded, only 13 individuals feel that the apprenticeship scheme is helpful in the industry, as shown in Figure 3. Of the 26 respondents, 16 (62 percent) responded positively to planning to use the scheme, as seen in Figure 4.

The recruitment of skilled workers is currently a challenge. Figure 5 below shows that 56.25 percent face challenges in finding and recruiting skilled workers to meet their organization's needs. These results indicate a shortage of skilled workers or challenges in recruiting potential skilled workers. Conversely, 43.75 percent of respondents do not report facing such difficulties.

Figure 2: Challenges Faced in Upskilling Human Resources (n=38)

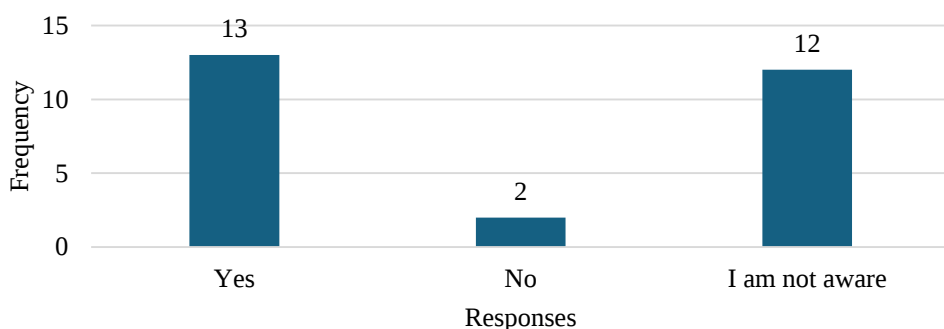
Do you see any challenges in up-skilling human resources?



Source: Authors' compilation based on Primary Survey by CII

Figure 3: Effectiveness of Apprenticeship Schemes (n= 27)

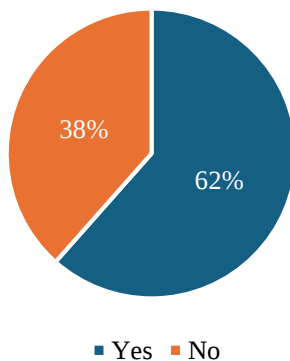
Is the apprenticeship scheme helpful to the industry?



Source: Authors' compilation based on Primary Survey by CII

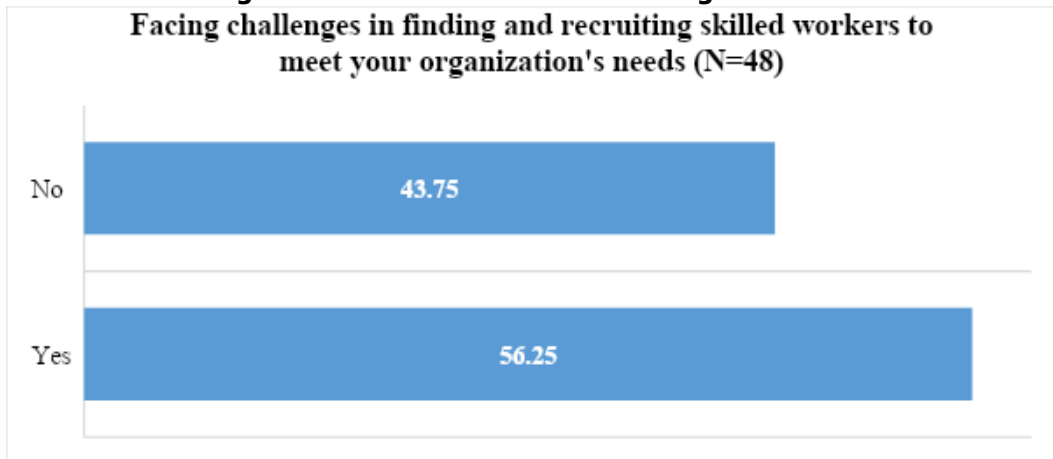
Figure 4: Utilisation of the Apprenticeship Scheme (n=26)

Are you planning to utilize the apprenticeship scheme?



Source: Authors' compilation based on Primary Survey by CII

Figure 5: Percentage of Respondents Facing Challenges in Finding and Recruiting Skilled Workers to Meet Their Organization's Needs

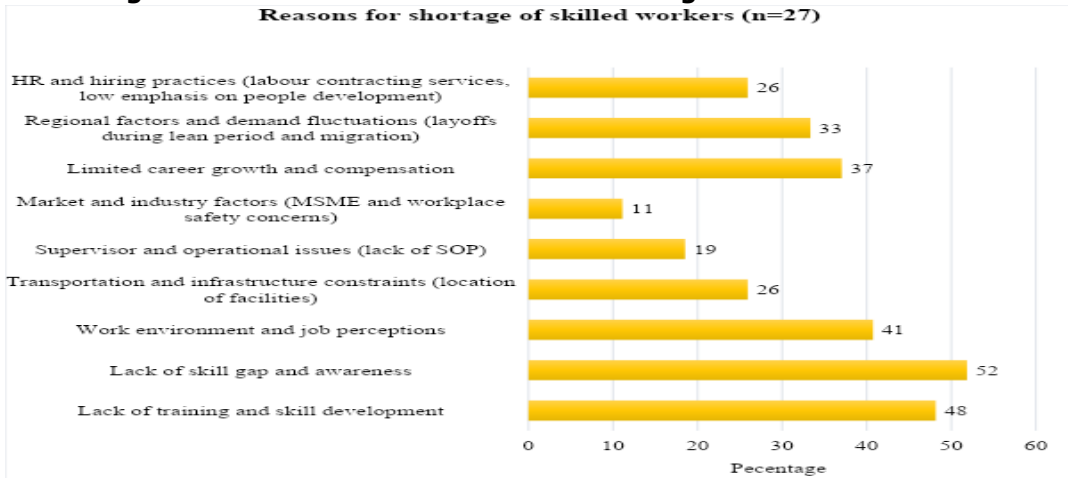


Source: Authors' compilation based on Primary Survey by CII

Figure 6 below presents data on the perceived reasons for the shortage of skilled workers, as reported by a sample of 56 percent of respondents who found challenges in recruitment (n=27). The data is categorized into seven primary factors, each with varying levels of impact on the skill shortage. Analysis of interviews reveals that lack of skill gap and awareness, and lack of training and skill development emerged as the most significant contributors with 52 per cent and 48 per cent responses respectively, indicating a clear gap in skill development initiatives and a lack of understanding about the skills required for the job market. Work Environment and Job Perceptions, with 41 per cent, follow closely behind as a reason for the skill shortage. This suggests that factors such as job satisfaction, work-life balance, and overall job perception play a crucial role in attracting and retaining skilled workers.

Limited career growth and compensation (37 percent) and regional factors and demand fluctuations (33 percent) are also perceived to significantly contribute to the skill shortage, highlighting the need for better compensation packages and stable employment opportunities. Other factors, such as HR and hiring practices, including labour contracting service and emphasis on people development and transportation and infrastructure constraints, both had 26 percent agreeing to contribute to a shortage in skilled workers. Supervisor and operational issues (19 percent) and market and industry factors, including workplace safety, also play a role, but to a lesser extent.

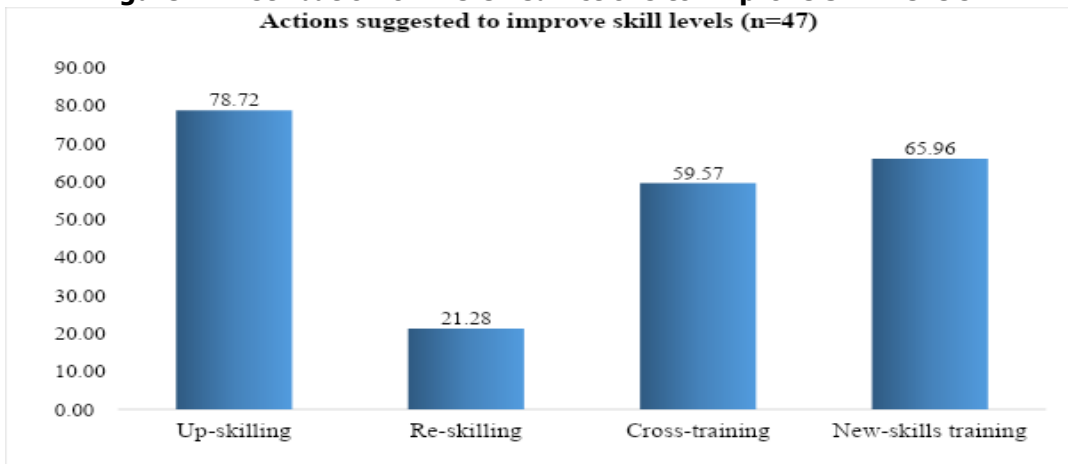
Figure 6: Perceived Reasons for The Shortage of Skilled Workers



Source: Authors' compilation based on Primary Survey by CII

The data shows a multifaceted challenge to address the shortage of skilled workers. Addressing the issue requires a comprehensive approach focusing on improving work environments, enhancing skill development programs, and creating stable and rewarding career paths. Additionally, mitigating regional disparities and industry-specific challenges will be essential in overcoming the skill shortage. To identify potential solutions to the skilled worker shortage, respondents were asked to indicate their preferred strategies for improving skill levels in workers. The results shown in Figure 7 emphasise enhancing existing competencies rather than acquiring entirely new skill sets. The survey findings indicate a strong preference for strategies that build upon existing skill sets.

Figure 7: Distribution of Preferred Actions to Improve Skill Levels



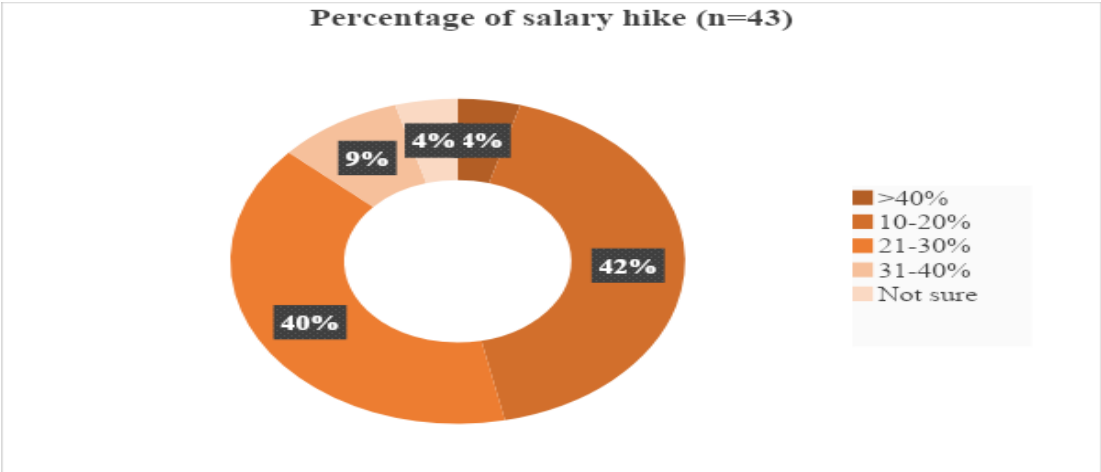
Source: Authors' compilation based on Primary Survey by CII

Further from Figure 7, we observe that the respondents strongly favoured up-skilling as the most effective way to address skill shortages, with 78.72 percent identifying

it as a crucial strategy. Similarly, acquiring new skills through training was deemed important by 65.96 percent of respondents, who highlighted the need for developing new competencies. Cross-training was also seen as essential by 59.57 percent of those surveyed. In contrast, re-skilling, which involves a complete overhaul of skill sets, was viewed as the least effective strategy, with only 21.28 percent of respondents supporting it. This indicates a clear preference for enhancing existing skills rather than completely replacing them. Overall, the data strongly emphasises improving current skills through up-skilling and cross-training while acquiring new skills, which is also valued. Re-skilling appears to be the least favoured approach among respondents.

The emphasis on enhancing existing skills aligns with a broader trend observed in the survey: organizations are also willing to offer higher salaries and better benefits to attract and retain skilled workers. Respondents' inclination towards up-skilling and cross-training suggests a focus on maximizing the potential of their current workforce, which may be complemented by offering competitive compensation packages to incentivize the development and retention of these skills. By prioritizing these strategies, organizations are willing to invest in their employees' growth and are interested in making financial commitments to secure and maintain a skilled workforce. The survey response in Figure 8 indicates a positive trend in offering or willing to offer salary hikes, with a considerable hike.

Figure 8: Respondents Offering or Willing to Offer Higher Salaries or Better Benefits to Attract and Retain Certified/Skilled Workers

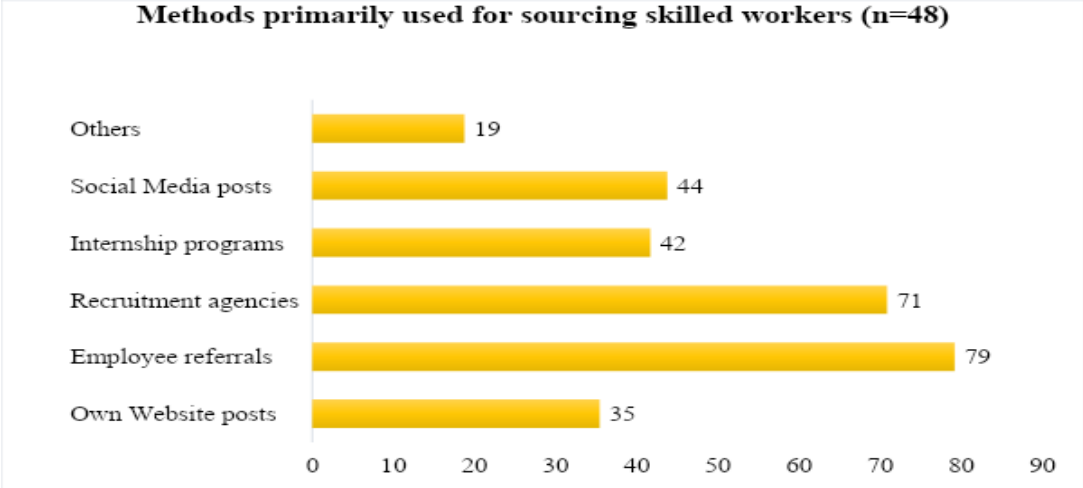


Source: Authors' compilation based on Primary Survey by CII

As per Figure 8, nearly half (49 percent) of respondents expressed a willingness to offer salary hikes, ranging from 21 percent to 40 percent. Within this group, 9 percent are prepared to provide increases between 31 percent and 40 percent, while an additional 5 percent are willing to offer hikes exceeding 40 percent. These figures reflect a dominance of higher salary hikes and a strong commitment among employers to maintain competitive compensation packages. Additionally, 42 percent of respondents preferred a more moderate level, favouring salary hikes within the 10 to 20 percent range. This suggests a balanced strategy to attract and retain talent without excessive financial commitment. A

small fraction of 4 percent of respondents reported uncertainty regarding their organization's salary adjustment plans, indicating limited clarity or willingness to disclose specific compensation strategies. The emphasis on offering higher salaries to attract skilled workers highlights how competitive compensation addresses organizations' challenges in sourcing skilled workers. This approach mirrors the preferred methods organizations use, as shown in Figure 9 below, to address and overcome the issues related to skilled worker shortages.

Figure 9: Methods Primarily used by Organizations for Sourcing Skilled Workers



Source: Authors' compilation based on Primary Survey by CII

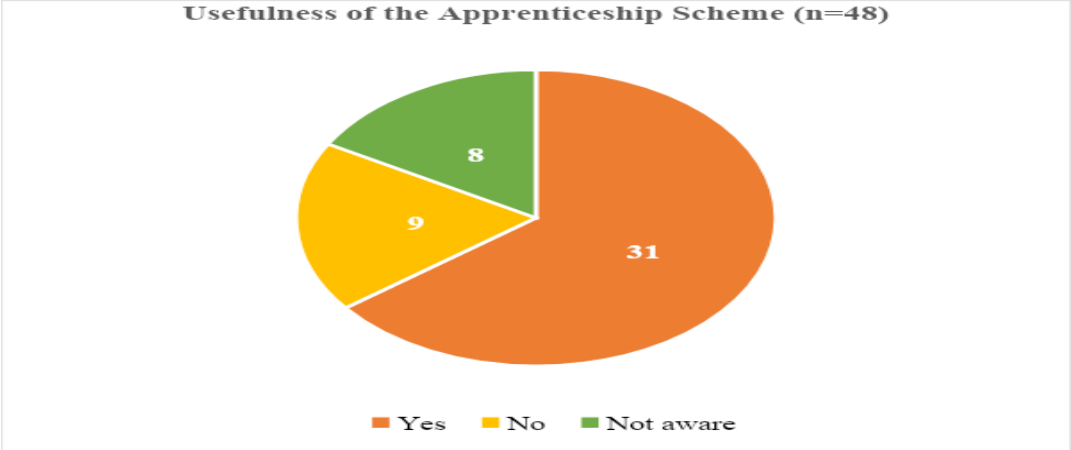
The data suggests that employee referrals (79 percent) are the most effective channel for sourcing skilled workers, as seen in Figure 9. This highlights the importance of fostering a positive employee experience to encourage referrals. Recruitment agencies also play a significant role in the talent acquisition process. They are the second most popular method, chosen by 71 percent of the respondents to source skilled workers. Forty-four percent and 35 percent of the organizations utilize social media posts and own website posts, respectively. While these are moderately popular, their effectiveness might vary depending on the industry and target job roles.

Other methods are used by 19 percent, of which advertisements in newspapers (44 percent) topped the list. The use of "other methods" suggests that organizations are exploring diverse strategies to source skilled workers. Other areas to explore while sourcing skilled workers could include professional networking platforms. To sum up, the graph indicates that organizations have implemented a range of recruitment strategies and rely on both internal and external channels to source skilled workers.

The apprenticeship scheme has been met with a generally positive response within the Indian logistics sector. Of the 48 respondents surveyed, 65 percent (31 respondents) reported viewing the program favourably, as seen in Figure 10. This indicates a substantial level of acceptance for apprenticeships as a means of skill development within the industry. However, the scheme's impact is only sometimes positive.

Approximately 19 percent of respondents (9 respondents) expressed dissatisfaction with the apprenticeship program, suggesting areas for improvement. Additionally, 17 percent (8 respondents) indicated a lack of awareness of the program, highlighting potential gaps in its dissemination. These findings suggest that while the apprenticeship scheme holds promise as a tool for skill development in the logistics sector, there is room for enhancement in terms of program awareness and overall effectiveness.

Figure 10: Usefulness of the Apprenticeship Scheme to the Industry



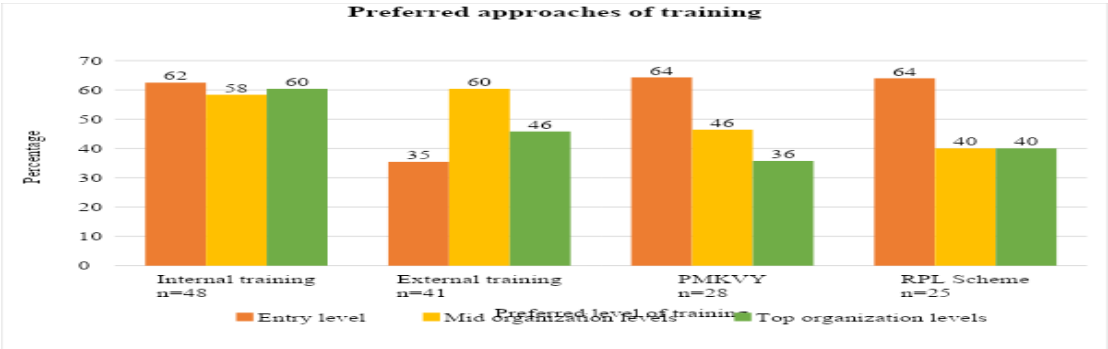
Source: Authors' compilation based on Primary Survey by CII

Training in logistics may be delivered by employers themselves as internal training, by organisations external to the employers like the training providers, colleges, and universities (external training), or through government schemes. The government scheme, Pradhan Mantri Kaushal Vikas Yojana (PMKVY), administered by the National Skill Development Corporation (NSDC) under the Ministry of Skill Development and Entrepreneurship, offers short-term skill training aligned with industry demands. PMKVY's Recognition of Prior Learning (RPL) component provides certification for individuals possessing prior skills and experience. Respondents were queried about their preference for RPL in addition to the other training methods.

From Figure 11, the evidence suggests internal training to be the most preferred approach across all organizational levels (entry, middle, or top-level), with the highest preference among entry-level employees (62 percent). Internal training was favored by all employee levels. Most organizations prioritize developing their internal training programs to meet the specific needs of their workforce. While external training is also valued, it is more focused on mid-level employees (60 percent), as compared to entry-level (35 percent) and top-level (46 percent), indicating a potential need for external expertise and industry exposure. When asked about PMKVY and RPL, only 57 percent (n=28) and 51 percent (n=25) of the respondents answered respectively, indicating that PMKVY and RPL schemes are either less prevalent in the logistics sector or that it is a less preferred training approach.

PMKVY and RPL are less favoured among higher-level employees, particularly at the top. This could be due to factors such as the specific skills offered by these schemes not aligning with the needs of higher-level roles or a perception of lower quality compared to other internal or external training. Something to note is that with a larger sample, entry-level employees (35 percent) were least considered for an external training approach. Conversely, they make up the highest consideration with a smaller sample, 64 percent each for PMKVY and RPL. To conclude, the graph highlights the importance of internal training programs in developing the workforce while also indicating a role for external training and government initiatives in specific circumstances.

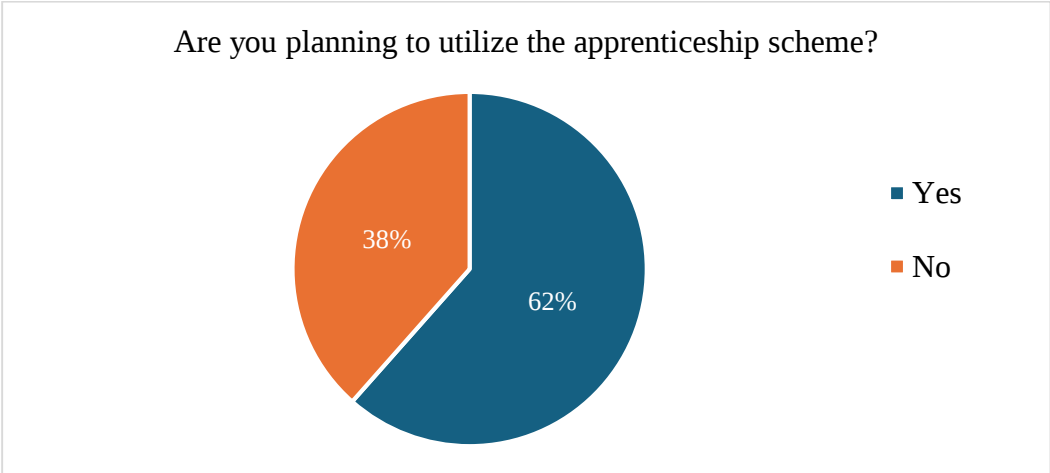
Figure 11: Respondents’ preferred approaches and level of training



Source: Authors' compilation based on Primary Survey by CII

One of the survey questions inquired whether the participants currently faced any challenges in finding and recruiting skilled workers to meet their organization's needs. As shown in Figure 12, 20 (54 percent) respondents reported facing challenges in finding skilled workers, while 17 percent did not encounter any difficulty in meeting their firm's requirements.

Figure 12: Challenges in finding skilled workers (n=38)

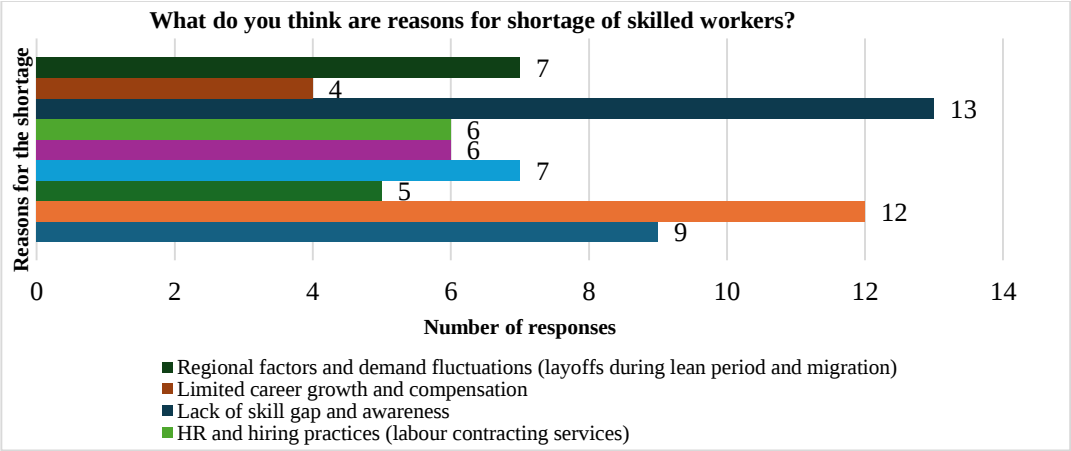


Source: Authors' compilation based on Primary Survey by CII

The respondents were further asked to specify the reasons for the shortage of skilled workers if they had responded yes to the previous question (Figure 13). However, many have not answered this follow-up question. The data indicates that the primary reasons for the shortage include a lack of awareness regarding skill gaps, cited by 13 respondents, and insufficient training and skill development, noted by 12 respondents.

There were also significant concerns about supervisors, operational issues, and the lack of standard operating procedures (SOPs). Nine respondents thought this contributed to the shortage of skilled workers in the logistics sector. Additionally, according to 7 respondents, transportation and infrastructure constraints were the primary reasons for the absence of skilled workers in the sector. The location of the facilities also contributed to the problem, according to them. Seven participants suggested that regional factors and demand fluctuations, such as migration and layoffs during lean periods, were the reason behind the shortage. Furthermore, 6 people thought that market and industry factors, including concerns related to Micro, Small, and Medium Enterprises (MSME) and workplace safety, also contributed to the shortage.

Figure 13: Reasons for the shortage of skilled workers (n=38)



Source: Authors' compilation based on Primary Survey by CII

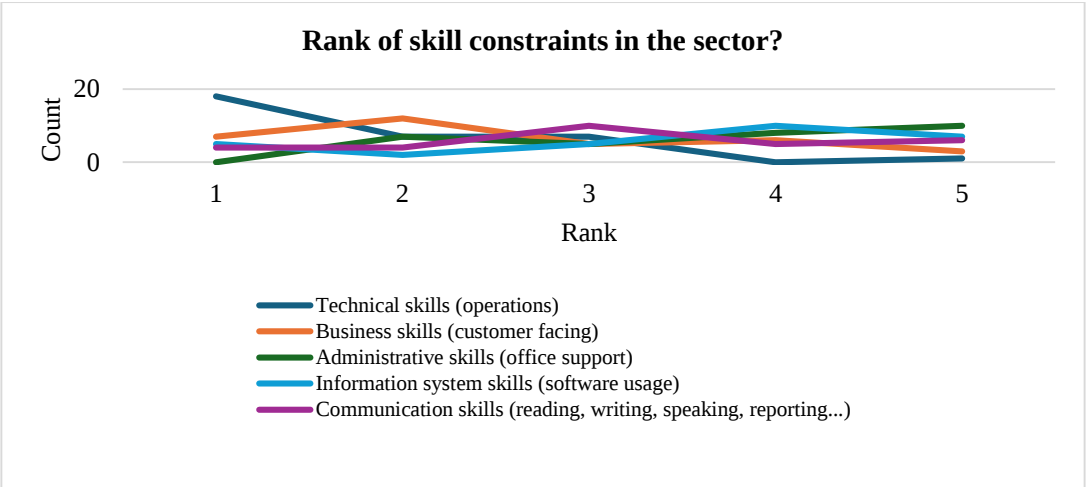
According to another six respondents, HR and hiring practices, particularly issues with labour contracting services, contributed to the problem. As to the 5 participants, the work environment and the perception of jobs as low-end affected the willingness of skilled workers to take up jobs in the sector. Finally, four respondents cited limited career growth and compensation as one of the barriers to attracting and retaining skilled workers in the industry.

The respondents were also asked to rank the skill constraints in the logistics sector. Based on the data provided by the 38 respondents, there is an apparent shortage of technical skills. Figure 14 shows that 18 respondents ranked technical skills (operations) as the highest constraint, followed by seven respondents placing technical skills in the second and third ranks.

In contrast, business skills (customer-facing) were identified as the second most crucial constraint, with seven respondents ranking them first and 12 placing them second. Administrative skills (office support) and information system skills (software usage) were more evenly distributed across the rankings, with most respondents ranking them in the fourth and fifth positions, suggesting moderate constraints in these areas. Communication skills (reading, writing, speaking, reporting) were also considered a constraint, with ten respondents ranking communication skills as the third most important constraint in the logistics sector.

Therefore, the data indicates that the shortage of technical skills is the most pressing issue. However, other areas, such as business skills, administrative skills, information system skills, and communication skills, also present significant constraints.

Figure 14: Ranking the Skill Constraints in the Respective Sectors (n=38)



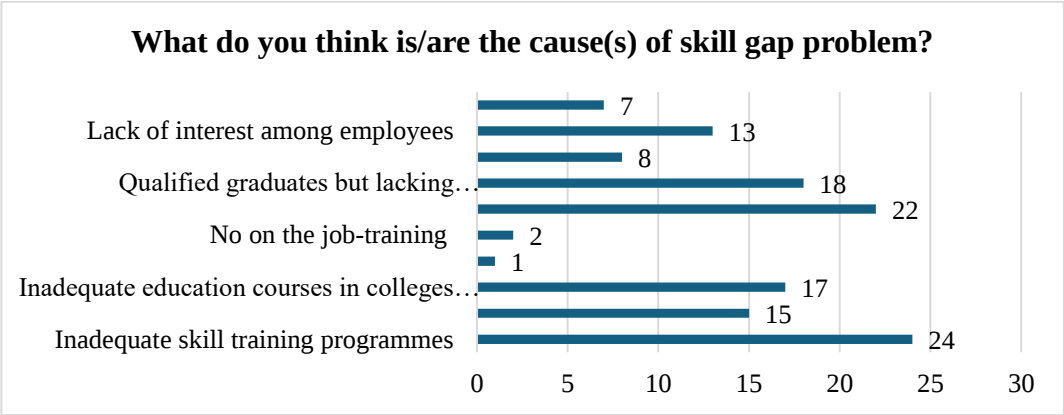
Source: Authors' compilation based on Primary Survey by CII

The participants were also asked to highlight the various causes of the skill gap problem in the sector. A significant number of respondents, 24 in total, identified inadequate skill training programs as the primary cause. This was followed by 22 respondents who suggested that the presence of qualified graduates lacking domain skills significantly contributed to the skill gap problem. Seventeen respondents cited inadequate education courses in colleges and universities as a cause of the skill gap problem. Additionally, 18 respondents noted that qualified graduates often lack essential communication skills, further contributing to the issue. On the other hand, 15 respondents indicated that inadequate budgets for skill training programs are one of the causes for the mismatch in demand and supply of skilled workforce in the logistics sector. Additionally, 13 respondents mentioned that a lack of interest among employees fuels the skill gap.

Furthermore, eight respondents also pointed to the lack of quality trainers, and 7 participants suggested that a high attrition rate caused the skill gap. Only a few respondents identified the lack of awareness of job opportunities (1 respondent) and the absence of on-the-job training (2 respondents) as significant issues. In summary, several

respondents identified multiple causes behind the skill gap problem. However, most pointed towards inadequate training programs, a lack of domain-specific skills among graduates, insufficient educational courses, and budgetary constraints as the primary causes.

Figure 15: Reasons for Skill Gap (n=38)

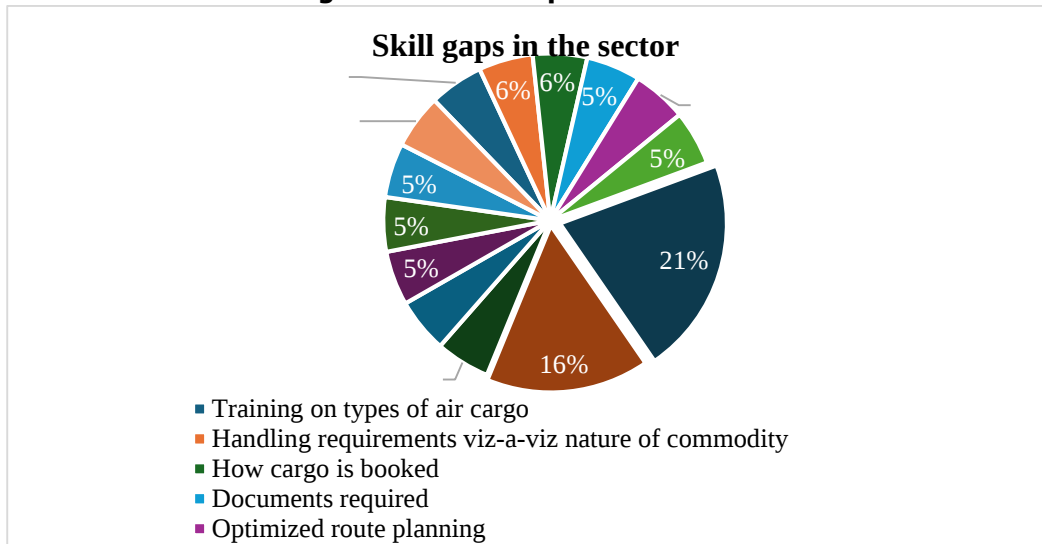


Source: Authors' compilation based on Primary Survey by CII

Sectoral Association View

The participants in the sectoral association interview were asked if the government's online training programs help bridge skill gaps in the logistics sector. However, as it was an open-ended question, most participants answered by identifying key skill gaps in the sector. Data analysis emerged as the most significant field, with four respondents identifying it as a crucial area requiring additional training. Cyber security was also highlighted, with three respondents suggesting the need for enhanced training in this arena. Respondents also mentioned other areas that require attention, including the understanding of air cargo types, handling requirements based on the nature of the commodity, cargo booking processes, required documentation, optimized route planning, and rate calculation. Additionally, participants suggested that training is needed in adaptability, technical skills, teamwork, soft skills, project management, and basic skills.

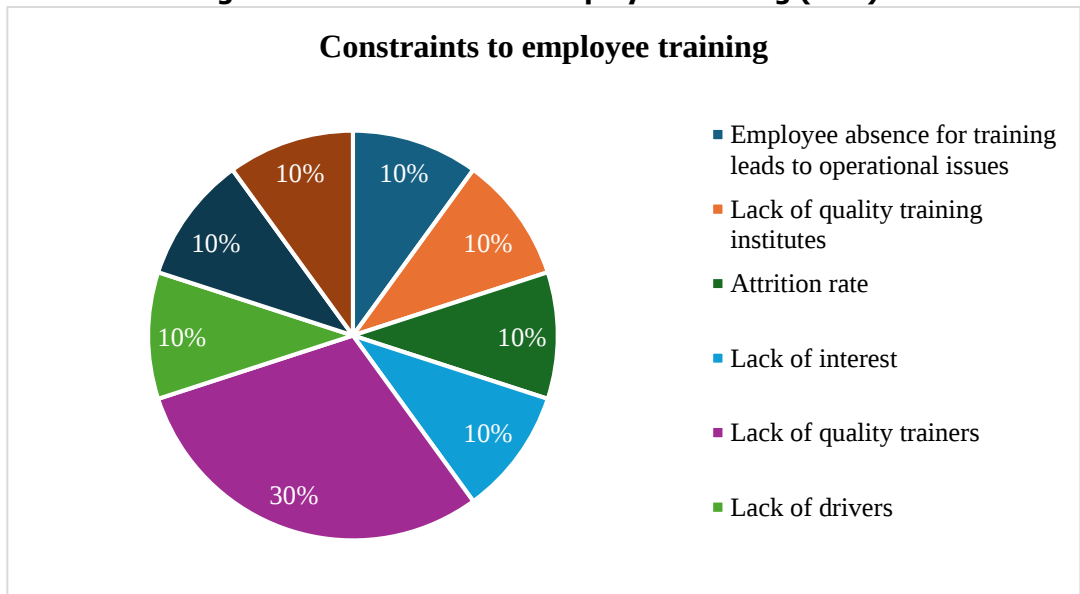
Figure 16: Skill Gaps in the Sector



Source: Authors' compilation based on Primary Survey by CII

The eight participants were also asked to identify some key constraints impacting employee training programs' effectiveness, as shown in Figure 17. The lack of quality trainers was identified as the most pressing challenge. Other constraints include operational disruptions caused by employee absences during training, lack of quality training institutes, and high attrition rates. Along with this, a lack of interest among employees, lower wages, and the overall cost of training also posed significant challenges.

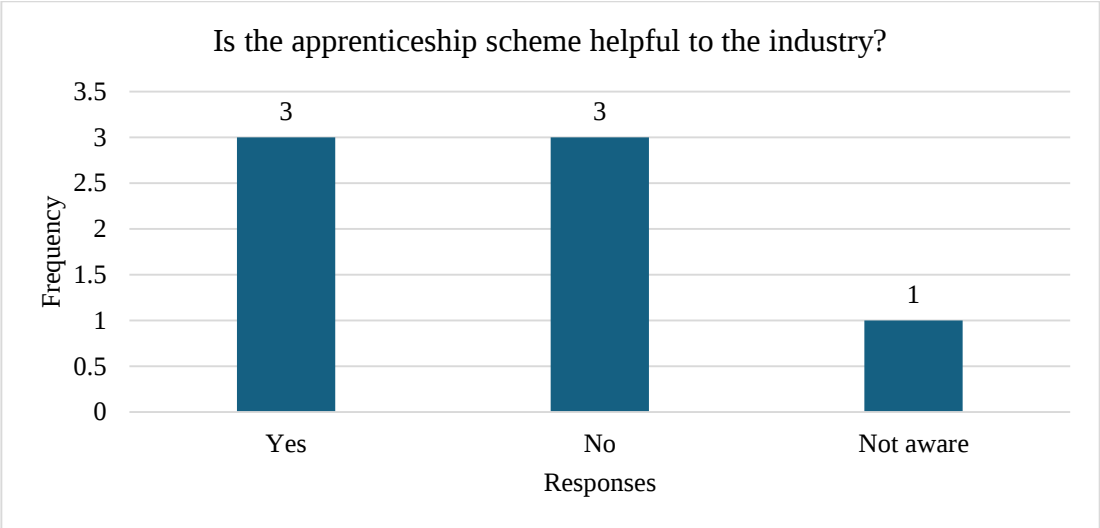
Figure 17: Constraints to Employee Training (n=8)



Source: Authors' compilation based on Primary Survey by CII

The respondents were also asked for their views on whether the apprenticeship scheme helped the industry (Figure 18). Of those who responded, 43 percent said yes, another 43 percent responded negatively, and the remaining 14 percent were unaware if the apprenticeship scheme would help the industry.

Figure 18: Usefulness of the Apprenticeship Scheme



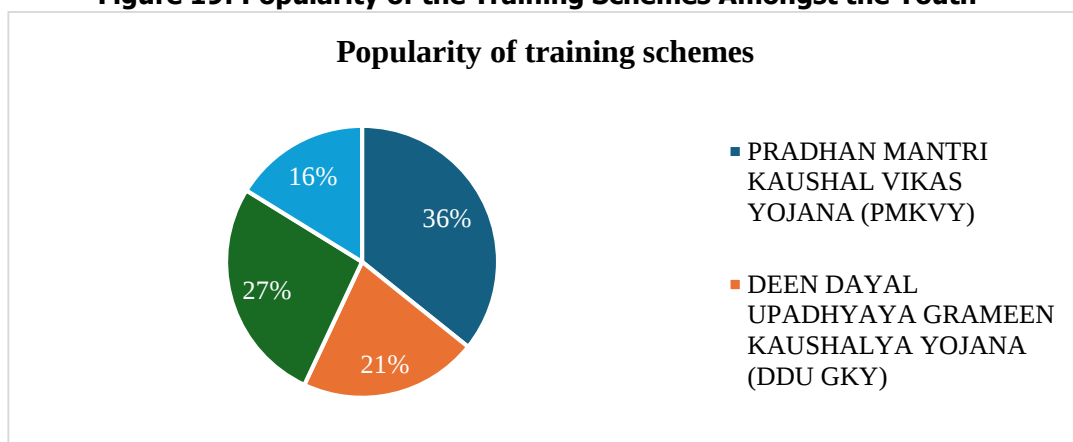
Source: Authors' compilation based on Primary Survey by CII

Youth Survey

The third stakeholder in this primary survey is the youth employed in the sector. Given the lower age, providing them with the proper training and skills will improve their long-term earnings and benefit the firm from their contributions. Further, given that the youth unemployment rate is very high, understanding the youth's perspective about how much training is beneficial to them will also help to upscale them, particularly in regions where the youth unemployment rates are very high.

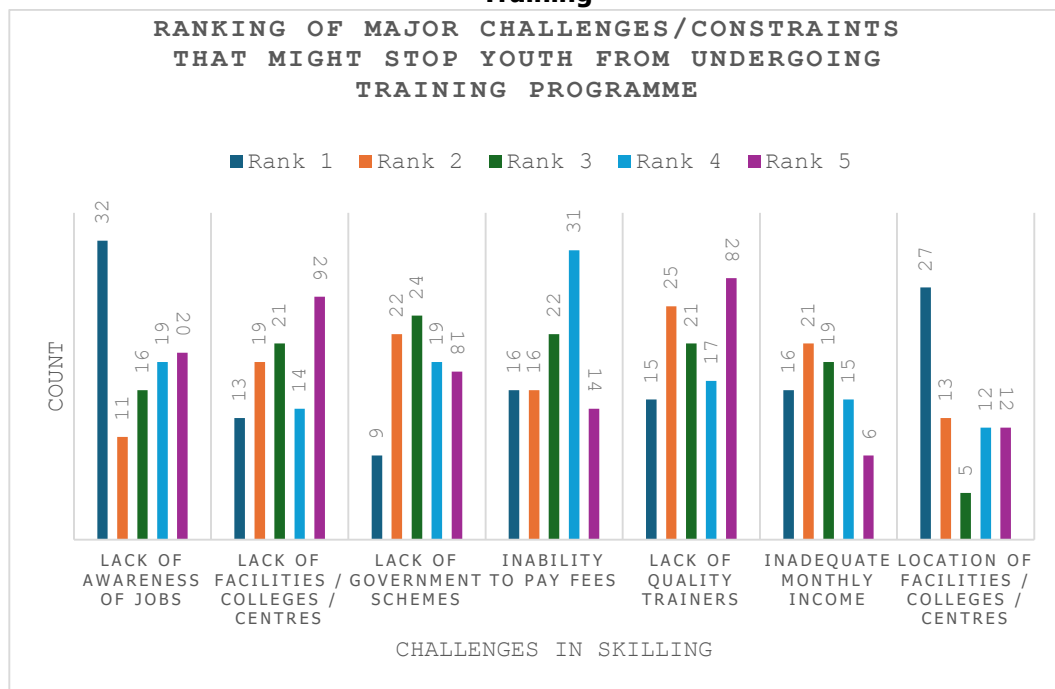
One of the questions that was put forth to the survey participants was whether or not they were aware of the various training schemes offered. Figure 19 shows the distribution of awareness of the multiple schemes among the youth. Most surveyed (64 respondents) recognized The Pradhan Mantri Kaushal Vikas Yojana (PMKVY). After that, most individuals (48 respondents) were also aware of the Apprenticeship Training Scheme – NAPS. Thirty-eight participants recognized the Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU GKY), while only 29 participants were familiar with the Recognition of Prior Learning (RPL) scheme.

Figure 19: Popularity of the Training Schemes Amongst the Youth



Source: Authors' compilation based on Primary Survey by CII

Figure 20: Ranking Major Challenges That Might Stop Youth from Undergoing Training



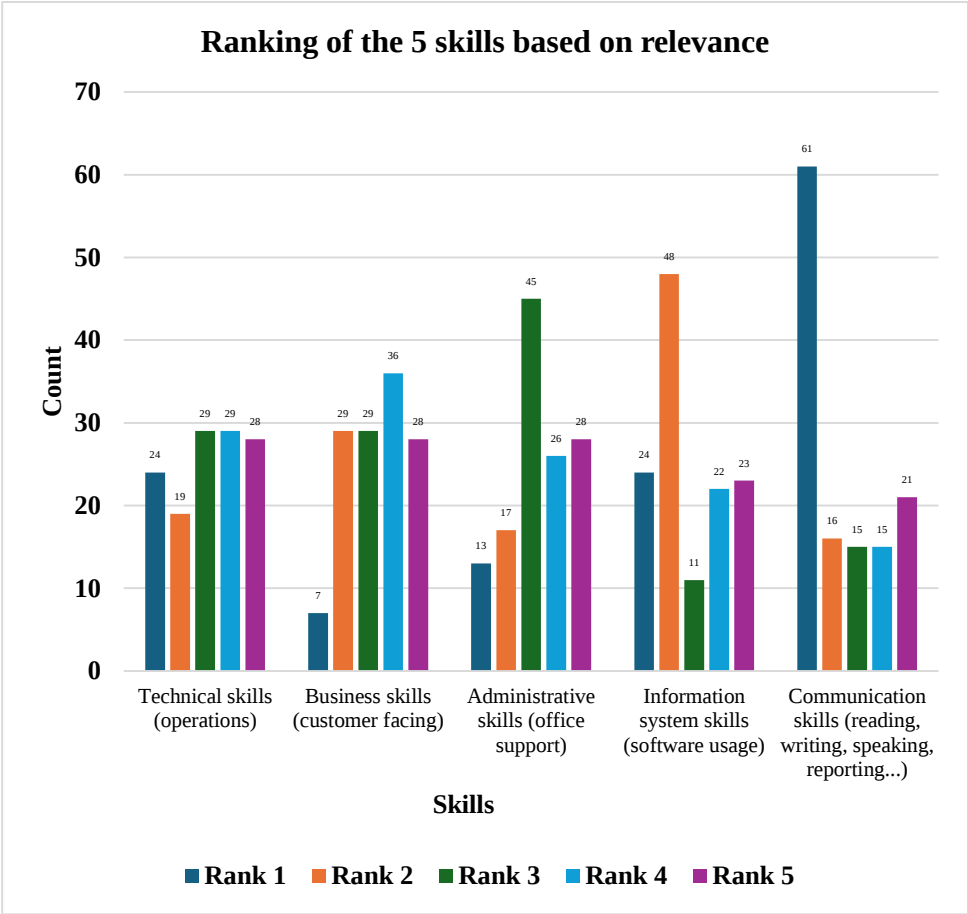
Source: Authors' compilation based on Primary Survey by CII

The participants were later asked to rank the major challenges preventing youth from undergoing training; the responses are given in Figure 20 below. The lack of awareness of job opportunities emerged as the most pressing issue, with 32 participants out of 129 participants ranking it as the most critical challenge. Lack of facilities, colleges, or centers followed, with 27 participants identifying it as a constraint in training. Sixteen respondents each opined that inability to pay fees and inadequate monthly income,

respectively, were the most relevant concerns that deterred the training of youth. In addition, according to 15 people, the lack of quality trainers was the major challenge. 13 people found the facility's location or college the major deterrent in preventing youth from engaging in training programs.

Figure 21 below shows that the main skill required was reported to be communication skills (reading, writing, speaking, and reporting). Sixty-one participants ranked them first. This is followed by the Information system skills (software usage), with 24 respondents ranking this as the most relevant skill for job performance and 48 people ranking this skill as the second most important skill. On the contrary, only seven respondents thought that business skills (customer-facing) were the most crucial skill required in the logistics sector.

Figure 21: Ranking the 5 Skills Based on Relevance Amongst the Youth



Source: Authors' compilation based on Primary Survey by CII

Chapter 5

CONCLUSIONS AND POLICY RECOMMENDATIONS

The logistics sector plays a pivotal role in the Indian economy by acting as a key enabler for other sectors of the economy and creating employment opportunities across a broad spectrum of skills. Despite the sector's potential for growth, a persistent skills gap remains a barrier. Current skilling and reskilling initiatives' insufficient scale and relevance further compound the challenge. As India strives to improve its global logistics ranking and enhance its economic output to a developed country level by 2047 under the 'Viksit Bharat 2047' vision, addressing these skill gaps becomes imperative. The Logistics Sector Skill Council and initiatives like PM Gati Shakti are critical steps toward fostering an efficient and skilled workforce, aligning with the broader goals of sustainable economic growth and inclusive development in the freight logistics sector in the country. This report focuses exclusively on the freight logistics sub-sectors, as defined by the National Industrial Classification (NIC) 2008. Specifically, it uses NIC 2-digit codes ranging from 49 to 53 but narrows down the analysis to relevant NIC 5-digit industries within this range, excluding those unrelated to freight logistics. By doing so, the report provides a more targeted and accurate examination of employment trends, skill gaps, and projections specific to the freight logistics sector and its subsectors.

The logistics sector maintained around a 6% share in total GVA from 2017-18 to 2022-23. While the sector experienced steady growth before COVID-19, the pandemic caused a temporary dip. Recovery post-pandemic has been strong. The sector's share of total employment has remained stable at around 2%, with freight logistics accounting for an increasing share of overall logistics employment, rising from 39% in 2017-18 to 46% in 2021-22.

Employment trends show a notable shift in the age composition of workers, with an increasing share of older workers (25-59 years) and a marginal recovery among younger workers (15-24 years) after a pandemic-induced decline. Educational levels among workers in the freight logistics sector are generally low, with the majority holding middle school or lower qualifications. However, there has been a positive trend toward higher education levels, especially among secondary and graduate-level workers, indicating some degree of upskilling.

Furthermore, participation in vocational training has increased significantly, especially in non-formal vocational training, while formal vocational training remains relatively low but steady. This reflects the growing importance of upskilling in response to industry demands and policy initiatives. Employment structure changes indicate an increase in regular workers and casual labourers. However, the share of self-employed (own account workers) has grown recently, raising concerns about job quality and social security protections. The sector remains dominated by male workers, with rural men comprising most of the workforce, while women's participation remains limited and concentrated in urban areas. Occupational shifts show a growing demand for basic labour roles, particularly

plant and machinery operators, while managerial positions have declined. Informal employment remains predominant, although there has been a slight increase in formal sector employment over the years, highlighting the ongoing challenges of informalisation in the logistics sector.

The analysis of employment patterns in the freight logistics subsectors reveals that the road transport sub-sector dominates employment, accounting for most workers. Other sub-sectors, such as rail, water, and air, show comparatively lower employment shares but have recently exhibited minor increases. The rail and water sectors maintained stable employment, while the air transport sector, though smaller, saw a gradual rise in employment from 2017-18 to 2022-23. At the regional level, States like Rajasthan, West Bengal, Uttar Pradesh, Tamil Nadu, and Maharashtra have consistently increased the workforce in the freight logistics sector over these years. The employment fluctuations across states like Punjab, Haryana, and Gujarat reflect regional dynamics, while states with more challenging terrain or economic conditions, like those in the northeastern region and hill states, have seen a decline in employment.

The employment forecasts for India's freight logistics sector through 2030 reveal steady growth, driven by increasing Gross Value Added (GVA) in the sector. The logistics sector, recovering strongly post-pandemic, is expected to expand significantly, with GVA projected to reach Rs. 17,36,159 crores by 2029-30, reflecting a compound annual growth rate (CAGR) of 6.67% during 2017-18 to 2029-30. Employment in the sector is also forecasted to grow, increasing from 7.2 million in 2017-18 to 10 million in 2022-23, and is expected to reach 15 million by 2029-30, with a CAGR of 6.18 %. The sub-sectors of freight logistics show varying degrees of employment growth. Road transport remains dominant, with employment expected to rise from 9 million in 2022-23 to 13.45 million by 2029-30. Rail, air, and water transport are also projected to grow, albeit at a slower pace, with rail expected to reach 0.59 million, air 0.34 million, and water 0.20 million by 2029-30. At the regional level, states like Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal, and Rajasthan show significant growth in logistics employment, with Maharashtra projected to increase from 7.4 lakh in 2017-18 to 14.2 lakh by 2029-30. Emerging states such as Bihar and Haryana are also expected to see strong employment growth. Northeastern states and union territories show relatively minor changes, with low employment growth.

The freight logistics sector shows a substantial skill gap among workers across subsectors. The proportion of workers without vocational training in the freight logistics sector is expected to decrease from 78% in 2017-18 to 36% by 2029-30. There is a potential trainable pool of around 5.33 million untrained workers across all subsectors by 2029-30. While the road sub-sector remains the largest employer, it also accounts for the highest number of untrained workers. This sub-sector, along with water transport, shows a gradual decline in the number of untrained workers. However, the air and rail sub-sectors are projected to see a slight increase in untrained workers by 2029-30. The largest skill gaps are seen in land transportation and courier services, accounting for a significant portion of untrained workers. Smaller but notable skill gaps are projected in warehousing, cold storage, rail freight, and air cargo. States with the highest logistics employment, such as Maharashtra, Tamil Nadu, Uttar Pradesh, and West Bengal, consistently show the highest number of workers without vocational training, peaking at over six lakhs in some

years. Gujarat and Andhra Pradesh also exhibit substantial skill gaps, fluctuating over time. The overall trend suggests that the skill gap will persist or even increase in most states by 2030, signalling a need for interventions to bridge these gaps.

The primary survey revealed several key insights into the skill gap challenges in India's logistics sector, as gathered from employers, industry associations, and youth. Employers find it challenging to upskill workers due to the rapid pace of technological advancements and evolving industry requirements. Apprenticeship schemes, while viewed positively by some, have not been universally effective or widely adopted, suggesting a need for better program design and implementation. Recruitment remains a critical challenge, with many organizations struggling to find skilled workers. Key factors contributing to this shortage include inadequate training programs, lack of awareness about skill requirements, and poor job perception. Technical skills, mainly operational expertise, were identified as the most pressing need, although notable gaps in business, communication, and administrative skills exist. The survey also revealed a strong preference for up-skilling and cross-training existing employees rather than complete re-skilling. Internal training programs are favored, especially for entry-level positions, while external training and government schemes like PMKVY and RPL are less popular but still relevant for specific roles. Addressing these findings involves enhancing training programs, improving job perceptions, and offering better career growth opportunities to bridge the skill gap effectively.

The sectoral association interviews identified data analysis and cybersecurity as critical areas needing enhanced training and specific skills related to air cargo handling, route planning, rate calculation, and documentation. Additionally, soft skills like adaptability, teamwork, project management, and technical skills were emphasized as necessary for workforce development. However, the effectiveness of employee training programs is unsatisfactory, primarily due to a shortage of quality trainers and training institutes. Other challenges include operational disruptions from employee absences during training, high attrition rates, and a general lack of interest in training. The cost of training and lower wages further complicate efforts to bridge the skill gap. Opinions on the apprenticeship scheme's effectiveness were divided, with an equal number of participants supporting and opposing its impact on the industry.

The survey among youth in the logistics sector highlights the critical role of proper training in enhancing their long-term earnings and contributions to the industry. Awareness of government training schemes varies, pointing to gaps in outreach and education about these programs. Major challenges preventing youth from undergoing training include a lack of awareness about job opportunities, insufficient training facilities, and financial constraints, such as the inability to afford fees and low monthly income. The absence of quality trainers and the location of training centers further deter youth participation in skill development programs. In terms of skill requirements, communication skills (reading, writing, speaking, and reporting) were identified as the most important for job performance, with information systems skills (software usage) also being crucial. In contrast, respondents ranked business skills like customer-facing abilities much lower in importance, indicating that technical and communication competencies are prioritized in this sector.

This research indicates that structural planning is necessary to address the structural labour market issues, and future planning is necessary to ensure a sufficient supply of labour with the appropriate skills. Expanding formal vocational training is essential to close the skills gap, especially since it's expected that by 2029-30, around 5.33 million workers will still be untrained. The government should focus on reducing this number, particularly in the road sector, which has the largest proportion of untrained workers. Emerging needs in the air, water, and rail sectors should also be considered. Partnerships between the government and industry can boost participation in vocational training, helping to create a skilled and adaptable workforce. Training programs tailored to the logistics sector adopting hybrid training models that combine online learning with practical sessions can reduce employee absences. The government can offer tax credits, subsidies, or grants for in-house programs or collaborations with educational institutions to encourage companies to invest in training.

Expanding skill development programs that involve both the government and industry, like the PMKVY, and making them more accessible, particularly in regions with high youth unemployment, is key. More training centers and financial help through subsidies or scholarships can also reduce barriers for young people. Additionally, improving the quality of trainers through certification and upskilling programs and encouraging leading industry experts to offer training services are vital. Customizing programs for specific sub-sectors within logistics can improve their relevance and effectiveness. The government needs to rethink the apprenticeship programs to align with the latest industry requirements, offering better incentives for both employers and participants. Greater awareness and more structured mentorship programs can increase participation and effectiveness. Promoting the use of e-learning platforms and online certification programs to help workers stay updated with technological advancements in the logistics sector would be desirable.

The government should also work on better platforms to match job seekers with employers, using job fairs, educational partnerships, and online portals like the AICTE Job Portal.

Investing in logistics infrastructure in states with high potential, such as Bihar, Rajasthan, and Haryana, alongside established logistics hubs like Maharashtra, Tamil Nadu, and Uttar Pradesh, can reduce regional employment inequalities. Given the predominance of small enterprises in the logistics sector, support measures such as financial incentives, easier access to credit, and training programs tailored for smaller firms can help improve productivity and employment conditions in this segment. Encouraging female participation in the freight logistics sector should be a priority. Targeted initiatives such as skills training for women, gender-sensitive workplace policies, and flexible working arrangements could help bridge the gender gap in the sector. Finally, policies should aim to reduce informality in the logistics sector. With the rise in self-employment and casual work, it is important to establish regulations that safeguard the rights and welfare of these workers. Policies aimed at formalizing employment contracts, expanding social security coverage, and ensuring minimum wage protections will enhance the overall job quality in the sector.

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GLOSSARY

CAGR	Compound Annual Growth Rate
CII	Confederation of Indian Industries
CSO	Central Statistical Office
DDU GKY	Deen Dayal Upadhyaya Grameen Kaushalya Yojana
FY	Financial year
GDP	Gross Domestic Product
GVA	Gross Value Added
ILO	Indian Labour Organisation
LSC	Logistics Sector Skill Council
MoSPI	Ministry of Statistics and Programme Implementation
NAPS	National Apprenticeship Promotion Scheme
NAS	National Accounts Statistics
NIC	National Industrial Classification
NSDC	National Skill Development Corporation
NSO	National Statistical Office
OECD	Organization for Economic Co-operation and Development
PLFS	Periodic Labour Force Survey
PMKVY	Pradhan Mantri Kaushal Vikas Yojana
RPL	Recognition of Prior Learning
SOP	Standard Operating Procedures
Skill Gap	A "Skill gap" is where an employee is not fully skilled, i.e., the number of workers without any vocational training (formal or non-formal)
Skill Shortage	A "Skill shortage" is the inability to find employees with the appropriate skills, qualifications, or experience

APPENDICES

A. Methodology

Data Analysis

The sector profile uses data from the Periodic Labour Force Survey (PLFS) to analyse the trends in the logistics sector in India. The PLFS, was conducted by the National Statistical Office (NSO) (2017-18 to 2022-23) under the Ministry of Statistics and Program Implementation (MoSPI) to measure employment and unemployment in India. The survey's Usual Status (Principal and Subsidiary Status) approach is one way to measure employment/unemployment in India. Unit record data using the Usual Status refers to the detailed, individual-level data collected from the PLFS based on principal status plus the subsidiary status of respondents. It is the primary source of data for the employment and unemployment situation of the country. For forecasting purposes, the data on employment and skill-gap estimates from 2017-18 to 2022-23 are obtained through the PLFS.

The data on the logistics sector Gross Value Added (GVA) is sourced from the National Account Statistics (NAS) statement, available from the Central Statistical Office (CSO). The CSO provides GVA by economic activity at constant (2011-12) prices from 2017-18 to 2021-22. This is used for calculating GVA projections till 2029-30 and subsequently employment projections till 2029-30. Further details can be found here: Source: <https://www.mospi.gov.in/publication/national-accounts-statistics-2023>

The data on Gross Domestic Product (GDP) at constant (2011-12) for the Indian economy are sourced from Statista. This is used for calculating GVA projections. Further details can be found at: <https://www.statista.com/statistics/1320092/india-value-of-gross-domestic-product>

Forecasting Methodology

The projection of employment is made assuming that employment (labour demand) is a function of gross value added (Output) and time. The US Bureau of Labour Statistics³ makes employment projections assuming a similar functional relationship between employment and output and time in addition to the relative wage rate. We are not using a relative wage rate in our estimation because we do not have a measure of output prices for the freight logistic sector or subsectors. The methodology and variables used in the various projections are detailed below:

Forecasting employment for the freight logistics sector in India 2023-24 to 2029-30:

- i. The employment estimates data availability for the freight logistics sector in India is from 2017-18 to 2022-23 from the Periodic Labour Force survey.
- ii. Forecasting the employment estimates from 2023-24 to 2029-30 is done by regressing employment as a linear function of Gross Value Added (output) and time using the data on employment and gross value added (GVA) from 2017-18 to

³ **Source** - <https://www.bls.gov/emp/documentation/projections-methods.htm#:~:text=The%20regression%20model%20utilizes%20industry,is%20extrapolated%20using%20historical%20data.>

- 2022-23. The coefficients of GVA, time variable, and intercepts obtained from the regression equation are used to forecast the employment for 2023-24 onwards. The R-square for the fitted regression is 0.97 and the Adjusted R-square is 0.94. The F-test statistic for the overall significance of the regression is statistically significant at 1 percent.
- iii. The data on the logistics sector gross value added is sourced from the National Account Statistics statement, available from the Central Statistical Office (CSO). The CSO provided gross value added by economic activity at constant (2011-12) prices from 2017-18 to 2021-22. Since data on the GVA is required for the entire period of analysis until 2030, GVA estimates are forecasted by regressing the GVA in the logistics sector as a function of India's GDP at constant (2011-12) prices and time. The data on GDP at constant (2011-12) for the Indian economy are sourced from Statista⁴. The R-square for the fitted regression is 0.61 and the Adjusted R-square is 0.22. The F-test statistic for the overall significance of the regression is statistically insignificant.

Forecasting employment estimates for the four engines mentioned in the PM Gati-Shakti from 2023-24 to 2029-30:

- i. The PM Gati Shakti subsector-wise employment estimates are forecasted by regressing employment in each subsector (Road, Rail, Water, and Air) as a linear function of GVA in each of the subsectors and time for the period from 2017-18 to 2022-23 and using the coefficients and intercepts value from this regression to forecast the employment for the subsequent years. The R-square for the fitted regression for the Road sector is 0.95 and the Adjusted R-square is 0.92. The F-test statistic for the overall significance of the regression for the Road sector is statistically significant at 1 percent. The R-square for the fitted regression for the Rail sector is 0.67 and the Adjusted R-square is 0.45. The F-test statistic for the overall significance of the regression for the Rail sector is statistically insignificant. The R-square for the fitted regression for the Water sector is 0.37 and the Adjusted R-square is -0.06. The F-test statistic for the overall significance of the regression for the Water sector is statistically insignificant. The R-square for the fitted regression for the Air sector is 0.62 and the Adjusted R-square is 0.36. The F-test statistic for the overall significance of the regression for the Air sector is statistically insignificant.
- ii. The CSO provides sector-wise GVA used in the above main regression from 2017-18 to 2021-22. We forecast the subsector-wise GVA from 2022-23 onwards by regressing subsector GVA as a linear function of GVA in the logistics sector and time. The R-square for the fitted regression for the Road sector is 0.99 and the Adjusted R-square is 0.99. The F-test statistic for the overall significance of the regression for the Road sector is statistically significant at 1 percent. The R-square for the fitted regression for the Rail sector is 0.90 and the Adjusted R-square is 0.80. The F-test statistic for the overall significance of the regression for the Rail sector is statistically insignificant. The R-square for the fitted regression for the Water sector is 0.61 and the Adjusted R-square is 0.22. The F-test statistic for the overall significance of the regression for the Water sector is statistically insignificant. The R-square for the fitted regression for the Air sector is 0.90 and

⁴ Source - <https://www.statista.com/statistics/1320092/india-value-of-gross-domestic-product>

- the Adjusted R-square is 0.80. The F-test statistic for the overall significance of the regression for the Road sector is statistically significant at 10 percent.
- iii. We calculate the employment elasticity of output for each sub-sector, which measures the percentage change in employment due to a unit percentage change in output. This elasticity reflects how responsive employment is to output growth. To estimate it, we first obtain the coefficient of sub-sectoral GVA from the regression of sub-sectoral employment on GVA and time (for the period 2017-18 to 2022-23), explained in step (i) above. This coefficient, representing the marginal effect of output on employment, is then multiplied by the ratio of the average output to the average employment over the same period to calculate the elasticity, i.e., $elasticity = \frac{\partial(employment)}{\partial(GVA)} \times \frac{\overline{GVA}}{\overline{employment}}$. The employment elasticity of output for the road logistics sector is estimated to be 0.11 for the period 2017-18 to 2022-23. This indicates that a 1% increase in the road sector's output is associated with a 0.11% increase in employment. Similarly, the employment elasticity of output during 2017-18 to 2022-23 for the rail, water, and air logistics sectors are estimated to be 1.14, 3.77, and 0.75, respectively. These values indicate notable differences in the responsiveness of employment to output growth across the sectors. The rail and water sectors exhibit elastic employment responses, with elasticities greater than 1. This means that a 1% increase in output leads to a 1.14% increase in employment in the rail sector and an even higher 3.77% increase in the water sector. In contrast, the air sector, with an elasticity of 0.75, shows an inelastic response, meaning a 1% increase in output results in a 0.75% increase in employment. The high elasticity in the water and rail sectors suggests significant employment growth potential relative to output increases, while the more modest elasticities in the road and air sectors indicate comparatively lower, yet positive, employment gains with output. The overall employment elasticity for India's freight logistics sector from 2017-18 to 2022-23 is estimated to be 0.25, indicating that a 1% increase in output across the sector is associated with a 0.25% increase in employment.

Forecasting employment estimates for the Nine subsectors (LSC) of the freight logistics from 2023-24 to 2029-30:

The employment estimates for each of the nine subsectors from 2017-18 to 2022-23 are calculated using the PLFS data.

- i. Since nine subsector-wise GVA is not available from the CSO, the average share of employment of each of these nine subsectors in the total employment in the freight logistics sector from 2017-18 to 2022-23 is calculated.
- ii. Each subsector-wise average share of employment is used to estimate the employment forecast from 2023-24 to 2029-30 as a proportion of the employment forecasts for the freight logistics sector.

Forecasting state-wise employment estimates of the freight logistics from 2023-24 to 2029-30:

- i. The state-wise employment estimates from 2017-18 to 2022-23 are calculated using the PLFS data.
- ii. Since the state-wise GVA for the logistics sector is not available from the CSO, the average share of employment of each of the states in the total employment in the freight logistics sector from 2017-18 to 2022-23 is calculated.

- iii. Each state's average share of employment is used to estimate the employment forecast from 2023-24 to 2029-30 as a proportion of the employment forecasts for the freight logistics sector.

Forecasting subsectors and State-wise skill gap estimates of the freight logistics from 2023-24 to 2029-30:

- i. The skill gap is measured as the number of workers without any vocational training (formal or non-formal vocational training).
- ii. The four sub-sector wise (Road, Rail, Water, and Air) number of workers without vocational training from 2017-18 to 2022-23 is estimated from the PLFS data.
- iii. The four subsector-wise number of workers without vocational training from 2023-24 to 2029-30 is forecasted by regressing the number of workers without vocational training as a linear function of employment in each sub-sector and time. The R-square for the fitted regression for the Road sector is 0.80 and the Adjusted R-square is 0.65. The F-test statistic for the overall significance of the regression for the Road sector is statistically significant at 10 percent. The R-square for the fitted regression for the Rail sector is 0.90 and the Adjusted R-square is 0.83. The F-test statistic for the overall significance of the regression for the Rail sector is statistically significant at 5 percent. The R-square for the fitted regression for the Water sector is 0.99 and the Adjusted R-square is 0.98. The F-test statistic for the overall significance of the regression for the Water sector is statistically significant at 1 percent. The R-square for the fitted regression for the Air sector is 0.91 and the Adjusted R-square is 0.84. The F-test statistic for the overall significance of the regression for the Road sector is statistically significant at 5 percent.
- iv. The state-wise estimates are based on the share of each state in the overall number of workers without vocational training during 2017-18 to 2022-23. We use these average shares to estimate the skill gap for the following years by taking this share in the overall forecast of number of workers without vocational training from 2023-24 to 2029-30 estimated earlier.

Primary Survey (Interviews)

Qualitative fieldwork in the form of primary surveys was conducted by the Confederation of Indian Industry (CII) to assess the skill gap in the logistics sector in India. As a part of the primary survey, member interviews, sectoral association interviews, and youth surveys were conducted which provided a rich and more detailed understanding of this project.

- For the member interviews, 64 individuals from different organisations from different states were interviewed.
- In the second phase of the industry-level survey on the skill gap in the logistic sector in India, the top executives from 48 companies were interviewed to draw insights on the challenges faced in recruiting skilled workers, suggested skilled training, salary increments, and apprenticeship schemes.
- In the third phase of the primary survey, individuals from 38 companies were interviewed to capture the industry views on the logistics sector.

- The sectoral association interviews, following the CII online survey, identified challenges in the logistics industry to formulate practical solutions. 8 individuals from different organisations were interviewed.

Finally, in the youth survey, 129 individuals between the ages of 17 to 27 years participated.

B. Interview Questionnaire

The interview questions are provided below:

Table 32: Member Interviews Questionnaire for Assessment of Logistics Skill Gap in India

Questions	Answers
Response ID	
Response status	
Time taken	
Collector	
Company	
State	
Designation	
Subsector	
What is the attrition rate (percentage) in \${Q-J} segment?	
Highlight 3 to 5 main reasons for attrition. [Attrition rate reason 1]	
Highlight 3 to 5 main reasons for attrition. [Attrition rate reason 2]	
Highlight 3 to 5 main reasons for attrition. [Attrition rate reason 3]	
Highlight 3 to 5 main reasons for attrition. [Attrition rate reason 4]	
Highlight 3 to 5 main reasons for attrition. [Attrition rate reason 5]	
In your view, is there a steady supply of skilled workforce in Logistics and Supply chain functions?	
What are the possible reasons for the short supply? [Attrition rate reason 1]	
What are the possible reasons for the short supply? [Attrition rate reason 2]	
What are the possible reasons for the short supply? [Attrition rate reason 3]	
What are the possible reasons for the short supply? [Attrition rate reason 4]	
What are the possible reasons for the short supply? [Attrition rate reason 5]	
List the job roles that have a steady supply and weak supply. [Steady supply] [Job role 1]	

List the job roles that have a steady supply and weak supply. [Steady supply] [Job role 2]	
List the job roles that have a steady supply and weak supply. [Steady supply] [Job role 3]	
List the job roles that have a steady supply and weak supply. [Weak supply] [Job role 1]	
List the job roles that have a steady supply and weak supply. [Weak supply] [Job role 2]	
List the job roles that have a steady supply and weak supply. [Weak supply] [Job role 3]	
In your view, what are the challenges in attracting and recruiting skilled human resources in Logistics and supply chain functions? Highlight them for all three levels – top, mid and entry levels. Wherever possible provide insights (examples) highlighting possible reasons, potential solutions / good practices.	
In your view, what are the challenges in the retention of skilled human resources in Logistics and supply chain functions? Provide insights (examples) on key factors and good practices.	
Do you see any challenges in the re-skilling or upskilling of human resources in the \${Q-J} segment?	
Please highlight any good practices you follow.	
Provide insights (examples) on factors influencing re-skilling or upskilling.	
Are you willing to allocate CSR funds for skill development projects?	
Tell us about any University, vocational and in-house or industry training courses that focused on \${Q-J} from your experience.	
Are there any international courses that are preferred for any of the \${Q-J} segment? For example, Dangerous goods handling, Equipment operations, Safety....	
List preferred international courses in \${Q-J} [Course or Certification name 1]	
List preferred international courses in \${Q-J} [Course or Certification name 2]	
List preferred international courses in \${Q-J} [Course or Certification name 3]	
How do you rate the quality of available logistics skill courses? 1: Below Average2: Average4: Good5: Excellent Comment on faculty, trainers, classrooms and labs, program structure, fees, study material, on-the-job training, equipment, technology, etc.	
How do you rate the quality of available logistics skill courses? 1: Below Average2: Average4: Good5: Excellent Comment on faculty, trainers, classrooms and labs, program structure, fees, study	

material, on-the-job training, equipment, technology, etc. [Comments]	
In your view. what are the key factors influencing the quality of skill courses?	
Is there a need to focus on courses related to emerging technologies readiness? For example, drone operators, AGV control, picking systems and equipment...	
Provide us with some insights about such training programs in the near-term future.	
The logistics sector has employed over 20-25 million people across job roles in tier 1, 2 and 3 cities and continues to create job opportunities for the unorganized workforce in India. From your perception of the demand trend, what is the estimated skilled logistics workforce by 2030 required in India?	
What are your views on meeting the anticipated demand \${Q-BF}\$ human resources gap? Such as impact on \${Q-J}\$ growth, quality of service, competitiveness...	
Where should the focus be on - vocational education, skill and training initiatives?	
What kind of initiatives are expected from the (Central / State) Government to improve skilled workforce availability in the \${Q-J}\$ sector?	
What is your view on the current \${Q-J}\$ training infrastructure in the country?	
What is your view on the quality of the training? Any suggestions to improve the quality of training?	
The Apprenticeship Rules, 1992, Rule-7B All establishments having work force (regular and contract employees) of 30 or more are mandated to undertake Apprenticeship Programs in a range from 2.5per cent -15per cent of its workforce (including direct contractual employees) every year. Download FAQ on Apprentice Act	
Is the Apprenticeship scheme helpful to the industry?	
What are the direct and indirect benefits?	
Tell us about Apprentice scheme challenges from your observations.	
What should be done to improve awareness of the apprenticeship scheme?	
Are you planning to utilize the apprenticeship scheme in \${Q-J}\$ functions?	
How many apprentice positions are likely to be opened in your organization?	

Table 33: Industry Views (Phase 2) Interview Questionnaire

Questions	Answers
Response ID	
Response status	
Survey URL accessed by the respondent	
Time taken	
Collector	
Designation	
Sub-sector type	
Total number of operating locations in India	
Major operating locations in India [Location 1] [State / UT]	
Major operating locations in India [Location 1] [District]	
Major operating locations in India [Location 1] [Pincode]	
Major operating locations in India [Location 2] [State / UT]	
Major operating locations in India [Location 2] [District]	
Major operating locations in India [Location 2] [Pincode]	
Major operating locations in India [Location 3] [State / UT]	
Major operating locations in India [Location 3] [District]	
Major operating locations in India [Location 3] [Pincode]	
Major operating locations in India [Location 4] [State / UT]	
Major operating locations in India [Location 4] [District]	
Major operating locations in India [Location 4] [Pincode]	

Continued...

Major operating locations in India [Location 5] [State / UT]	
Major operating locations in India [Location 5] [District]	
Major operating locations in India [Location 5] [Pincode]	
Major operating locations in India [Location 6] [State / UT]	
Major operating locations in India [Location 6] [District]	
Major operating locations in India [Location 6] [Pincode]	
Major operating locations in India [Location 7] [State / UT]	
Major operating locations in India [Location 7] [District]	
Major operating locations in India [Location 7] [Pincode]	
Major operating locations in India [Location 8] [State / UT]	
Major operating locations in India [Location 8] [District]	
Major operating locations in India [Location 8] [Pincode]	
Major operating locations in India [Location 9] [State / UT]	
Major operating locations in India [Location 9] [District]	
Major operating locations in India [Location 9] [Pincode]	
Major operating locations in India [Location 10] [State / UT]	

Major operating locations in India [Location 10] [District]	
Major operating locations in India [Location 10] [Pincode]	
List current job role titles in your organization and levels.	
What methods do you primarily use for sourcing skilled workers?	
Do you offer or willing to offer higher salaries or better benefits to attract and retain certified / skilled workers?	
If yes, what is the percentage difference between non-certified and certified skilled workers?	
If "No", how do you think certified and skilled workers will get encouragement in finding jobs?	
Are you currently experiencing an increase in demand for skilled workers within \${Q-E}	
Are you currently facing challenges in finding and recruiting skilled workers to meet your organization's needs?	
If yes, highlight the reasons for shortage of skilled workers?	
How would you describe the rate of demand growth for skilled workers in subsector in past two years?	
What specific job roles are in highest demand within \${Q-E}? Please list	
What are the new job roles related to emerging technologies do you think may be in created in near future?	
What actions would you like to suggest to improve skill levels in \${Q-E}?	
Indicate two (2) good practices to bridge the gap between supply and demand for skilled workers in existing and emerging job roles in subsector?	
Suggest two (2) new initiatives to bride the skill gaps in subsector	
The Apprenticeship Rules, 1992, Rule-7BAll establishments having work force (regular and contract employees) of 30 or more are mandated to undertake Apprenticeship Programs in a range from 2.5per cent -15per cent of its workforce (including direct contractual employees) every year. Download FAQ on Apprentice Act	
Is the Apprenticeship scheme helpful to the industry?	
Tell us about Apprentice scheme challenges from your observations.	
What should be done to improve awareness of the apprenticeship scheme?	
Are you planning to utilize the apprenticeship scheme in \${Q-E} functions?	
How many apprentice positions are likely to be opened in your organization?	
Do you collaborate with educational institutions or industry organizations to bridge the gap between the supply and demand of skilled workers in \${Q-E}?	
Suggest key actions for attracting and retaining skilled workforce from the below list	

Table 34: Industry Views (Phase 3) Interview Questionnaire

Questions	Answers
Sr_No	
ResponseId	
Prefix	
Organisation Name	
Designation	
State	
Sub-Sector	
Are companies able to get candidates with desired level of education qualification?	
Are you aware about NPTEL or SWAYAM online education platforms?	
Are you currently facing challenges in finding and recruiting skilled workers to meet your organization's needs?	
Are you from a CII member organisation	
Describe the type Research and Development activity in brief.	
Desired educational qualification for Entry level management roles (Operators)	
Desired educational qualification for Middle level management roles (Managers)	
Desired educational qualification for TOP management roles (General Manager)	
Do you collaborate with educational institutions or industry organizations to meet demand for skilled workers?	
Do you have Research and Development in your organization?	
Do you offer or willing to offer higher salaries or better benefits to attract and retain certified / skilled workers?	
How many states your organization has operational office presence	
If yes, highlight the reasons for shortage of skilled workers?	
If yes, what is the percentage difference between non-certified and certified skilled workers?	
Is the Apprenticeship scheme helpful to the industry?	
Suggest key actions for attracting and retaining skilled workforce from the below list	
Suggest two (2) new initiatives to bridge the skill gaps in subsector	
Tell us about your views on emerging technologies (AI, automation, green technologies...) impact, challenges in training and re	
Type of organization ownership	
What are the new job roles related to emerging technologies do you think may be created in near future?	
What are the top three to five skills that are necessary in your sector? Highlight any skill gaps that you have noticed.	
What do you think is/are the cause(s) of skill gap problem?	
What do you think should be ideal duration for effective training programme in your sector?	
What specific job roles are in highest demand in your sector? Please list	

What type of actions do you suggest for improving training effectiveness?	
What type of support or partnerships from Government and Industry associations do you expect in training?	
IPAddress	
CreateDate	
Rank the skill constraints: Technical skills (optional), Business skills (customer facing), Admin skills (Office support), Information system skills (Software Usage), Communication skills (reading, writing, speaking, reporting,...)	

Table 35: Sectoral Association Interviews Questionnaire

Questions	Answers
Title	
Name	
State	
Exact geographic location	
Sub sector	
Designation	
Is your association taking up vocational education, skill and training initiatives? Briefly, provide some insights on your action plans.	
Apart from PMKVY, are you aware of NPTEL or SWAYAM online education platforms. Can online training programs by the government help bridge skill gaps in your sector?	
Are there any such Research and Development promoting initiatives by the association?	
If yes, please briefly mention key Research and Development projects	
What kind of Research and Development would you like to encourage for members to be engaged?	
Do you have any collaborations with educational institutions or training providers to enhance employee skills. What is the nature of these collaborations.	
Are you aware any of the existing government initiatives to reduce skill gaps in the logistics sector? Please list a few.	
Constraints to employee training?	
Is the Apprenticeship scheme helpful to the industry? Yes / No	
Future skills and emerging technology adoption?	
If yes, what are the direct and indirect benefits of the Apprentice scheme?	
Tell us about Apprentice scheme challenges from your observations.	
What should be done to improve awareness of the apprenticeship scheme?	
What is the share of workers (percentage) protected by the social security benefits? If possible, distribution by male/female and migrants/non-migrants.	

What is the share of workers (percentage) having a written job contract? If possible, distribution by male/female and migrants/non-migrants	
Male to female population ratio?	
What is the average daily or monthly salaries of the three categories of employees: White, grey and blue? Distribution by gender What percentage (per cent) of workers is protected by social security benefits?	
What percentage (per cent) of migrant workers in the logistic subsector you are engaged in?	

Table 36: Youth Survey

Questions	Answers
Prefix	
First name	
Last name	
Organisation Name	
Are you from a CII member organisation: Yes/No	
Email	
Mobile(optional)	
Gender: Male/Female	
Age (in years)	
What describes your current profile: Student enrolled in college education/ graduated recently and employed/ self-employed/ no educational qualification and formal employment	
Which segment in logistics are you interested to work or currently working: Land transportation/warehousing/courier&express/cold chain logistics solutions/Exim logistics/inland waterways & marine services/ port terminals/ ICD & CFS/ air cargo operations/ e-commerce/ liquid logistics/ rail logistics	
What is the nature of your study: University degree in India/ university degree outside India/vocational diploma/graduation/Private training	
If you are a student, do you plan to work after completing your current level of Study: Yes/No	
If you are a student, which industry would you like to work or initiate a business after completing your current level of study: Automobile/logistics/banking & financial services/consumer goods/ heavy engineering/construction. Pharma & healthcare/other	
If you are employed (0-3 years' experience), which sub-sector are you employed in the Logistics: Land transportation/warehousing/courier&express/cold chain logistics solutions/exam logistics/inland waterways & marine services/ port terminals/ ICD & CFS/ air cargo operations/ e-commerce/ liquid logistics/ rail logistics	

Continued...

If you are employed, what is the type of firm that you are employed: Private firm less than 250cr turnover/ private form more than 250cr turnover/ company listed in stock market/ multi-national company	
If you are employed, do you see possibility of career and income growth in your job: Yes/No	
If you are employed, do you have a written or a verbal contract: I do not have any work contract/I have a verbal contract/Working as an intern or project work/ I have a written contract or job offer letter	
What is the nature of your work? Fulltime/seasonal/ part-time but for a continuous duration throughout the year/occasional or irregular or gig work	
If you are unemployed, how long have you been actively looking for a job? Searching since 1 month/6 months/12 months/ more than 1 year	
Are you interested in pursuing opportunities as a Gig Worker (E-commerce fulfilment, Courier...) – short-term contract-based job)? Yes/no	
Tell us more about what should be done to improve employability. *	
Rank from 1 to 5 skills are most relevant for a job/work: Technical skills (operations)/ business skills (customer facing)/ admin skills (office support)/ information system skills (software usage)/ Communication skills	
Which among the below training schemes are you aware? PMKVY/ DDUGKY/NAPS/RPL	
Rank from 1 to 5 major challenges/constraints do you think that would stop youth from undergoing training programme? *lack of awareness of jobs/ lack of facilities or colleges or centres/ lack of govt schemes/ inability to pay fees/ lack of quality trainers/ inadequate monthly income/ location of colleges or centres or facilities	
Are you willing to migrate out of your native place for work? * yes/no	

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