LABOR MARKET ASSESSMENT

In Punjab

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Acronyms

ADB	**Asian Development Bank**
CNC	**Controllers and Operators of Control**
EU	**European Union**
GIZ	**Deutsche Gesellschaft für Internationale Zusammenarbeit**
ILO	**International Labour Organization**
M&E	**Monitoring and Evaluation**
NAVTTC	**National Vocational and Technical Training Commission**
NSIS	**National Skills Information System**
OECD	**Organisation for Economic Co-operation and Development**
PBS	**Pakistan Bureau of Statistics**
PLCs	**Programmable Logic Controllers**
PSDA	**Punjab Skills Development**
PSDF	**Punjab Skills Development Fund**
PVTC	**Punjab Vocational Training Council**
SSP	**Sector Support Programme**
TEVTA	**Technical Education and Vocational Training Authority**
TVET	**Technical and Vocational Education and Training**
UNESCO	**United Nations Educational, Scientific and Cultural Organization**

Executive Summary

As part of cooperation with the Government of Pakistan, this report is prepared for TVET Sector Support Programme to make recommendations on the potential, initial and key reforms needed including, but not limited to, demand driven courses, expansion of training programmes, and gender mainstreaming in TVET system across Punjab. The study shows that there is a strong job market for skilled workforce in the fields of manufacturing, construction, hospitality & tourism, textiles & garments, agriculture, livestock & fisheries, renewable energy, printing and packaging, and allied health.

An integrated intervention strategy is used that entails tools development and calibration, staff recruitment and training of surveyors, determination of parameters for field visits, definition of sampling parameters, and data collection and entry. Employers' sample for the study was systematically selected from the growth sectors within concentrated industrial districts to represent the broader population. The sampling framework was taken from Punjab Industries, Commerce and Skills Development Department and National Skills Information System (NSIS) datasets to ensure reliable and valid results. Using acceptable estimates of over 95% confidence level and a margin of error smaller than the conventional 5% with a sample size of 1,889 units have been completed for a better understanding of the labour market along with their skills requirements.

Demand for workers in Punjab is seen in technical and professional skills in manufacturing industries with a focus on construction and automation. Wide vacancies exist in areas like CNC Machine Operations, Electrical, Civil, and Renewable Energy technologies. For example, a lack of Solar Photovoltaic Technicians as well as solar electricians are indicative of the province's changing economy with a focus on achievement of country's sustainability standards. There are also considerable shortages in the hospitality sector to fill the positions of the Food and Beverage Captains and Waiters, and Hospitality Management Professionals. Also, there needs to be more focus on the development of digital economy as demand for professions such as digital marketing, social media managers and computer graphic designers increases.

To meet these challenges, TVET sector should extend training programmes in these sectors of high demand. In particular, the priorities identified will include renewable energy, hospitality and digital skills to ensure that workforce adapts to the new economic growth opportunities. Special focus on women and persons with disabilities is necessary to promote inclusivity. Hence, TVET institutions can make a positive contribution to social inclusion by facilitating greater entrance of women in sectors dominated by men and using assistive technologies for persons with disabilities in the job market.

Key Recommendations

Training providers may focus on training programs in CNC machine operations, electrical work, and culinary arts to address skill labour shortages essential for Punjab's manufacturing and construction industry.

As employment opportunities rise in the construction industry and clients are seeking qualified masons, carpenters and welders, TVET institutions should expand training offers for local construction and manufacturing sectors.

In line with the emerging demand in solar energy, it is necessary for TVET institutes in Punjab to offer training for photovoltaic technicians, solar electricians and DC electricians.

To close the large gaps in the food and beverages service, TVET institutes should introduce more hospitality and tourism trainings to support service segment for employment generation in combination with policies promoting tourism.

There is a need for TVET institutions to develop and initiate programmes in social media marketing, computer graphics among other software to produce a workforce that can adjust in evolving technological manufacturing industries.

TVET institutes should conduct trainings related to Programmable Logic Controllers (PLCs) to improve skills required in the food processing industry. The curricula should be revised in collaboration with the local industries to make it labour market responsive.

The training should be improved for textiles and manufacturing occupations in Lahore, Faisalabad, and Sialkot. TVET institutes should also address shortage of workforce in trades that are more crucial in textiles industry such as stitching machine operators, quality controllers, and CNC machine operators. Targeted training in these areas will enhance industrial productivity and address labour shortages in these industries.

NAVTTC should integrate green skills in curricula such as renewable energy systems, energy efficiency practices, and digital skills to equip students for the tech-driven sector. Partnership with environmental organizations will add more practicality into the curriculum, as well as create sustainability-oriented training.

Targeted training for women in male-dominated sectors such as construction, renewable energy, and manufacturing will help close the gender gap in these fields.

1. Introduction

This document presents the report "Labor Market Assessment in Punjab" conducted under the Team Europe funded TVET Sector Support Programme (SSP), which aims to introduce reforms like demand-driven courses, expand training programmes, and promote gender equality in collaboration with the National Vocational & Technical Training Commission (NAVTTC).

For this study, consultations with key stakeholders both in public and private sectors were held to achieve the study's objectives. The findings and results of the report will help the policy makers and implementers in data-driven decision making for TVET programme designing and execution.

2. Background

TVET sector in Pakistan plays a crucial role in addressing the country's skilled workforce needs and fostering economic development. However, the sector faces several challenges that hinder its effectiveness and limit its potential impact. According to a report by UNESCO[1], Pakistan has one of the lowest enrollment rates in TVET programmes among developing countries, with only 5.5% of secondary-level students enrolled in such programmes.

One of the major challenges faced by the TVET sector in Pakistan is the lack of coordination and standardization among various governing bodies and institutions. The sector is governed by multiple authorities at federal[2] and provincial levels, leading to fragmentation and inconsistencies in policies, and quality assurance mechanisms. Additionally, the TVET sector suffers from inadequate funding, outdated curricula, and a shortage of qualified instructors, particularly in emerging technologies and industries[3].

Another significant challenge is the social stigma[4] associated with TVET education in Pakistan. Many perceive TVET programmes as inferior to traditional academic pathways, leading to a lack of interest and enrollment among students and their families. Furthermore, the TVET sector faces issues related to gender disparities[5] with lower participation rates among women due to socio-cultural norms and limited access to TVET institutions in certain regions.

Similarly, individuals with disabilities and transgender community have extremely limited access to vocational training. Only a small fraction of these marginalized groups has access, and even then, it is typically limited to traditional and outdated courses that have little demand in the market.

[1] http://uis.unesco.org/en/country/pk
[2] https://www.adb.org/publications/technical-vocational-education-training-pakistan
[3] https://www.pide.org.pk/research/technical-vocational-education-training-tvet-in-pakistan/
[4] https://www.worldbank.org/en/country/pakistan/publication/technical-vocational-education-training-pakistan
[5] https://www.undp.org/pakistan/publications/improving-technical-and-vocational-education-and-training-tvet-in-pakistan

In recent years, efforts have been made to address these challenges and improve the TVET sector in Pakistan. The government has introduced[6] various initiatives, such as the National Vocational and Technical Training Commission (NAVTTC) and the Prime Minister's Youth Skills Development Programme, aimed at promoting TVET education, standardizing curricula, and offering skills training opportunities.

The Punjab Vocational Training Council (PVTC), the Punjab Technical Education and Vocational Training Authority (PTEVTA) and the Punjab Skills Development Fund (PSDF) have been instrumental in promoting TVET education and skills development. The Punjab Skills Development Authority (PSDA) oversees the governance and quality assurance of TVET institutions in the province, while the PSDF provides funding and support for training programmes in collaboration with industry partners.

Despite these efforts, the TVET sector in Pakistan, including Punjab continues to face challenges in terms of resource allocation, quality assurance, and stakeholder engagement. Ongoing efforts are needed to enhance the relevance, accessibility, and quality of TVET programmes to meet the evolving demands of the labour market and contribute to the country's socio-economic development.

3. Purpose and scope

Purpose

The main purpose of this study is to present a comprehensive labour market assessment in the province of Punjab, Pakistan. It identifies skill gaps, shortages, and mismatches in sectors with higher growth potential, enabling TVET institutes to align their programmes and qualifications with the actual needs of the job market.

Scope of the Study

The scope of this study is a thorough examination of the current labour market conditions, employment trends, occupational demand and supply, skills gaps, and emerging industry needs. The scope of the study covers the following key aspects:

Skills Demand Assessment

Engage with employers and industry representatives to understand their workforce needs, preferred qualifications, and desired skill sets. This information will help in aligning TVET qualifications and TVET programmes with the labour market demands.

Employment Projections and Future Trends

Analyze technological advancements, and economic forecasts to project future employment landscapes. Identify emerging job roles and industries to help tailor TVET programmes accordingly.

[6] Prime Minister's Youth Skills Development Programme. http://navttc.gov.pk/pmysdp/

District-Level Mapping

Conduct skilled workforce demand and supply mapping for each district of Punjab. Identify trades with shortage or surplus of skilled workforce and provide skill forecasts and projections for identified growth sectors.

Gender and Disadvantaged Groups

Suggest high-demand occupations for disadvantaged groups (women, transgender, minorities, etc.) that should be introduced in TVET institutes, promoting inclusivity and equal opportunities.

Recommendations

Provide practical and actionable recommendations for TVET policymakers and implementers based on the findings to help them address the identified challenges and align TVET programmes with labour market needs.

The study employed quantitative research methods, drawing representative samples, tools development for employer surveys, data analysis, and employment projections. This report is based on the outputs of the aforementioned methods and consolidates the same to give recommendations for enhancing the effectiveness of the TVET sector in meeting the skill demands of the labour market.

4. Methodological Framework

4.1. Data Collection and Analysis

For this research, both primary and secondary data were collected and analyzed. Primary data was collected through employer/enterprise surveys. While on the other hand, secondary data was gathered from provincial industry and commerce departments, Qualification Awarding Bodies (QABs) and National Skills Information System (NSIS). The secondary data helped in defining the sampling frame for primary data collection and calculation of weights for result extrapolation.

The survey tool was designed to address key issues related to the labor market, such as employment data, employee turnover, and the characteristics of businesses. Data was collected using the KOBO Collect application. Data quality was ensured through physical and digital monitoring.

Once the data collection was completed, data cleaning was carried out to correct any errors or inconsistencies and to check for any missing data. This process was crucial to ensure that the results were accurate, reliable, and reflective of the actual situation before moving on to the

4.2. Review of Literature

In the pursuit of a comprehensive understanding of the employment landscape, various methods have been employed to assess the status of employment details. These methods are crucial for examining employment densities, the demand and supply of specific jobs, the scarcity of skills, and the emergence of new-generation job markets. ILO (2017)[1] provided significant insights into the employment situation in Pakistan and underscored the urgent need for green skills. It was essential to recognize that the inclusion of green skills in the framework of an efficient green economy was vital, while also acknowledging the existing flaws within the current labour market, which aligned with the overarching purpose of this assessment.

Moreover, in ILO (2018)[2] a lot of discussion has been made on the possibility of creating new jobs through the transition towards green technologies. The implications for future employment and training workers for the available green jobs have also been observed. This perspective is useful for recognizing those sectors with the likelihood of creating many jobs in the future and establishing the applicability of current TVET programmes to meet emerging requirements.

[1]ILO (2017) Employment and Environmental Sustainability in Pakistan: a factsheet: available at: https://www.ilo.org/publications/employment-and-environmental-sustainability-pakistan-0

[2]ILO (2018). World Employment and Social Outlook 2018: Greening with Jobs, available at https://webapps.ilo.org/weso-greening/documents/WESO_Greening_EN_web2.pdf

ILO (2019)[3] is an interesting study, where it is possible to find out about important factors related to the greening of a workforce. There is an exploration of the necessary skills, which may be an important aspect of green jobs and how the scope of these skills can be implemented in the existing TVET programmes. This aligns with insights into the current and future skills sought by businesses and the growth of sectors. Therefore, it is also necessary to involve employers and other stakeholders in the workforce to understand their demands for workers, their preferences for an educated workforce, and their expectations for qualified personnel. It assists in linking TVET qualifications to the employment market.

According to ILO (2021a)[4], there is a need for lifelong learning to enable the advancement of economic growth and enhanced social cohesion in the face of an increasingly dynamic TVET labour market; with this perspective offering a guideline that allows for the incorporation of contemporary skills demands to the TVET education system. There is also the need to incorporate human capital development, especially through promoting lifelong learning in TVET so that workers produced remain relevant in the market (ILO, 2021b)[5]. Furthermore, ILO (2021c)[6] is targeted at the textile and garments sector where learners can learn the green skills and practices of the sectors. It is useful in tracking skills demand within certain sectors.

Analyzing demographic changes, technological advancements, and economic forecasts is essential for understanding future employment landscapes. The ILO (2022a[7],b)[8], in its policy brief on skill development for a just transition, and a practical guidance tool on greening TVET and skills development provides practical guidance on integrating green skills into TVET programmes, helping to tailor them to future job market needs. TVET institutions and organizations also use these reports to spot new professions and sectors, so their programmes are relevant for the future.

ADB (2023)[9] a global outlook for green skills and how they can be implemented in different sectors. These sources illustrate how demographic and technological factors change employment patterns and needed skills. Therefore, green skills are key in every industry as new forms of economic activities develop occupations requiring structural changes and worker transition. In the case of a switch to a low-carbon economy, the ability of the working population to retrain and move between industries appears critical. It highlights the critical role of skills and education policies in driving ecological modernization (OECD, 2014)[10].

[3]ILO (2019). Skills for a Greener Future: Challenges and Enabling Factors to Achieve a Just Transition, available at: https://www.ilo.org/publications/skills-greener-future-challenges-and-enabling-factors-achieve-just

[4]ILO (2021a). Shaping Skills and Lifelong Learning for the Future of Work, International Labor Conference, available at: https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@ed_norm/@relconf/documents/meetingdocument/wcms_813696.pdf

[5]ILO (2021b). Resolution Concerning Skills and Lifelong Learning (ILC.109), available at: https://www.ilo.org/media/231121/download

[6]ILO (2021) Greener clothes? Environmental initiatives and tools in the garment sector in Asia, available at: https://www.ilo.org/publications/greener-clothes-environmental-initiatives-and-tools-garment-sector-asia

[7]ILO (2022a). Skill Development for a Just Transition, ILO Policy Brief (Oct. 2022), available at: https://www.ilo.org/publications/skills-development-just-transition

[8]ILO (2022b). Greening TVET and Skills Development: A Practical Guidance Tool, available at: https://www.ilo.org/publications/greening-tvet-and-skills-development-practical-guidance-tool

[9]ADB (2023). Preparing the Workforce for the Low-Carbon Economy: A Closer Look at Green Jobs and Green Skills, available at: https://www.adb.org/sites/default/files/publication/916561/adb-brief-262-workforce-low-carbon-economy.pdf

[10]OECD/Cedefop (2014), Greener Skills and Jobs, OECD Green Growth Studies, available at:https://www.oecd.org/content/dam/oecd/en/publications/reports/2014/02/greener-skills-and-jobs_g1g3e70b/9789264208704-en.pdf

For carrying out such determined trades' cross mapping, skilled workforce demand and supply for each division, district, and tehsil of Khyber Pakhtunkhwa is essential for recognizing trades where different skilled workforce elements are scarce or in surplus. Its work from this perspective includes comparative analysis to arrive at forecasts and projections of growth industries. When undertaking this mapping, the ILO's reports and other literature can be helpful in the task, particularly relating to a sector's required skills and employment outlooks.

Despite the extensive body of literature on green skills and their integration into diverse sectors, notable gaps exist regarding specific focuses on sectors such as manufacturing & industry, construction, hotels & tourism, textiles & apparel, agricultural & livestock & fisheries, renewable energy, printing & packaging, health & pharmaceutical, and sporting goods industries. While studies have addressed green skills in broader contexts, limited research explores the unique green skill requirements and the potential for job creation within these specific industries.

Moreover, although general concepts of green manufacturing and construction skills have been discussed, few studies have provided effective meaning. Current publications in this field are rich in descriptions of emerging sustainable practices and technologies for these industries but lack comprehensive guidelines for implementation. For instance, the hospitality and tourism sectors require specific green skills. As such, this has received insufficient attention, underscoring the need for a deeper identification of green skills in this area. The literature on specific green skills essential for enhancing environmental initiatives in the textile and garments sector is similarly scarce. This gap is critical for developing suitable TVET programmes.

Literature offers limited insights into the green skill requirements for agriculture, livestock, and fisheries, emphasizing the need for TVET programmes tailored to these sectors. While the renewable energy sector is well-documented regarding job creation, there remains a pressing need for a deeper exploration of the precise skills required for various technologies and roles. Moreover, research on green skills in the printing and packaging, allied health, and sports goods sectors is sparse. Understanding the unique skill requirements for these industries is crucial for effectively tailoring TVET programmes.

Addressing these gaps, the current labour market assessment focuses on tailoring TVET programmes to sector-specific green skills. By incorporating insights from the literature and conducting primary research, this study aims to enhance the relevance of TVET programs in promoting sustainable development and meeting the evolving demands of Pakistan's job market. This endeavour will ultimately support sustainable development and align with the evolving demands of the job market, ensuring that the workforce is adequately prepared for the future.

4.3 Sample

This survey is technically different from the household survey in certain aspects. For instance, household surveys normally capture vast and heterogeneous populations, and the proper sampling technique used is too intricate to capture the variability in the population factors. On the other hand, surveys applied to manufacturing firms are focused on relatively more limited populations. Hence, samples have to be specific and often, even comprehensive to have reliable and valid results. Households are located almost everywhere requiring regional analysis while manufacturing firms are mostly located in industrial areas. Data availability is also different; for households, the data is available with national databases while manufacturing firms may involve specific industrial databases. Population size and distribution skews strongly differentiate between the major types of survey and affect the design of each type of survey strongly.

An efficient sample size has been determined, using National Skills Information System (NSIS) datasets to have a representative sample of each adoption type. Moreover, to ensure impartiality and technical accuracy of the assessment, an expert in the field of TVET has been enlisted to conceptualize and conduct the survey. This will be followed by a targeted survey, providing insights into the labour market and the skill demands of the sampled industries.

Table-1 shows district-wise breakdown of the sample size.

The sample size 'n' has been calculated using the following formula for finite populations:	$$n = \frac{N \times Z^2 \times p \times (1-p)}{\left(E^2 \times (N-1)\right) + \left(Z^2 \times p \times (1-p)\right)}$$

- N^1 represents the overall population of industrial units or entities for which the study will seek to provide the assessment. Due to the small population base in many cases, the formula derives such that the sample size is also sufficiently good.

- Z^2 corresponds to the confidence level of the study. For a 95% confidence level, a Z-score of 1.96 is used. Estimated Proportion (p) represents the proportion of the population expected to have the characteristic of interest (e.g., alignment between vocational training and industry demand). When this proportion is unknown, it is conservatively set at 0.5 to maximize the sample size, as this value assumes the highest variability.

- The Margin of Error (E)[3] is the acceptable amount of error that has to be considered while calculating the results of the completed sample space. Less percentage error means that the sample size has to be big; on the other hand, a high percentage error means that the sample size can be comparatively small. A 5% margin of error is tolerable in most of the research.

Table 1: Sample size drawn from different districts

District	Manufacturing	Construction	Hospitality & Tourism	Textile & Garments	Agri, Livestock & Fisheries	Renew-able Energy	Printing & Packaging	Allied Health	Sports Goods	Total
Lahore	55	32	65	50	0	50	28	20	0	300
Sialkot	33	15	20	60	26	11	15	16	90	286
Faisalabad	18	18	24	110	24	12	10	12	0	228
Sheikhupura	42	12	20	19	24	10	8	10	0	145
Gujrat	32	26	36	10	23	32	9	12	0	180
Gujranwala	44	10	40	28	25	12	10	14	0	183
Multan	6	18	30	30	30	17	14	20	0	165
Rawalpindi	5	15	50	15	8	13	16	12	0	134
Bahawalpur	4	10	20	15	21	14	12	10	0	106
Jhelum	0	9	12	0	20	10	10	8	0	69
Sargodha	5	10	10	0	25	9	8	7	0	74
Grand Total	244	175	327	337	226	190	140	141	90	1,870

4.4. Sampling Technique

Official statistics were collected from national household surveys through enumeration blocks and sampling frames, which are refreshed periodically by the Pakistan Bureau of Statistics (PBS), however, for this study the NSIS database and data from the provincial industries departments were utilized. Therefore, the earlier recorded NSIS data shall be employed in sample making and generalization of findings.

After determining the overall sample size using the above formula, the sample was stratified by sector to ensure that each industry is proportionally represented. This stratified random sampling approach ensures that the study captures the specific demands and characteristics of different sectors, thereby enhancing the precision and relevance of the evaluation.

By employing this formula and carefully considering the factors influencing sample size, the study will achieve a balance between statistical accuracy and practical feasibility, leading to credible and actionable insights into the effectiveness of the government's technical and vocational training programmes.

5. Distribution of Industries

Size-Wise Distribution of Sample

Figure 1 categorizes establishments based on their sizes across Punjab, revealing significant regional differences in business structures and workforce composition.

Punjab is dominated by large and medium-sized establishments which is constitute by37% of businesses (707), while medium-sized establishments (with 100 to 249 employees) make up 30% (569). This highlights Punjab's industrial strength, where large-scale industries, such as manufacturing, textiles and garments, and agriculture require substantial labour forces and advanced organizational structures. The prevalence of larger businesses suggests a more formal and developed economy, where enterprises can scale their operations and integrate modern production techniques. Among the remaining, 30% (561) firms are small-scale while only 3% (52) are micro-scale firms.

Figure 1: Establishments based on their size across Punjab (%)
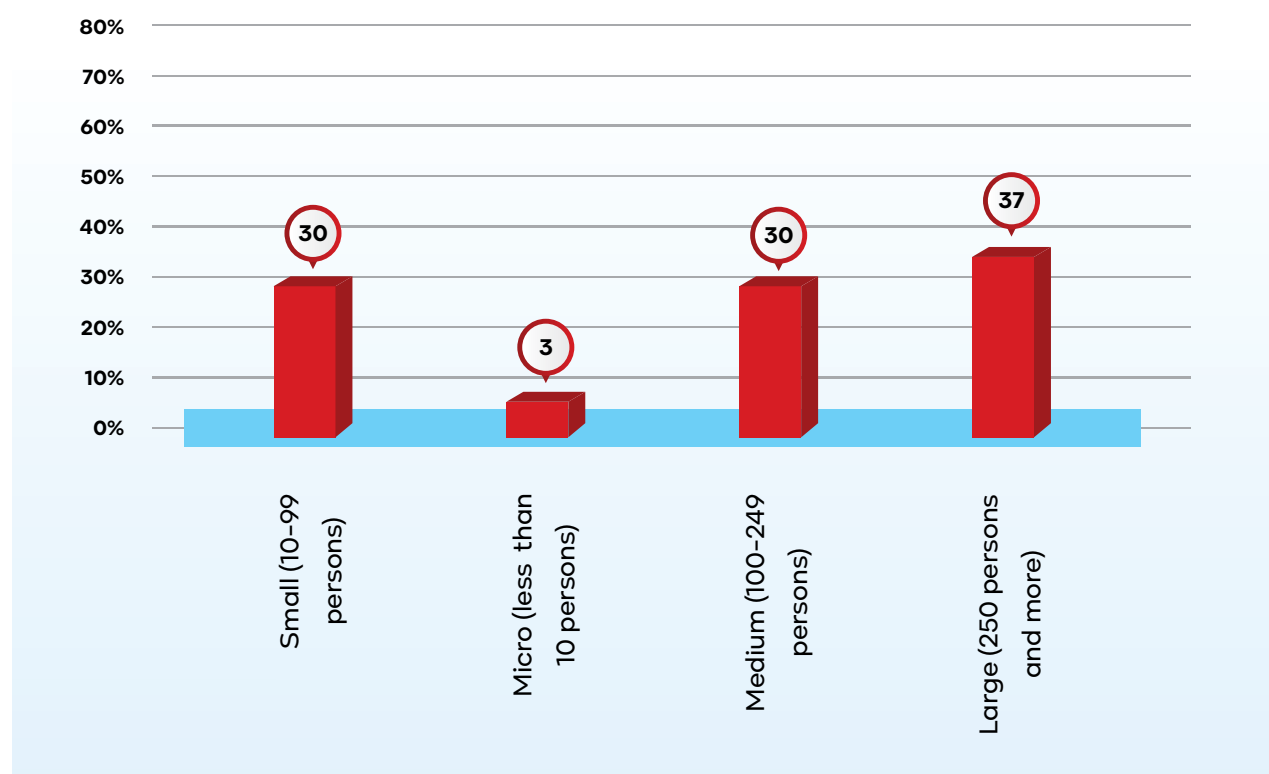
6. Findings of Survey

6.1 Sector-Wise Distribution of Industries

In Table 2 the sector-wise distribution of establishments in Punjab reflects that the manufacturing sector dominates, accounting for 35.9% (679) of the establishments, followed by the hospitality and tourism sector, making up 15.9% (300) in Punjab. The Agriculture, Renewable Energy, and Textiles and Garments sectors are almost equal distributed, with 9.6% (181), 9.2% (174) and 8.9% (168), respectively. The Construction sector represents 8.6% (163) of the establishments, reflecting the province's ongoing infrastructure development and demand for skilled labour in construction-related trades. The Allied Health Sector, although smaller, still accounts for 6.5% (122) of establishments, indicating growing healthcare needs in the province. Printing and Packaging account for 4.0% (76), serving industries like manufacturing and textiles.

Moreover, professional, scientific, and technical activities, alongside the services sector, have a minimal presence, accounting for only 0.7% (14) and 0.6% (12) of the establishments, respectively. This shows that these more specialized sectors are not as developed in Punjab as the traditional and large-scale sectors, like manufacturing and agriculture. The total of 1,889 establishments distributed across various sectors emphasizes Punjab's industrial diversity, with manufacturing leading the economic landscape.

Table 2. Sector-wise distribution of establishments

Sector	Frequency	Percent
Manufacturing	679	35.9
Hospitality & Tourism	300	15.9
Agriculture	181	9.6
Renewable energy	174	9.2
Textiles & Garments	168	8.9
Construction	163	8.6
Allied Health	122	6.5
Printing and Packaging	76	4.0
Professional, scientific and technical activities	14	0.7
Services	12	0.6
Grand Total	1,889	100

6.2. Annual Skilled Workforce Demand and Supply

To effectively meet industrial requirements, it is essential to bridge the skilled workforce gaps, with the help of data evidence. Figure 2 depicts the gap between the demand and supply of skilled workers. The demand for skilled labour stands at 446,941, whereas the available supply is only 233,086, reflecting a shortfall of over 213,000 skilled workers. This substantial gap highlights the pressing need to improve workforce development strategies and expand vocational training programmes to align the supply of skilled workers with industry needs. Without addressing this gap, the shortage of skilled workers could hinder economic progress, particularly in key sectors like Manufacturing, Renewable Energy, and Allied Health. Focused efforts on expanding TVET programmes and increasing accessibility to training could help mitigate this discrepancy and ensure that the workforce is equipped to meet future demands.

Figure 2: Annual skilled workforce demand and supply
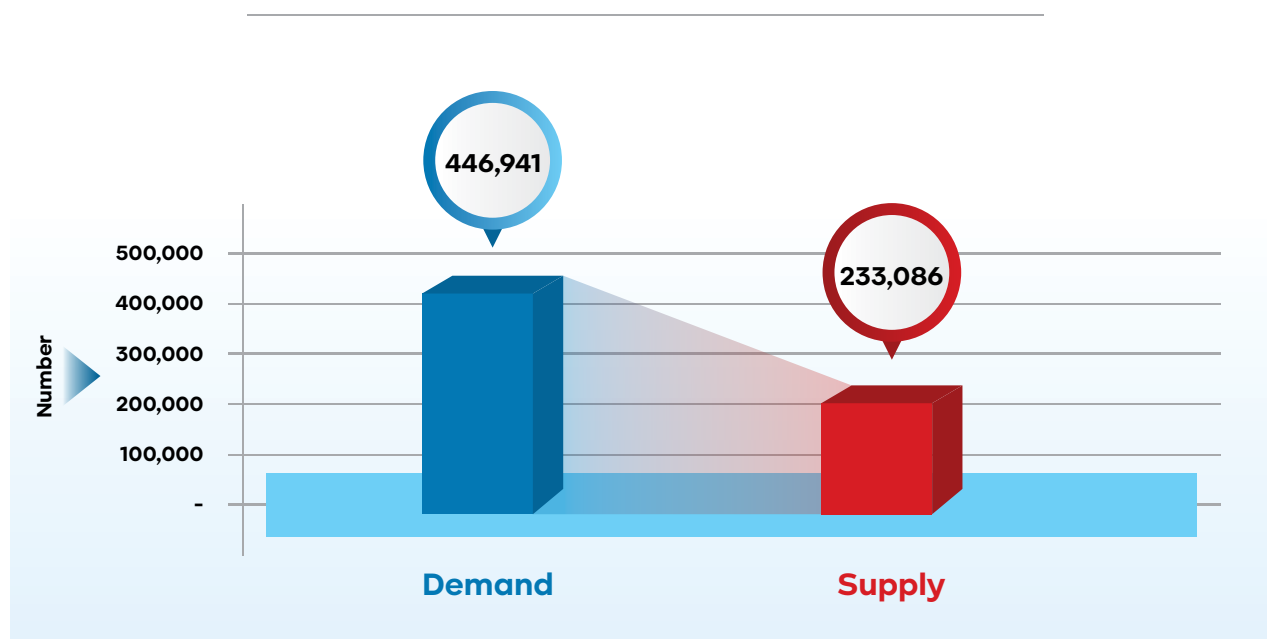
6.3. Sector-Wise Skilled Workforce Demand

To understand the unique labour needs of different industries, it is vital to analyze sector-wise skilled workforce demand. The Manufacturing sector alone accounts for the largest portion of this demand, requiring 202,752 skilled workers (Figure 3). Sectors such as Agriculture (20,822), Allied Health (22,445), Construction (31,607), Hospitality and Tourism (49,768), and Textiles & Garments (74,996) also show considerable demand for skilled labour. Sectors like Sports Goods(15,218), Renewable Energy(13,417), Printing and Packaging(7,029), and Surgical tools (5,040) have smaller but specialized skilled labour demands. Addressing these sector-specific skill demands is essential for ensuring economic growth, improving productivity, and meeting labour market demands across both provinces.

Figure 3: Sector-wise skilled workforce demand in Punjab

Values shown above bars (left to right): 522, 2348, 5040, 7029, 13417, 15218, 20822, 22445, 31607, 49768, 74996, 202752

Categories (left to right): Professional, Scientific & Technical Activities; Services; Surgical Tools; Printing and Packaging; Renewable Energy; Sports Good; Agriculture; Allied Health; Construction; Hospitality & Tourism; Textile & Garments; Manufacturing
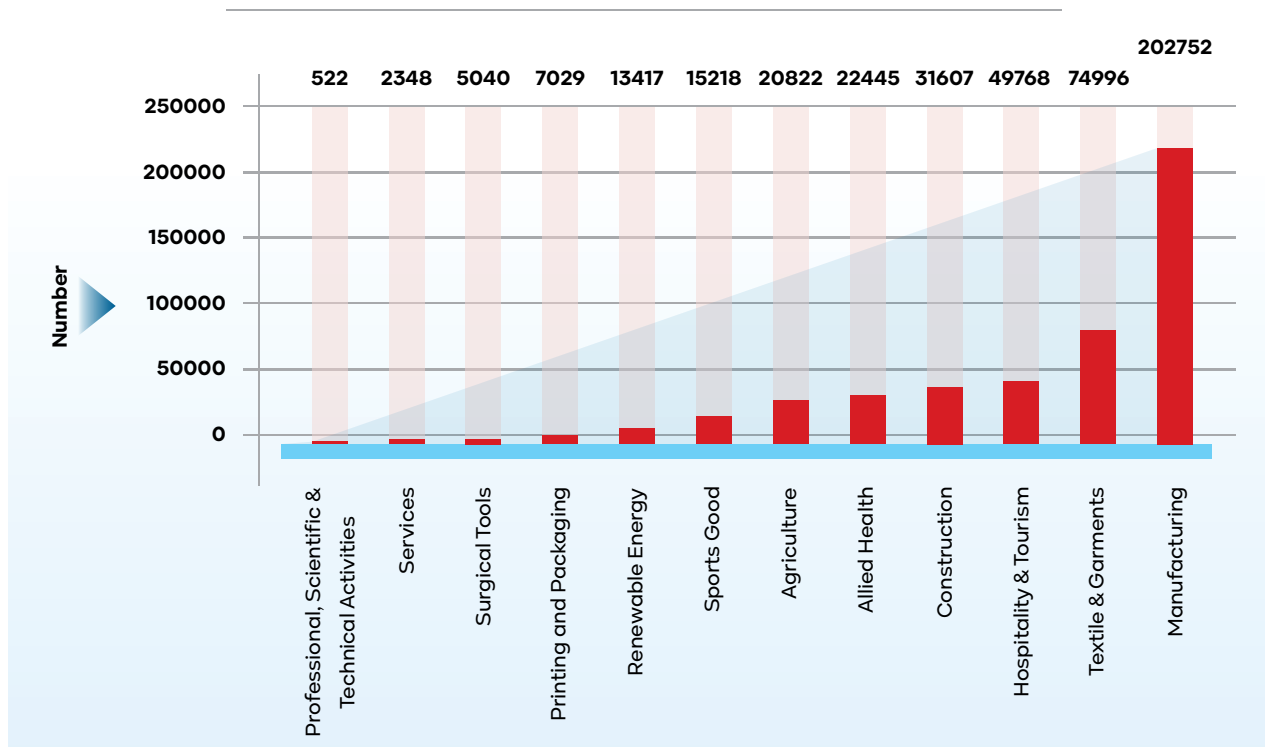
6.4. Trade-Wise Skilled Workforce Demand

Analyzing trade-wise skilled workforce demand reveals critical insights into the specific job roles needed across various sectors. Figure 4 illustrates the workforce demand for various job roles across sectors, providing valuable insights into the skilled labour requirements. Machine Operators lead the demand, with 43,855 workers required. This high demand is reflected in the industries' heavy reliance on machinery, like those in Manufacturing, and Textiles and Garments sectors. The prominence of machine operators in the workforce indicates that mechanized production is a cornerstone of the industrial sector, and specialized training in operating advanced machinery is crucial.

The second-highest demand is for Stitching Machine Operators, with 30,172 workers needed. This points to the robust textiles and garments industry. It emphasizes the need for vocational training programmes focused on garment manufacturing. Other roles with significant demand include Electrical Technician (11509), Quality Assurance (10,257) and Computer Operators (9,463). Quality Assurance is critical in ensuring the standards of production in both manufacturing and service sectors, indicating a growing emphasis on maintaining product standards and quality control. The demand for Computer Operators reflects the increasing digitalization and automation of processes across sectors, requiring a workforce proficient in IT and related skills.

Roles like Assistant Managers (9,253), Packaging Experts (9,038), and Press Machine Operators (9,036) also are in high demand, indicating the growing importance of middle management and specialized operational roles in various industries, especially in packaging and manufacturing. Skilled trades such as Welders (6,380), and Masons (5,596) exhibit moderate demand, signifying the need for technical skills in construction, electrical work, and industrial maintenance.

Other roles like Electrical Technicians (5,471), Polishers (5,196), and Chefs (4,405 for regular chefs and 4,906 for fast food chefs) highlight diverse opportunities across sectors. The demand for chefs indicates growth in the hospitality and food service industries, while electrical and polishing skills are essential in manufacturing and production. At the lower end, CNC Machine Operators (4,241) show relatively low demand compared to traditional Machine Operators. This may reflect the more specialized nature of CNC machining, which is crucial for precision engineering.

Figure 4: Workforce demand for various job roles across sectors
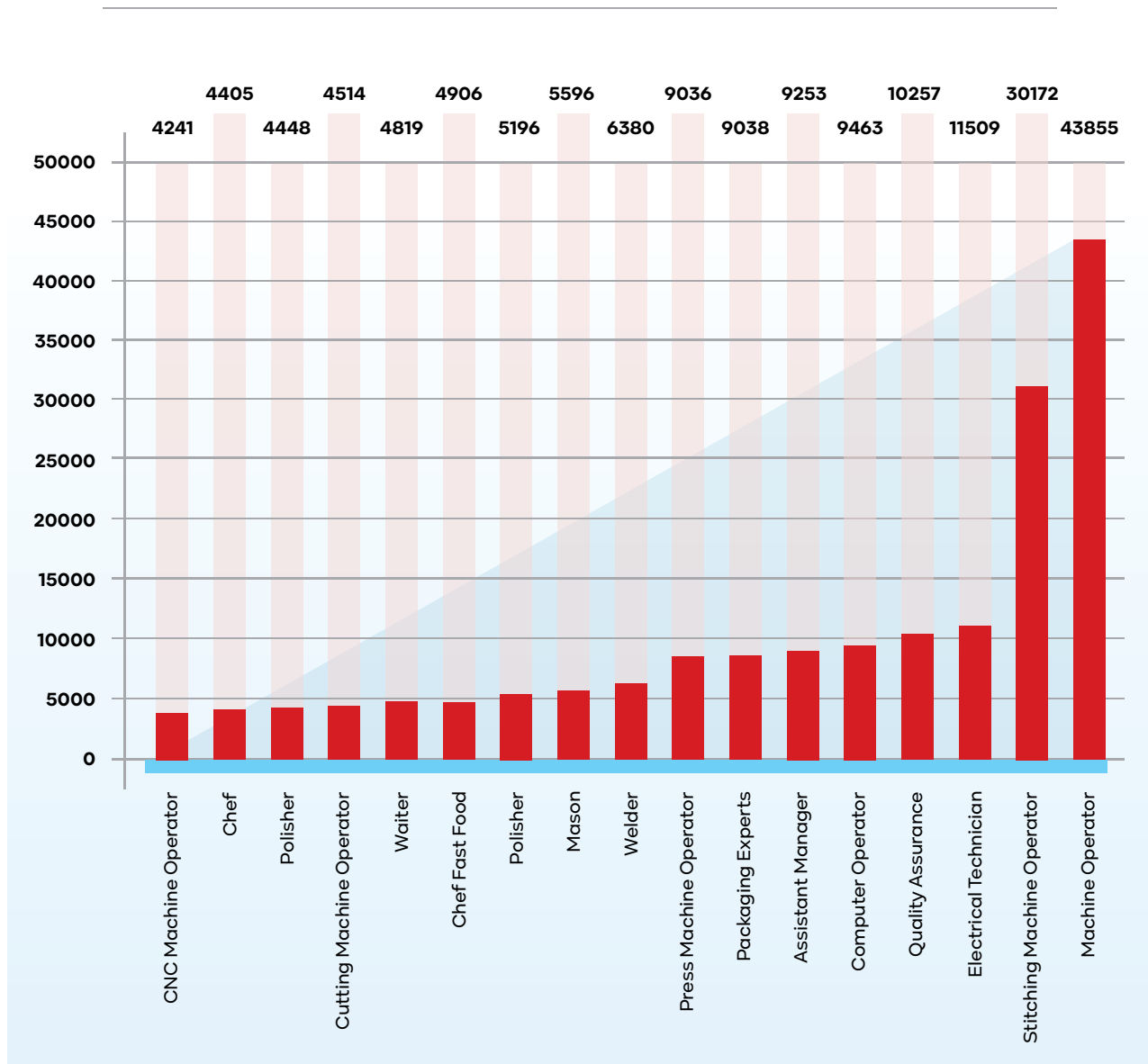
6.5. District-Wise Skilled Workforce Demand

Across Punjab, Lahore leads in workforce demand, requiring 92,589 workers (Figure 5). As a central economic hub, Lahore's high demand is driven by its diverse industries, including manufacturing, services, and commerce, reinforcing its position as a vital player in Pakistan's economy. Sialkot follows closely with a demand of 84,336 workers, reflecting its prominence in sports goods production, surgical instruments, and export-oriented industries. Faisalabad (72,341) shows significant demand as well, particularly driven by its thriving Textiles and Garment industries. Gujranwala (63,666) and Gujrat (44,840) also exhibit high workforce demand, primarily due to their focus on Manufacturing, especially in sectors, such as Ceramics, Electronics, and other Heavy industries. Sheikhupura (42,445) shows a steady demand for workers, likely due to its proximity to Lahore and its expanding industrial base. Moreover, districts such as Multan (11,940), Rawalpindi (9,474), Bahawalpur (9,020), and Jhelum (8,370) display moderate workforce demand, which can be attributed to there mix of agricultural activities and emerging industrial growth. Sargodha (7,920) indicates a demand for labor largely driven by agricultural activities.

Figure 5: District-wise skilled workforce demand

6.6. Sector and Gender-wise Skilled Workforce Demand

Gender-wise workforce demand across sectors highlights notable differences in male and female employment patterns. The Manufacturing sector shows the highest demand, with 150,664 male workers required compared to 51,994 female workers (Table 3), reflecting a significant gender disparity. The Textile and Garments sector also shows a much lower demand for female workers, at 13,792 compared to 61,382 males. Sectors like Renewable Energy and Construction remain heavily male-dominated, with 12,322 males required in Renewable Energy compared to just 1,095 females, and 29,778 males in Construction compared to 1,829 females.

Similarly, Agriculture demands more male workers (19,847) than female (975), while Sports Goods, Printing and Packaging, and Surgical Tools exhibit male dominance but show some female workforce presence. Sectors like Services, and Professional, Scientific and Technical Activities display minimal demand for male and female workers, with men still having a larger share. However, Allied Health shows more gender equity, with 12,551 males and 9,894 females in demand, reflecting a growing gender balance in healthcare-related jobs. Hospitality and Tourism also demonstrate a relatively more balanced demand, with 27,210 males and 22,514 females needed.

Overall, the labor market demands 335,605 male and 110,359 female workers across all sectors, highlighting the need to create more inclusive opportunities for women in traditionally male-dominated industries, while also enhancing the representation of men and women in sectors showing potential for gender parity, like Allied Health and hospitality.

Table 3: Sector and Gender-wise workforce demand

Sector	Male	Female	Total
Manufacturing	150,664	51,994	202,658
Textile & Garments	61,382	13,792	75,174
Hospitality & Tourism	27,210	22,514	49,724
Construction	29,778	1,829	31,607
Allied Health	12,551	9,894	22,445
Agriculture	19,847	975	20,822
Sports Good	9,352	5,782	15,134
Renewable Energy	12,322	1,095	13,417
Printing and Packaging	5,916	1,113	7,029
Surgical Tools	4,130	910	5,040
Services	2,020	372	2,392
Professional, scientific and technical activities	433	89	522
Grand Total	335,605	110,359	445,964

6.7. Skill-level and Gender-Wise Workforce Demand

Table 4 highlights a significant gender disparity across all levels, with males consistently outnumbering females at every stage. The largest concentration of males (92,141) and females (36,938) is seen at Level 2, suggesting that this is a pivotal point where both genders are demanded in higher numbers. However, the stark difference in participation at each level suggests that females may face considerable barriers compared to their male counterparts. At Level 1, for example, the number of males (37,217) is significantly higher than that of females (8,965), showcasing a clear imbalance right from the entry levels.

This disparity continues across the middle and higher levels. The concentration of both males and females peaks at Level 2. Then, it gradually declines towards higher levels. Level 5 shows the lowest representation of both genders, with males at 50,093 and females at just 12,149. This may explain why a group of participants, particularly females, is less likely to advance to the highest categories. This could be due to limited access to education and training, and a lack of promotional and career advancement opportunities in their professions.

Table 4. Skill-level and Gender-wise workforce demand

Level	Male	Female	Total
Level 1	37,217	8,965	46,182
Level 2	92,141	36,938	129,079
Lecel 3	78,728	25,708	104,436
Level 4	77,426	26,599	104,025
Level 5	50,093	12,149	62,242
Total	335,605	110,359	445,964

6.8. Sector-wise Leading Trades

The data highlights the importance of different sectors of the economy, each of which relies on a skilled workforce to sustain growth.

6.8.1. Manufacturing Sector

Understanding workforce demand in the Manufacturing Sector reveals key insights into essential roles and skills needed. Figure 6 depicts the demand for the workforce in the Manufacturing Sector. The profession of Machine Operator has the highest demand, needing a total of 27,417. This shows that operating manufacturing processes depends on the skilled Machine Operator to manage and run the equipment. Similarly, a large demand is seen for Stitching Machine Operators with 23,812 vacancies.

Demand for workers with specific skills is evident through the positions available, including a Polisher position with 8,592 openings and Packaging Experts with 8,169 openings. It may indicate that there is a need for workers with adequate skills in polishing as well as packaging goods to meet standard market requirements before they are shipped to various markets. This is further supported by the necessity of Quality Assurance specialists with 6,041 openings.

Figure 6: Workforce demand in the manufacturing sector
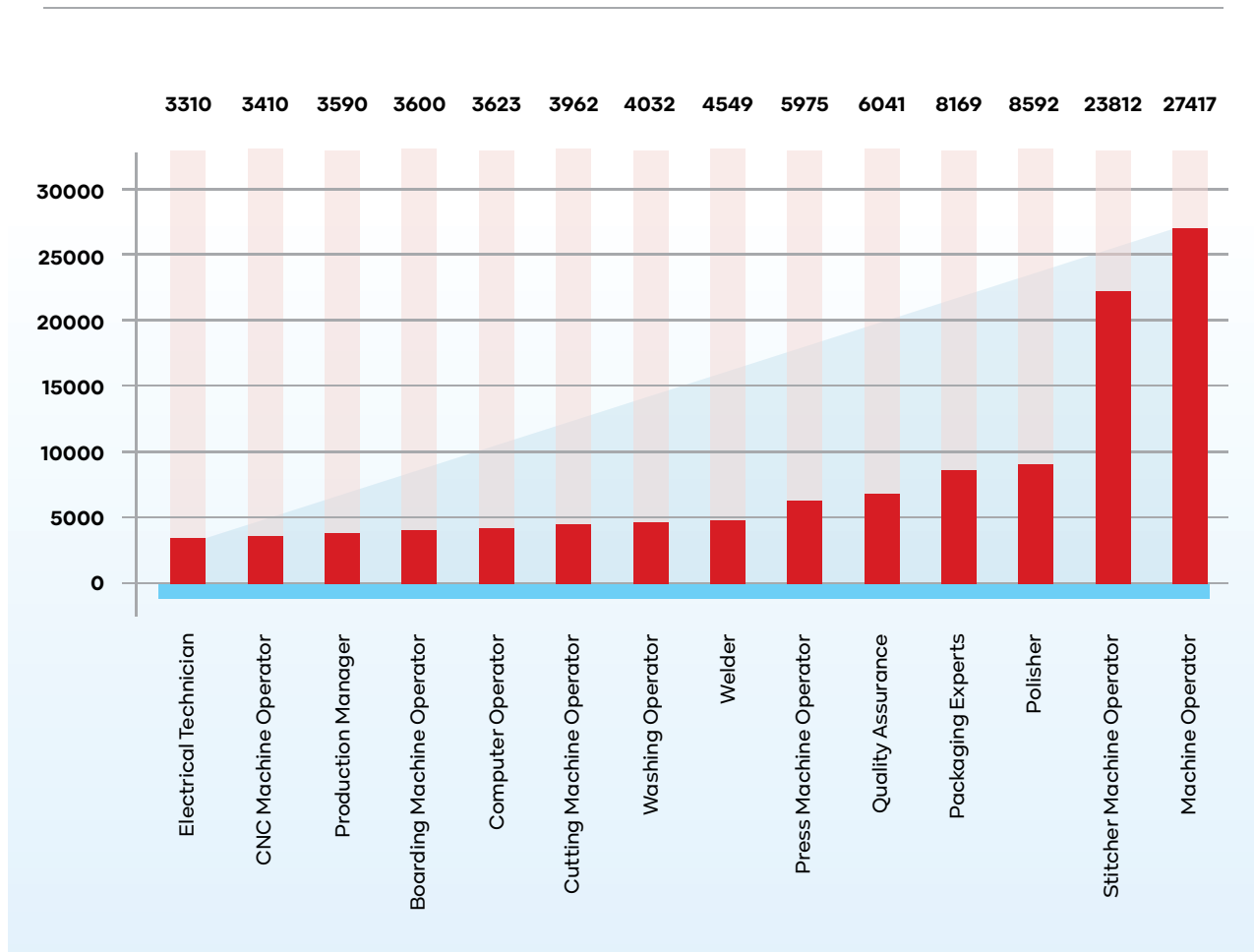
As for the occupations that require using a specific machines, the most in-demand are the press Machine Operator (5,975) and Welder (4,549) positions. Open positions, such as Washing Operators (4,032) and Cutting Machine Operators (3,962) show that a wide range of tasks are required for smooth and effective manufacturing.

6.8.2. Hospitality & Tourism Sector

Figure 7 depicts the demand for front-line and supporting roles in Hospitality and Tourism, emphasizing the sector's growth and the diverse range of skills required to support its expansion. As such, the position with the highest expected demand is for Restaurant Managers with 9,383 open positions. Chefs are also in high demand of 7,656. Also, demand of 4,906 'Chef Fast Food' reveals that fast food service providers play a vital role in developing this sector. A few of the most requested positions include event manager with 2,691 jobs, indicating the growing importance of tourism, and corporate events.

Traditional support job positions include Housekeeping, which requires 1,361 workers. Job titles like Computer Operator with 1,142 jobs demonstrate the application of technology and maintenance in the hospitality industry. The requirement of administration-related positions such as record keeper and accountant, for 1,078 and 852, respectively, emphasizes the importance of record maintenance and accountancy in the sector. There is an a notable demand for waiters (4,805) to serve customers in various service industries. Other jobs include Bar B Q Chef and Receptionist with 669 and 503 positions, respectively.

Figure 7: Workforce demand in hospitality and tourism
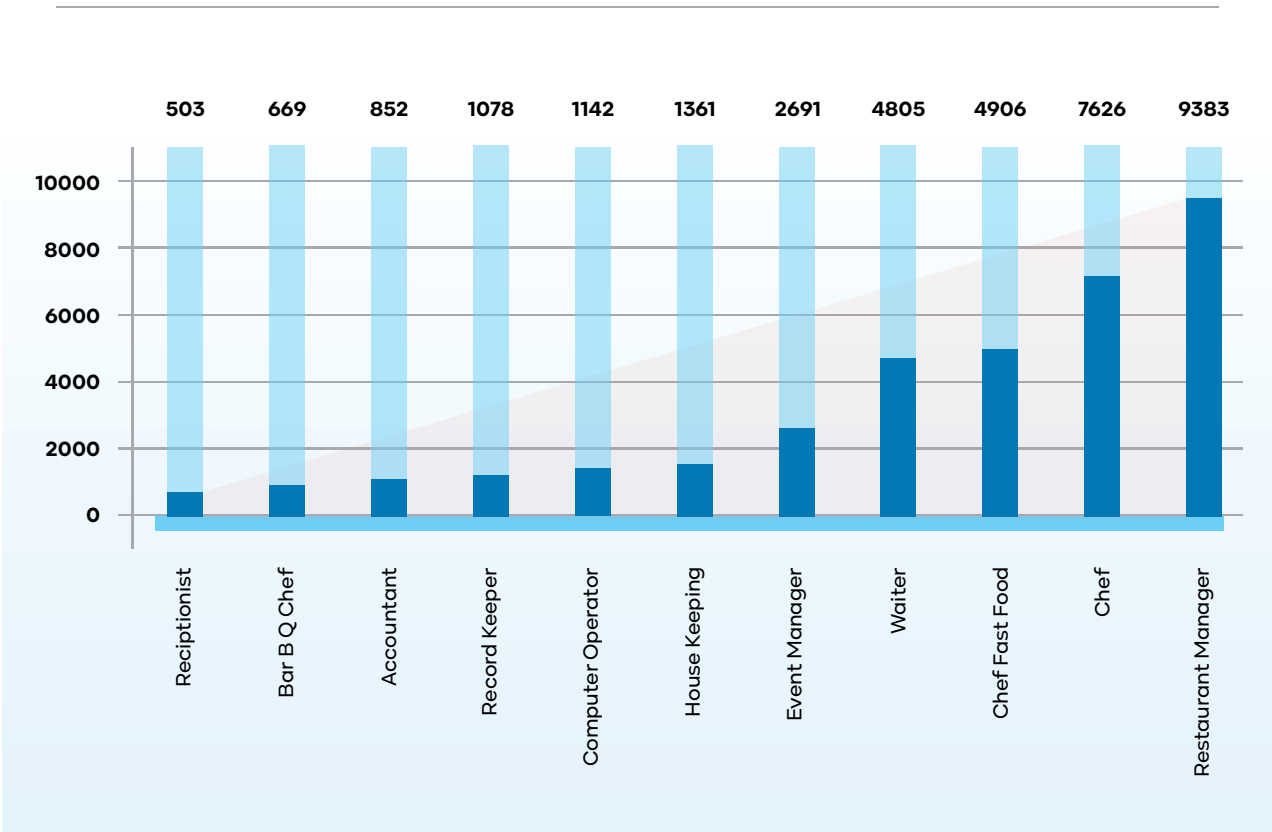
6.8.3. Agriculture Sector

Workforce demand across agriculture sector is illustrated in Figure 8. The largest group is Agricultural Advisors, which consists of a total 1,943. On the other hand, new and unique positions like Computer Operators, at 1,058, Veterinary Technicians, at 1,143 and Feed Plant Operators, at 4,72, depict the growing integration of technology and specialized expertise in agriculture. Several listed positions are connected to the IT sector and the increase in mechanization of farming processes, namely, IT Technicians – 632 and Agricultural Machine Operators – 1,103. These roles are becoming critical as farms shift to advanced technological practices for the enhancement of performance, yield and profitability. It also reveals the change in the competency demanded in the contemporary management of agricultural enterprises, where technical competence is paramount.

Figure 8: Workforce demand in the agriculture sector
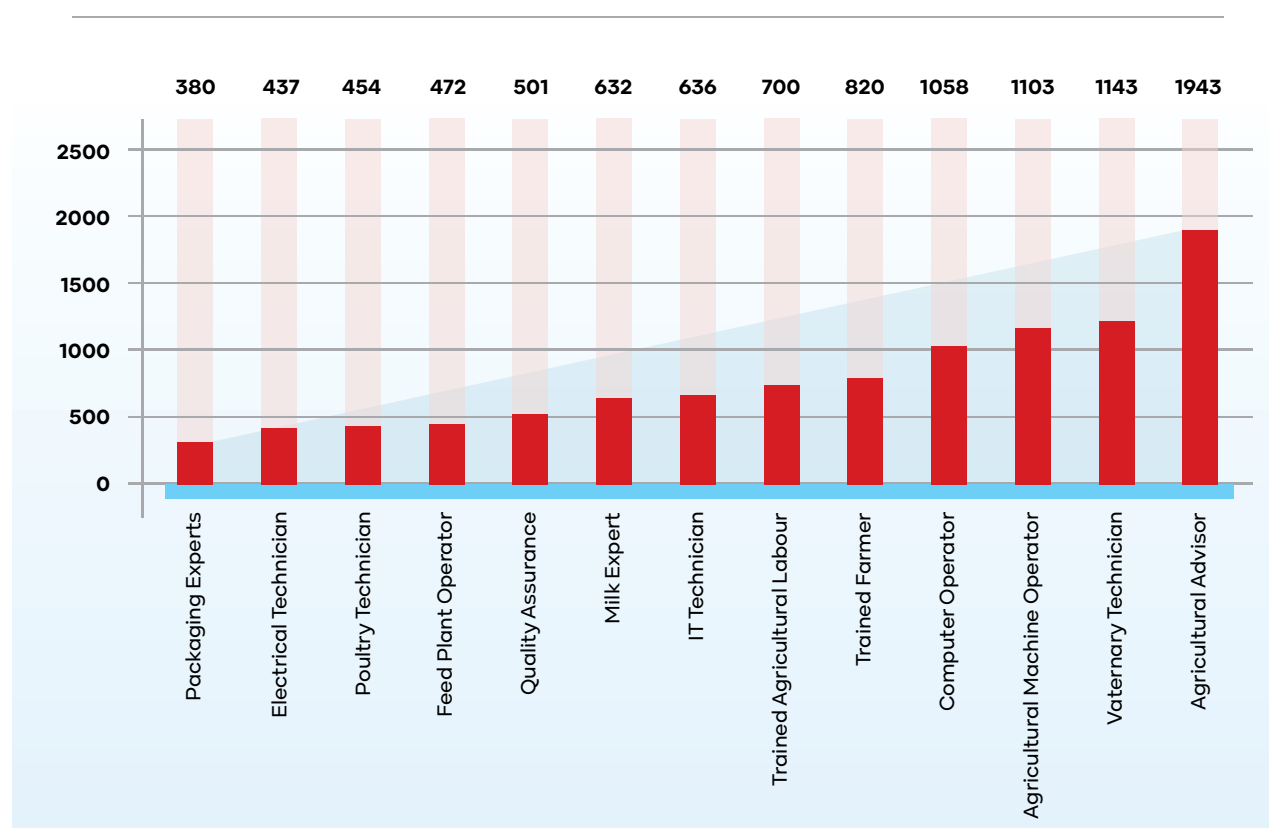
Several positions, like trained Farmers (820), Milk Experts (632) and Packaging Experts (380) highlight the demand for specialized knowledge in fields including crop production, milk production, and soil management. These roles are crucial for the development of innovative and efficient agricultural methods. The relatively smaller numbers for Quality Assurance (501) reflect the need for management and oversight in the agriculture sector, ensuring that food quality standards are maintained.

The requirement for poultry technicians (454) highlights the specialized nature of certain segments within agriculture, particularly in livestock and poultry management. Though less represented, these positions are critical in maintaining farm hygiene, ensuring animal welfare and optimizing production in specific farming sectors.

6.8.4. Renewable Energy Sector

The study reveals a variety of positions within the renewable energy industry, focusing on employees' skills in solar installation and sales in addition to managerial and administrative work. This mix is desirable given the increasing need for expert and professional competencies in a segment, which is crucial to the evolution of sustainable power.

The Renewable Energy sector encompasses roles related to solar power, with electricians (solar) in high demand, accounting for 4,679 job openings (Figure 9). This is aligned with the current trend for solar energy systems for which qualified electricians are required to install, maintain and repair these systems. The demand for solar panel installation technicians stands at 3,217, indicating the requirement of technical personnel for the installation and proper functioning of the solar panels. This role is important as the use of renewable energy technology is on the increase.

In support of solar infrastructure, Welders (2,094) are necessary for joining and repairing all structural elements, used to manufacture solar panels and other equipment for utilization of renewable energy. Trained Workers (1,517), Electrical Technicians (1,161) and Salesmen (838) also cater to the commercial side of the sector. Furthermore, 658 positions are demanded for DC electricians in projects involving electricity generation from solar power. These positions are critical for maintaining and ensuring the smooth operation of renewable energy systems, particularly in handling electronics and computer-related components.

Figure 9: Workforce demand in the renewable energy sector
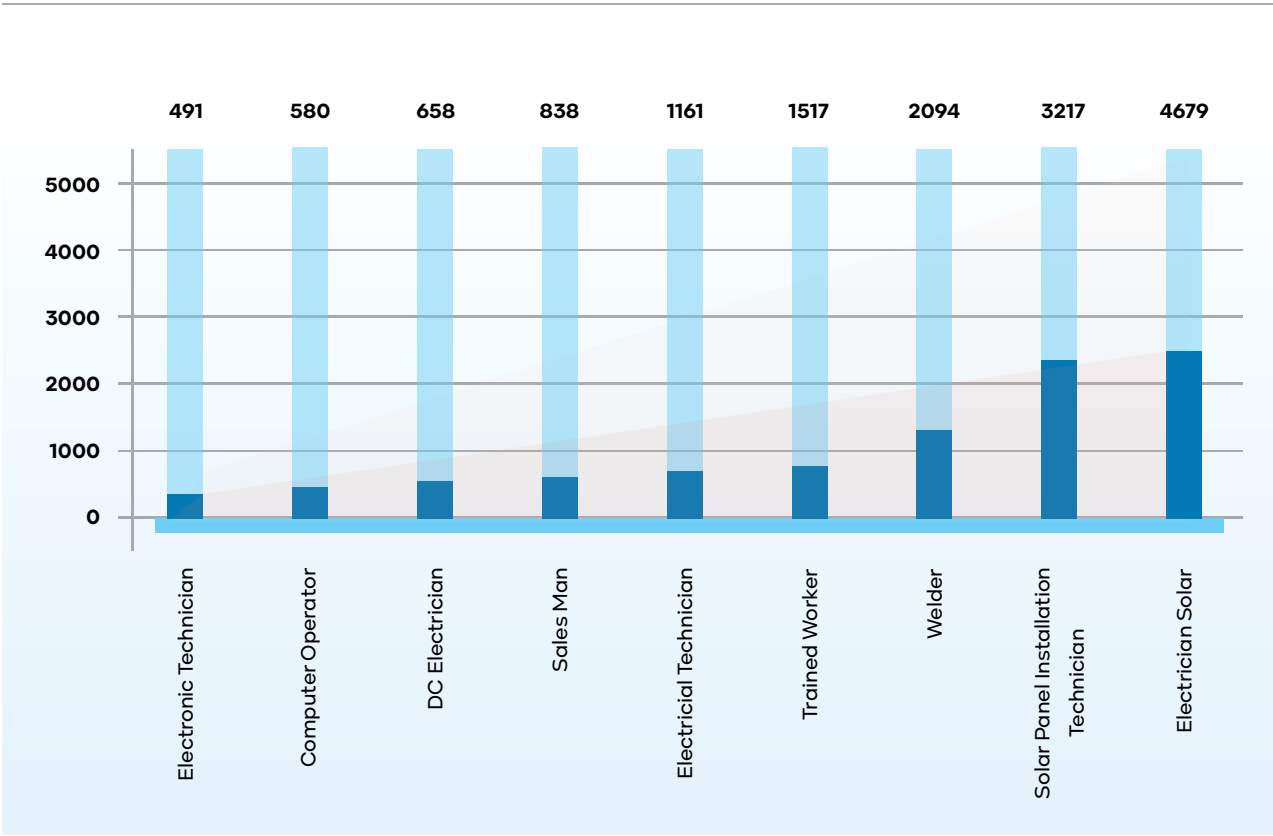
6.8.5. Textiles and Garments Sector

The Textiles and Garments sector exhibit a high demand for machine operators with 14,864. This demand is fundamental in producing textile manufacturing plants where material handling is critical in aiding different plant production processes. There is also demand for Stitching Machine Operators (5,746), who are significant in assembling parts of garments. The demand for quality assurance calls for 2,719 individuals (Figure 10).

Other significant roles include Electrical Technician (2,438), Loom Operators (2,240), Weaving Machine Operators (2,054) and Computer Operators (1781). Demand for Textile Technicians stands at 1,045 positions for diploma holders in textile engineering are in demand. The demand for Knitting Machine Operators is 998, needed in the manufacturing of knit fabrics.

Demand for skilled workers in Machine Operation, Quality Control, Technical Maintenance, and Design underscores the diverse expertise needed in the Textile and Garments sector, from hands-on production roles to more creative and technical positions.

Figure 10: Workforce demand in the textiles & garments sector
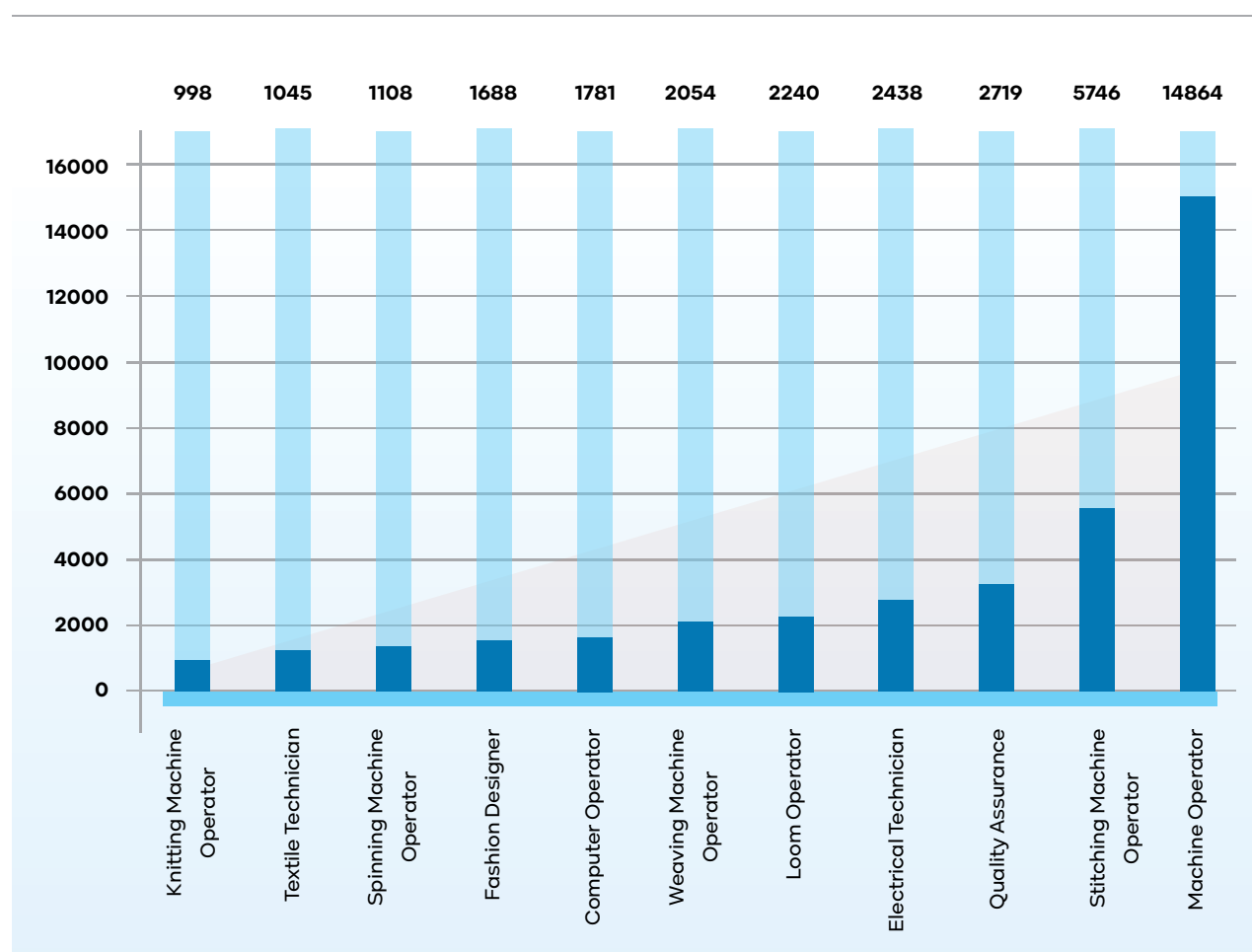
6.8.6. Construction Sector

The demand for specific skilled occupations is illustrated in Figure 11, showing a marked variation across different trades. At the top of the list, Masons are in exceptionally high demand, with 6,923. This significantly exceeds the demand for other trades. Other notable occupations include Steel Fixers and Civil Technicians, with demands of 2,516 and 2,430, respectively. These trades are critical to structural and Civil Engineering projects, underscoring the importance of construction-related skills in meeting the workforce demands.

Building Electricians and Concrete Machine Operators follow, with demands of 1,809 and 1,540, respectively. This data suggests ongoing electrical and concrete work is also essential to the growing construction sector. Trades such as Plumbers, Architecture Technicians, and Electrical Technicians have moderate demands, 1,259, 949, and 880, respectively. While Tile Fixers and Civil Surveyors are at the lower end of the spectrum, with demands of 809 and 782, respectively.

Training initiatives should focus on these areas to help bridge the skills gap and meet the growing demand in the construction industry.

Figure 11: Workforce demand in the construction sector
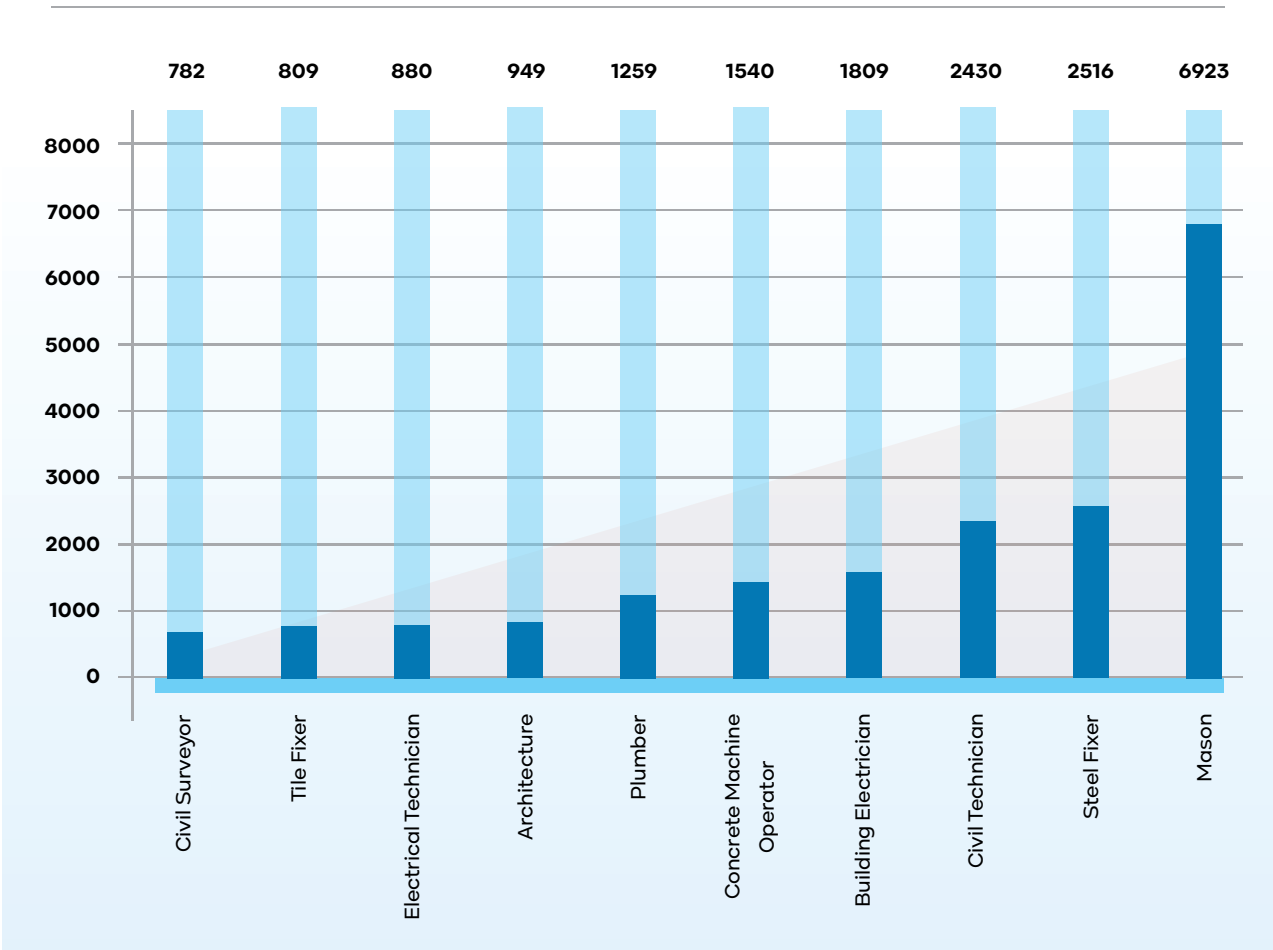
6.8.7. Allied Health Sector

The data presented for the Allied Health sector in Figure 12 highlights the demand of various skills, with Nurses constituting the largest group at 4,190 individuals. This significant representation indicates that nursing plays a central role in healthcare service delivery. Given the labor-intensive and highly demanding responsibilities of nurses in public and private healthcare systems, their role in the workforce is crucial for maintaining the overall functionality of healthcare services.

Figure 12: Workforce demand in the allied health sector
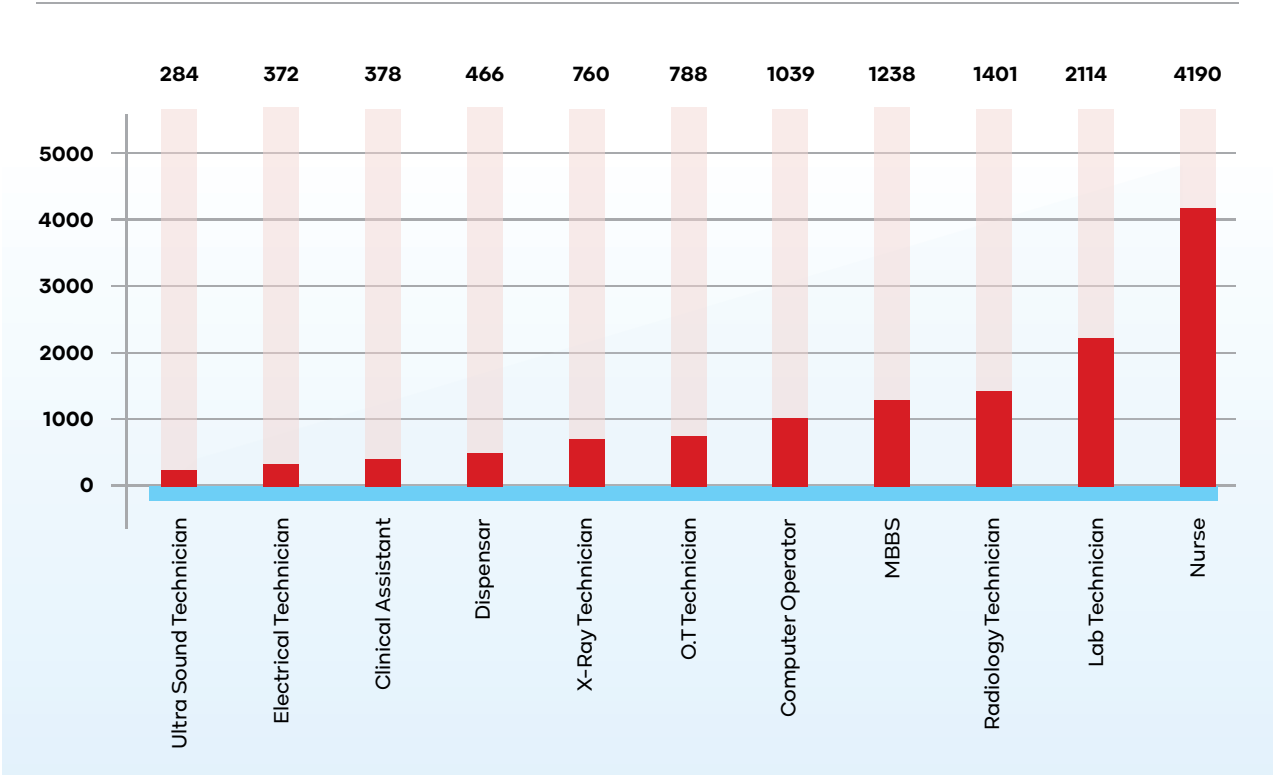
Following Nursing, Lab Technicians (2,114) form another substantial part of the sector's workforce. This reflects the growing importance of diagnostic services, which are essential for effective medical care and treatment. In more specialized roles, MBBS Doctors (1,238) and Technicians related to radiology, including Radiology Technicians (1,401) and X-Ray technicians (760), highlight their need in both primary healthcare providers and diagnostic imaging for patient care. These are essential for a well-rounded healthcare team to meet various medical needs.

Other supporting roles, such as Computer Operators (1,039), O.T Technicians (788), Clinical Assistants (378) and Dispensers (466). Including Electrical Technicians (372) and Ultrasound Technicians (284), further emphasize the need of a diverse Allied Health work force in over all healthcare facilities. These roles ensure that hospitals, clinics, and health centers are fully operational, even in challenging situations like power outages or technological failures.

6.8.8. Printing and Packaging Sector

The need for technical and creative professionals in the printing and packaging sector is fairly diverse and cuts across different production levels, as shown in Figure 13. The press machine operators are sought in the largest number as they are needed in 2,367. This suggests the importance of press operation among the workers in the industry because those who operate the printing presses are also responsible for managing, maintaining, fixing and operating several kinds of presses that are used in putting out different print productions.

Figure 13: Workforce demand in the printing and packaging sector
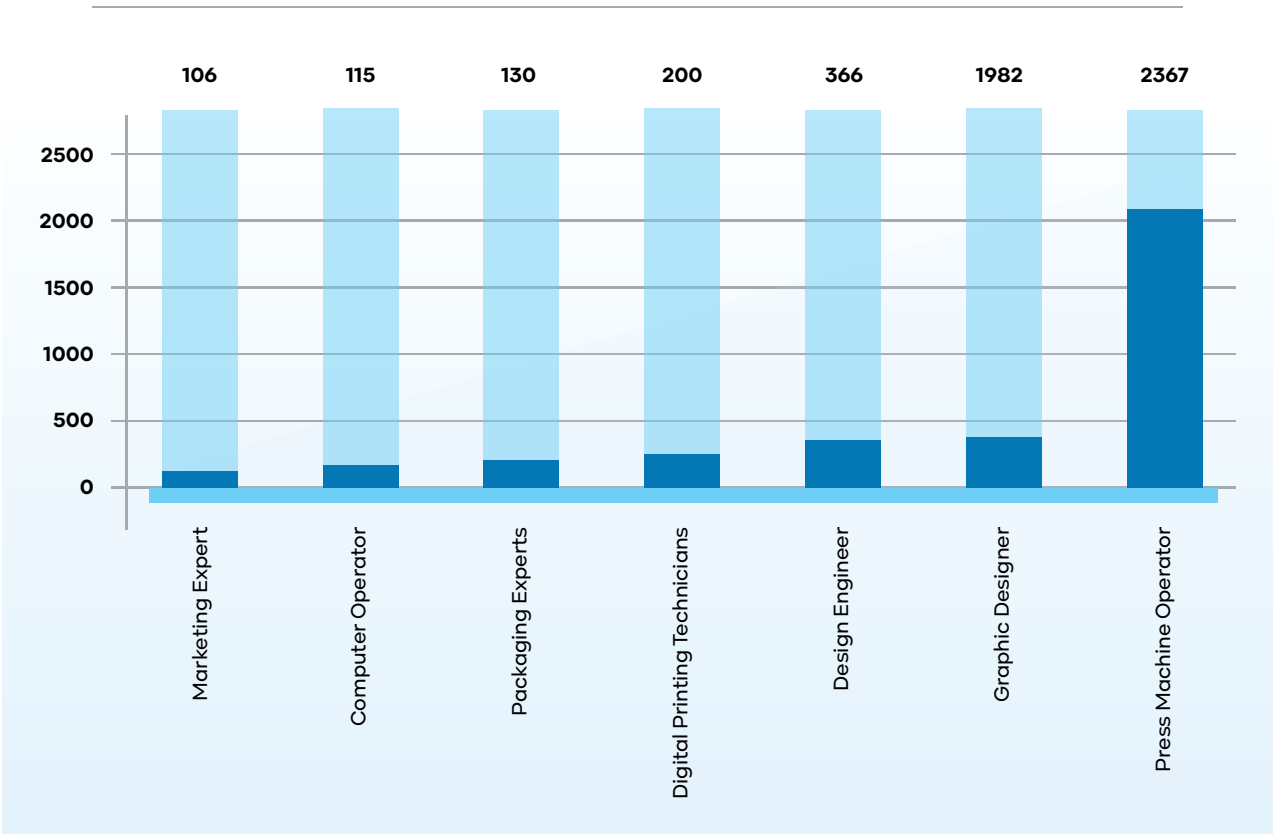
With 1,982 positions demanded, Graphic Designers are a prime example of the importance of creative roles which conceptualize visual arts for print and packaging. Design engineers are another important creative skill with the demand of 366 vacancies. Computer Operators (115) are required to control digital systems, regulate working relationships, and maintain effectiveness in the production process. Other occupation in high demand include Packaging Experts (130), Digital Printing Technicians (200) and Marketing Expert (106).

6.8.9. Sports Goods Sector

The Sports Goods Sector requires large numbers of Stitching Machine Operators with as many as 4,158 employees needed for stitch-based products like footballs. Other stitched products. This demand corroborates the fact that this industry is highly intensive in terms of employing human labor since the way the garments are stitched determines the quality of the resultant garments. Also, 1,106 industrial stitchers are in demand (Figure 14).

The demand for screen printing machine operators stands at 1,050, given branding and logos are essential components of sports goods – especially for leading brands. Press Machine Operators (966) are required to operate machines that mould or shape raw materials into sporting articles. This process is integral to creating consistent, high-quality products such as balls, protective gear, and more. The demand for Industrial Designers (840 positions) highlights the importance of innovation in the sports goods industry.

Figure 14: Workforce demand in the sports goods sector
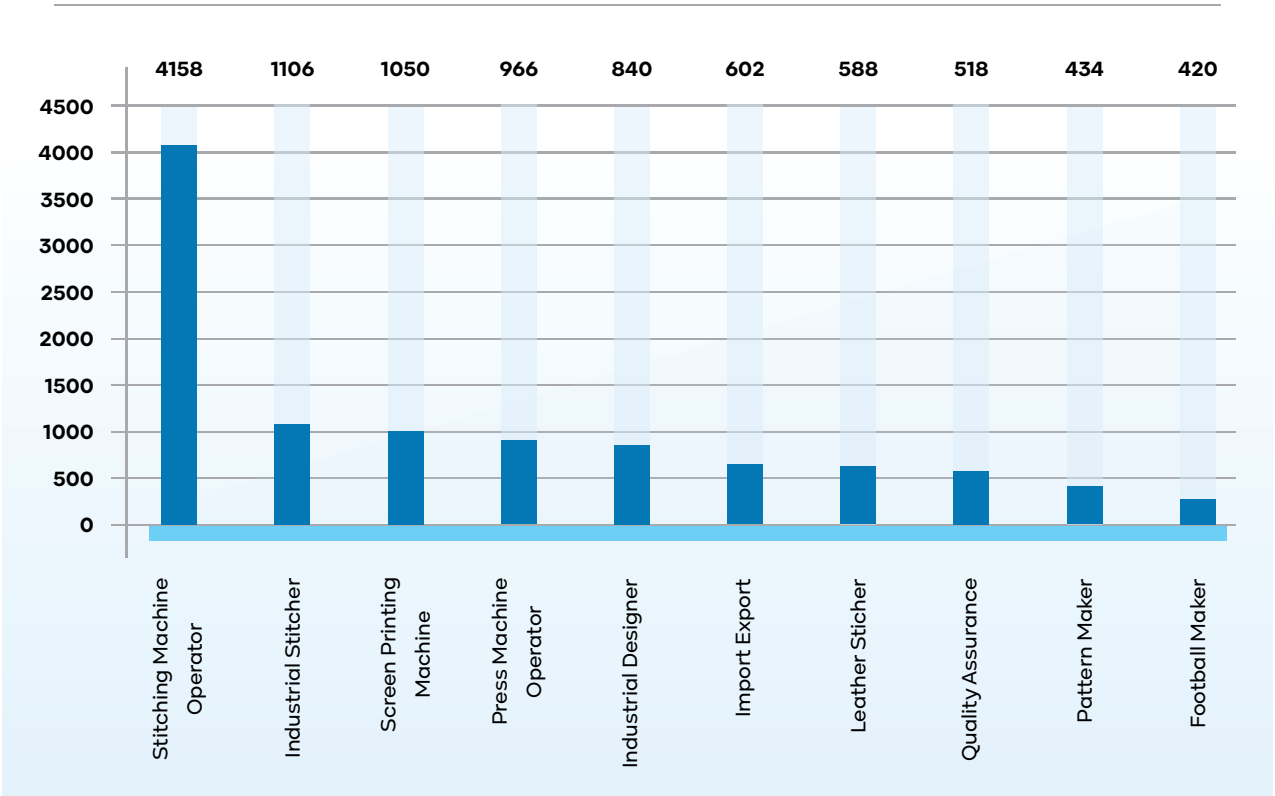
Other notable roles include Import-Export Specialists (602 positions), which reflects the global nature of the sports goods industry. These professionals manage the logistics and regulatory aspects of importing raw materials and exporting finished goods. Leather stitchers (588) are particularly important in the production of high-quality leather sports goods, such as footballs and gloves, while Quality Assurance professionals (518) ensure that the products meet industry standards and customer expectations. Supporting roles such as Pattern Makers (434) and Football Makers (420) is also crucial. Pattern Makers develop templates for sports goods, ensuring consistency in production, while football makers are specifically skilled in assembling this iconic sports item.

6.9 Occupations in Top 5 Leading Districts

6.9.1. Lahore

Figure 15 displays the demand for various skilled occupations in Lahore, with a particular focus on the Textiles and Manufacturing industries. The most in-demand occupation is Stitching Machine Operators, with an overwhelming requirement of 12,290 workers. This high demand is indicative of Lahore's strong position as a textile hub, where stitching is a critical function in garment production.

Other machine-related jobs such as General Machine Operators and Washing Operators also show substantial demand, 4,610 and 3,970, respectively. This reflects the importance of automated processes in the Textiles and Manufacturing industries, which rely heavily on machine operators to maintain productivity and efficiency. Demand of Cutting Machine Operators (3,340) and Packaging Experts (3,340) further underscores the need for skilled labour in the Production and Packaging stages of manufacturing. Similarly, occupations such as Mason (3,090) and Quality Assurance Technicians (3,090) reveal the importance of ensuring product quality and supporting construction activities.

On the lower end of the demand spectrum, roles like Press Machine Operators (1,980), Carpenters (1,350), and Steel Fixers (1,260) are seen, which are in notable demand. The diverse range of skilled occupations in demand highlights Lahore's industrial complexity, particularly in textile production, with a growing need for technical expertise to meet industry needs.

Figure 15: Leading occupations in Lahore
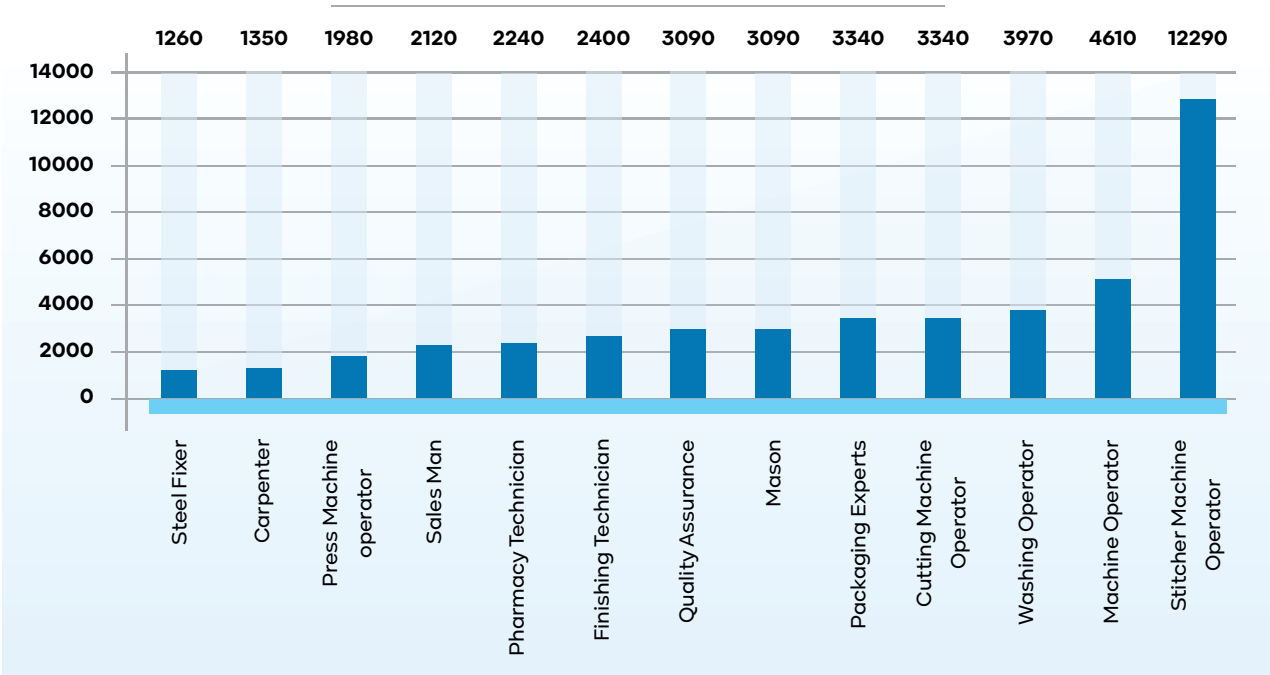
6.9.2. Sialkot

The demand for various skilled occupations in Sialkot, a city renowned for its Manufacturing, particularly of sports goods and surgical instruments, is highlighted in Figure 16. The Stitching Machine Operator role stands out with an overwhelming demand of 13,426. This high demand is a testament of Sialkot's strong presence in industries such as sports goods manufacturing, where stitching is a crucial part of production processes. Other notable occupations in demand include Import/Export professionals (3,892), reflecting the city's international trade activities, and Quality Assurance Specialists (3,360), crucial for maintaining the high-quality standards required in Sialkot's industries, particularly for export-oriented goods.

Similarly, Press Machine Operators (3,262) and Polishers (3,220) play important roles in the finishing stages of product development, underscoring the labor-intensive nature of these industries. Further down the chart, roles such as Industrial Stitchers (3,066) and Cutters (3,010) show that manual labor in the initial stages of production remains vital. Occupations like CNC Machine Operators (2,086) and Industrial Designers (2,758) reflect the demand for technical expertise and innovation in the design and manufacturing processes. It reveals the intense demand for a diverse range of skilled workers in Sialkot, particularly in roles directly linked to its manufacturing capabilities. Expanding training in these key areas will be essential to meet the growing workforce needs of this industrial city.

Figure 16: Leading occupations in Sialkot
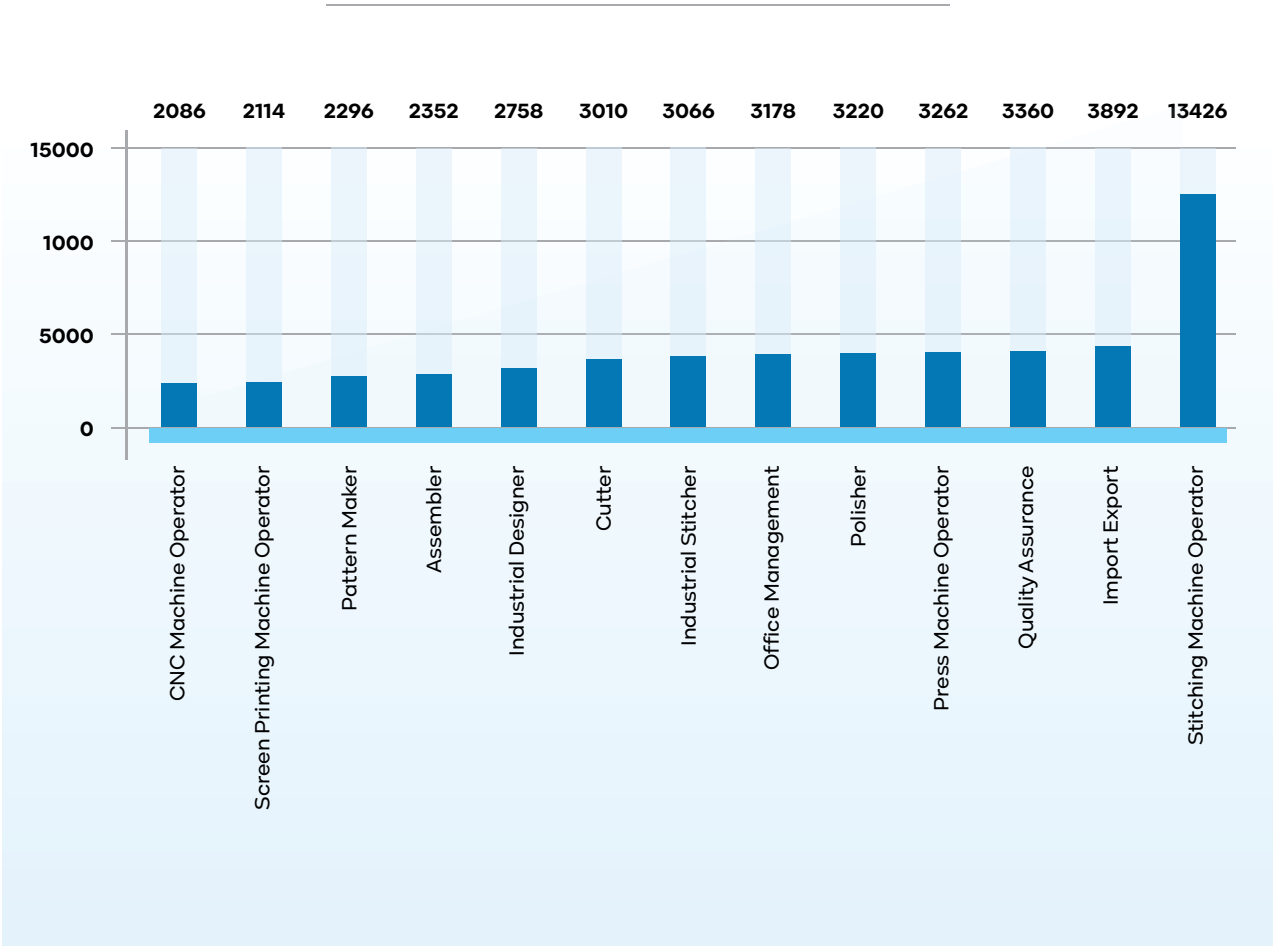
6.9.3. Faisalabad

Especially renowned for its textile and manufacturing sectors, Faisalabad is a major industrial hub of Pakistan. Figure 17 shows the demand for various skilled roles and highlights the critical need for skilled machine operators, with 29,538 required in the city's booming industrial base. This high demand underscores the significance of mechanized production, especially in Textiles, which remains the backbone of Faisalabad's economy. Stitching Machine Operators are the second highest in demand, with 7,740 required, while Boarding Machine Operators rank third with 3,600 needed. Other roles include Packaging Experts (1,530), Mason (1,278), and Mechanical and Electrical Technicians, with demand of 1,278 and 1,206, respectively.

By providing targeted training, TEVTA may ensure that industries have a steady supply of technically proficient workers, thereby enhancing productivity and contributing to industrial growth. Furthermore, there is a need to focus on Quality Assurance and technical roles like Mechanical and Electrical Technicians for ensuring that the skilled workforce can meet the sophisticated needs of modernizing manufacturing units.

Figure 17: Leading occupations in Faisalabad
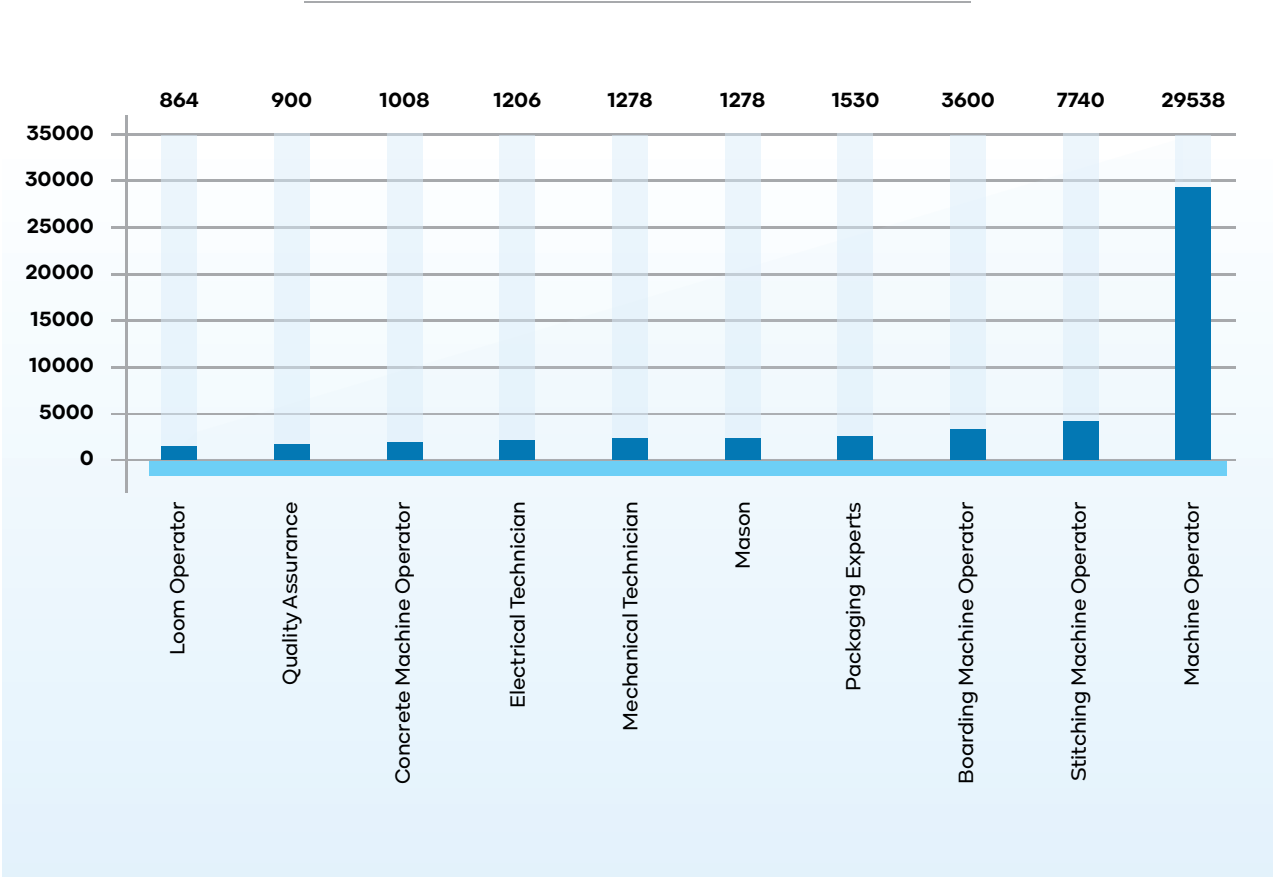
[9]More than 95% of polishers are in the Surgical instruments manufacturing sector. This also applies to cutters.

6.9.4. Gujranwala

Gujranwala is known for its manufacturing and food services sectors. Figure 18 indicates that the district's demand for Restaurant Managers stands at 9,207, indicating a thriving food services industry. Furthermore, the demand for Fast Food Chefs is also significant, with 4,590 positions. In manufacturing and technical fields, roles such as Machine Operators (2,268), Welders (2,556), and Quality Assurance Specialists (2,025) are also in significant demand. The demand for CNC Machine Operators (1,521) and Injection Molding Machine Operators (1,395) indicates specialized and mechanized labor requirement. The demand for Industrial Electricians (1,350) and Fitters (1,386) also reflects the technical expertise required in maintaining and expanding industrial operations.

Figure 18: Leading Occupations in Gujranwala
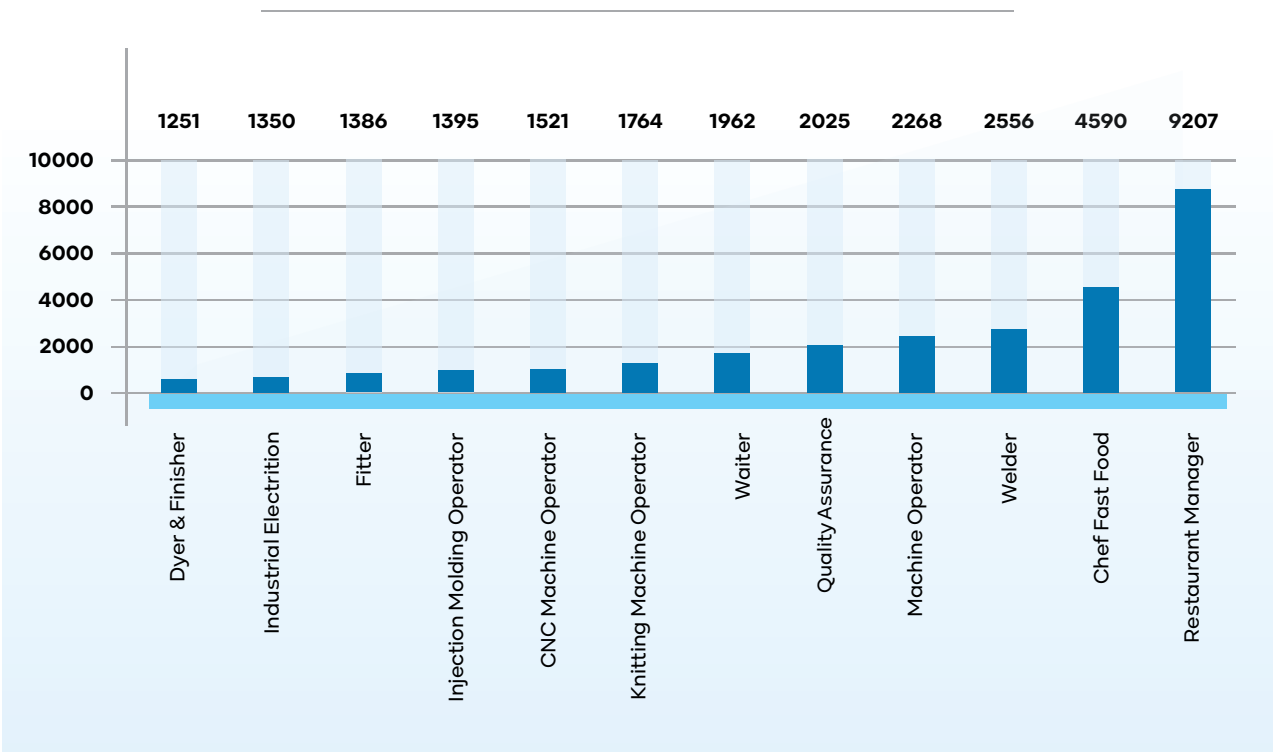
6.9.5. Gujrat

As shown in Figure 19, the demand for Polishers in Gujrat is 6,160, highlighting the importance of finishing work in industries like Ceramics, Cutlery, or Furniture. Also, the role of Machine Operators is significant as seen from the demand of 2,400. Furthermore, the demand for Press Machine Operators (2,120) suggests a thriving manufacturing sector requiring skilled individuals to handle advanced machinery. In addition, the demand for Weaving Machine Operators (1,360) and Loom Operators (1,340) underscores the notable presence of the Textiles industry in Gujrat. Design Engineers (1,450) and Carpenters (1,520) are also highly sought after, showing that craftsmanship and industrial design remain integral to Gujrat's economic fabric.

Figure 19: Leading occupations in Gujrat

| | 980 | 1220 | 1270 | 1340 | 1360 | 1450 | 1520 | 2120 | 2400 | 6160 |

Chart categories (left to right): Chef, Tyre Building Expert, Driver, Loom Operator, Weaving Machine Operator, Design Engineer, Carpenter, Press Machine Operator, Machine Operator, Polisher
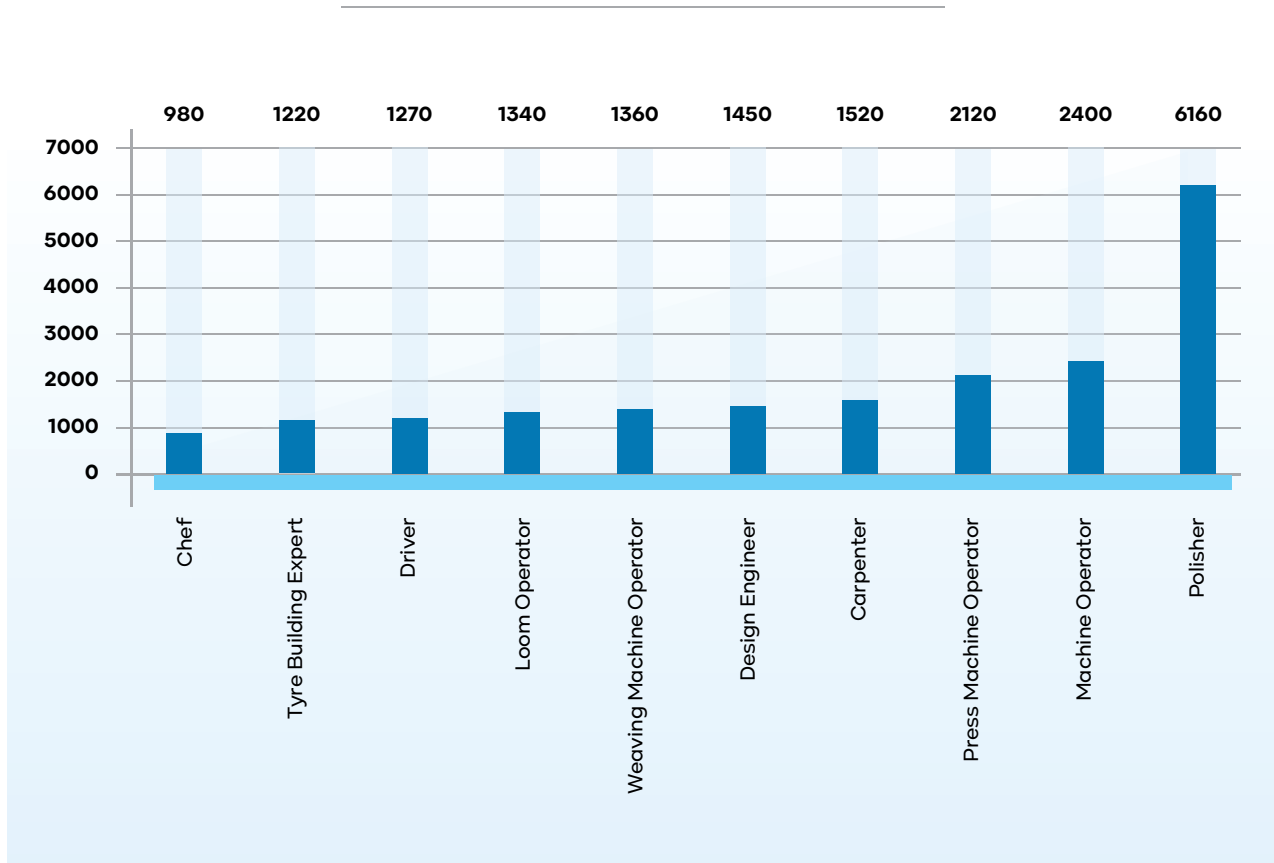
6.10. Demand and Supply Gaps

The analysis of demand-supply gap for Punjab's vocational trades emphasizes the need for targeted training. This analysis reflects a wide range of occupations, from technical and industrial fields to creative and service-based roles. One of the most significant gaps appears in technical trades. The CNC Machine Operator alone shows a shortfall of 3,674 positions, while Electrical Technician has a shortage of 4,865 and Civil Technician trade reflects a gap of -5,630 positions. This evidence underlines the need to enhance training opportunities in mechanical, electrical, and civil engineering technologies so that the demand for manufacturing and construction sectors may be duly met.

Automation technology shows a gap of 190 whereas electrical technicians face a shortfall of 7,465 positions. This indicates a critical requirement to enhance training opportunities in Automation and Electrical trades. The Construction sector also faces significant shortages of 6,387 Masons and 3,557 Carpenters. These are essential roles for infrastructure development projects. The gap in Plumbers (487 positions) and Pipe Fitters (312 positions) further emphasizes the need for increasing skilled labor to support services in construction and industrial projects. A shortage of 2,892 Welders is also critical for growing energy and infrastructure initiatives.

The Hospitality and Service sector presents as another critical area, with a massive gap of 21,250 for Food and Beverage Captains and 4,808 Waiters. This shortfall can be deemed crucial given the government's increasing focus on Tourism and Hospitality as key drivers of economic growth. Furthermore, in the Technology and IT sectors, a gap of 4,775 Computer Graphics Professionals, 2,340 Computer Operators, and 1,505 Social Media Marketing specialists demonstrates the province's growing need for digital skills in an increasingly tech-driven economy. A gap of 2,501 Solar Photovoltaic System Technicians highlights the demand for green jobs. These gaps call for TEVTA to incorporate green energy and advanced digital skills into their training programmes to meet the demands of a more sustainable, technologically advanced economy.

Creative industries are also facing substantial gaps. This reflects a significant opportunity for TEVTA to expand training in Fashion Designing, Tailoring and Stitching (gap: 1294), which is in high demand and could provide numerous employment opportunities, especially for women.

In agriculture-related occupations, there is a gap of 1,238 for Farm Managers, while Milking Machine Operators position faces a shortfall of 1,195. These gaps reflect the need to modernize training in the agriculture and dairy sectors, particularly in Punjab as the province remains a vital agricultural region. Training programmes that may focus on modern farming techniques, agribusiness management, and mechanization are critical for improving productivity and meeting the growing demand. Other significant gaps include Quality Assurance (11,089 positions), Salesmen (3,678 positions), and Import/Export Documentation Specialists (2,871 positions). Overall, it is important to have training programmes to cater to the needs of export-oriented industries, quality control, and business management.

The data on excess supply (Table 9, Annex-C) highlights a significant overproduction of skilled workers in several areas, particularly in beauty and fashion-related occupations. For instance, 15,037 Computer Applications Specialists and 3,672 Certificate Holders in MS Office face an oversupply, reflecting a mismatch between the volume of trainees produced and actual market demand. The same pattern is seen in the fashion industry, where 1,780 Pattern Makers and 2,811 Fashion Designers exceed the current demand. Additionally, there is an excess of Hand Embroiderers of about 1,496 , further emphasizing the need for training providers to realign trainings to reduce excess supply in saturated fields while focusing on emerging areas with higher demand.

TVET institutes are currently not producing enough graduates in certain trades leading to significant unmet demand across key industries. For instance, in the Manufacturing sector critical roles such as Stitching Machine Operators (30,333 vacancies), Machine Operators (42,300) and Packaging Experts (9,038 vacancies) show substantial gaps. Similarly, Welders (6,386) and Polishers (9,644) also have significant shortfalls, indicating a pressing need for training in these areas to support industrial growth.

In the Healthcare sector, gaps are pronounced in roles like Nurses (4,514 vacancies), Radiology Technicians (1,401) and Veterinary Technicians (1,003), where training needs largely remain unmet despite the critical importance of these professions. Likewise, the Renewable Energy sector faces growing demand, particularly for roles such as Electrician Solar (1,942) and DC electricians (658), where no training programmes currently exist. This demand highlights the need for increasing specialized vocational trainings to support Pakistan's transition to cleaner energy sources.

The Agriculture sector also faces significant shortages of Agricultural Machine Operators (1,103) and Trained Agricultural Laborers (700). These roles are crucial for modernizing farming techniques and improving agricultural productivity. Additionally, the construction sector has an unmet demand for roles such as Concrete Machine Operators (1,540 vacancies) and Industrial Painters (200 vacancies), where supply remains at zero.

Introducing targeted vocational programmes in these high-demand trades will be pivotal for addressing unemployment, supporting industrial growth, and aligning the workforce with market demands.

Table 5: Employment Oppurtunities for disadvantaged groups

Special Group	Punjab	Percent
Person with disability	5,664	52.4
Religious minority	2,268	21.0
Women	1,188	11.0
Transgender	924	8.5
Elderly	660	6.1
Ethnic Minority	108	1.0
Grand Total	**10,812**	100

6.11. Quota or Reserved Seats for Disadvantaged Groups

Table 5 highlights the quota for disadvantaged groups in Punjab, with a total of 10,812 seats under process for allocation. Most of these seats are reserved for persons with disabilities (PWD) that comprise the largest set of beneficiaries in this respect - 52.4% of the total seats (5,664). Religious minorities have a significant share - 21% (2,268) of the total seats. Women account for 11% (1,188) of these seats, whereas transgenders have a share of about 8.5% (924). Seats reserved for the elderly represent 6.1% of the total, with seats available throughout Punjab (660 seats). Lastly, ethnic minorities, however, have the smallest share of the quota, about 1% with 108 seats.

6.12. Skills for Disadvantaged Groups

Table 8 (Annex-B) presents a detailed view of the occupational seats allocated to disadvantaged groups in Punjab, totaling 10,812 seats. These positions are for a variety of jobs roles, ranging from low-skill roles like Sweepers and General Workers to more skilled positions such as Lab Technicians, Computer Operators, and Machine Operators. The variation in the number of seats allocated per occupation reflects the diverse industrial and service sector needs across the province.

A prominent finding from the data is that the highest number of seats, 4,440, is allocated to Packing Workers. This substantial allocation is likely due to the significant demand in Punjab's thriving Manufacturing and Logistics sectors, where packing and sorting are essential and frequent tasks. Similarly, the large number of demand for Sweepers (1,832) indicates the ongoing need for sanitation workers, which is a critical aspect of both urban and rural development. Additionally, the demand of 1,212 general workers highlights the need for unskilled labor, across multiple sectors, including construction, maintenance, and services.

Technical and administrative roles such as Lab Technicians (229), Receptionists (132), and Computer Operators (36) show a smaller but significant demand.

These roles reflect the need for skilled labor in healthcare, education, and service industries, where a growing demand for technical proficiency is evident. Interestingly, jobs like medical technicians and stitchers have been allocated fewer seats, suggesting potential areas where future demand could increase as these sectors grow.

6.13. Employers' Satisfaction with TVET Graduates

Table 6 outlines employers' satisfaction with TVET graduates across various sectors in Punjab, on the scale of Satisfied, Not Satisfied, or Don't Know with respect to the services or opportunities in each sector. The satisfaction levels reveal important insights into the performance and perception of these sectors in terms of their workforce, productivity, or service provision.

Manufacturing, Services, and Textiles & Garments sectors stand out with 100% satisfaction levels, indicating that respondents are universally content with the current conditions in these sectors. These sectors likely benefit from better infrastructure, training, and other opportunities that meet the needs of both employers and employees, establishing these industries as models of satisfaction.

Sectors like Agriculture, Allied Health, and Construction present mixed results, with around 52%–61% satisfied but also a significant portion either not satisfied or undecided. For instance, in agriculture sector employers show 57% satisfaction but a concerning 16% dissatisfaction and there is a 27% who don't know. This may be indicative of potential gaps in agriculture services or uncertainties about job security, training, or innovation in the sector.

The Printing and Packaging sector stands out negatively with 100% of respondents not knowing about their satisfaction levels, highlighting a serious lack of awareness, interest, or satisfaction within this industry. This could indicate poor communication, lack of opportunities, or unclear development pathways within the sector. The Renewable Energy

Table 6: Employers' Satisfaction with Technical and Vocational Education and Training

Special Group	Satisfied	Not Satisfied	Don't Know
Agriculture	57	16	27
Allied Health	52	24	23
Construction	61	24	15
Hospitality & Tourism	61	17	22
Manufacturing	100	0	0
Printing and Packaging	0	0	100
Renewable energy	61	16	22
Services	100	0	0
Textiles & Garments	100	0	0
Average	59	19	22

6.14. Industry-led Training Opportunities

Industry-led training are essential for TVET graduates for consistent acquisition of new knowledge and practical experience. During this study, it was observed that smaller industries and enterprises are relatively less involved in offering accredited internal training, which could be attributed to financial constraints.

These firms depend more on other training institutions, including TVET programmes, to create avenues fo skills training. The existing training opportunities are often focused on improving employees' technical competencies, communication skills, and understanding of industry-specific regulations of the industry's own personnel.

Figure 20: Industry-led training opportunities
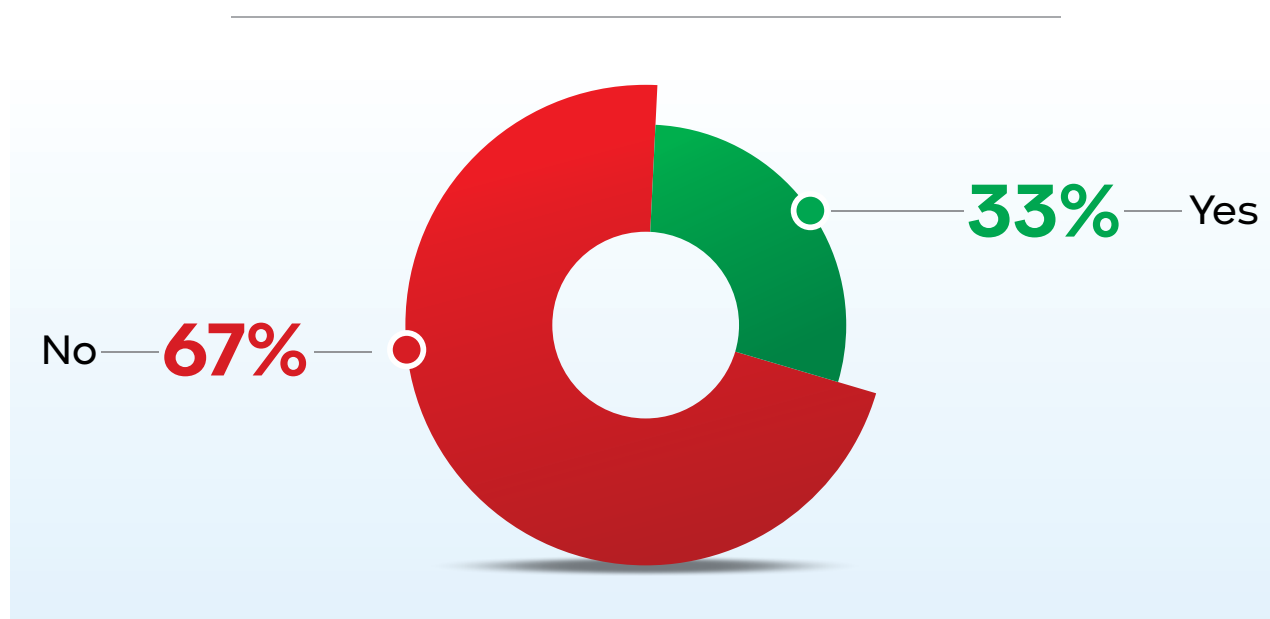
The smaller organizations can benefit from stronger partnerships with vocational institutions to help them develop training programmes tailored to their needs. It also reflects the industry's broader need for a more coordinated effort for enhancing workforce skills, involving educational institutions and businesses.

6.15. Skills Assessment in Recruitment

Figure 21 highlights various assessment methods used by employers during the hiring process showing how they evaluate skills and competencies. Personal interviews are the most preferred assessment method, based on pertinent responses of 86%. Practical skills assessments are also highly prioritized, with 74% of the employers using this method. This particularly underscores an interest in hands-on competencies.

Figure 21: Methods of skills and competencies assessment
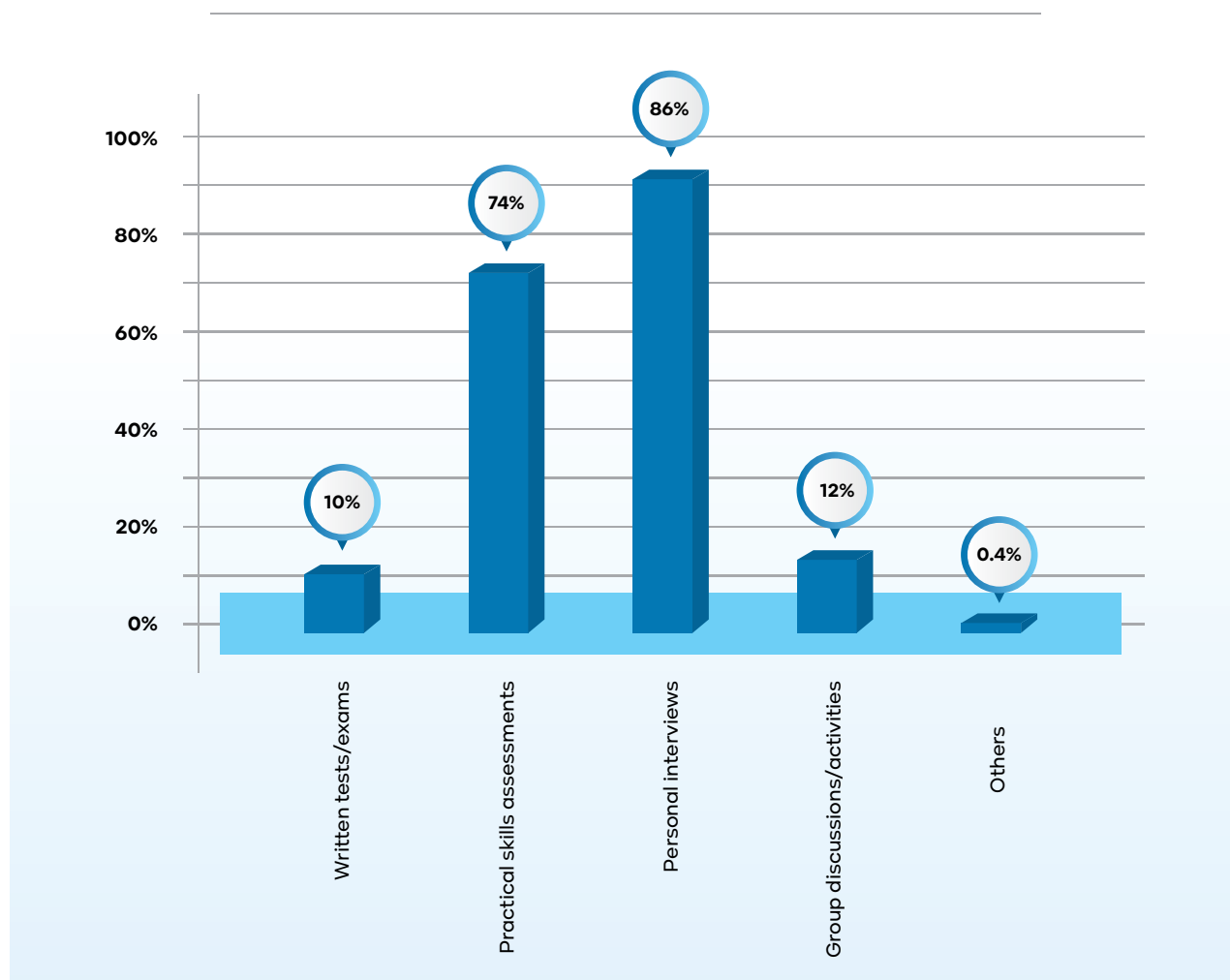
As most preferred activity for recruitment, the use of written test examinations and group discussion/activities is followed by only 10% and 12% of the establishments, respectively. Other forms of assessment are used infrequently (0.4%).

6.16. Challenges in Hiring or Retaining Employees

6.16.1. Female Employees

Figure 22 presents the issues relating to the hiring and retention of female employees in Punjab.

The most cited problem (46%) is the lack of flexible work arrangement. This implies that extending shift work or working from home may well be the way to go as they could be fundamental to retaining more female employees. The second most frequent problem is the absence of Occupational Segregation and Gender Stereotypes according to 34% of the respondents. This suggests that there are probably many women who find their workplace environments unhealthy and/or unresponsive to their needs, and this calls for policy change and better organizational culture. This challenge also relates to the traditional perception that guides who hires women for which job thus limiting their participation in certain fields.

Safety and security is a significant challenge reported by 33% of the participants. Lastly, 'other' challenges were mentioned by 11% of respondents, including cultural constraints that do not allow female to be hired as labors.

Altogether, these results highlight lacunas in workplace policies and a lack of flexibility, along with the effects of gender stereotyping and safety concerns on overall female hiring and high turnover rates in Punjab.

Figure 22: Challenges in hiring or retaining female employees
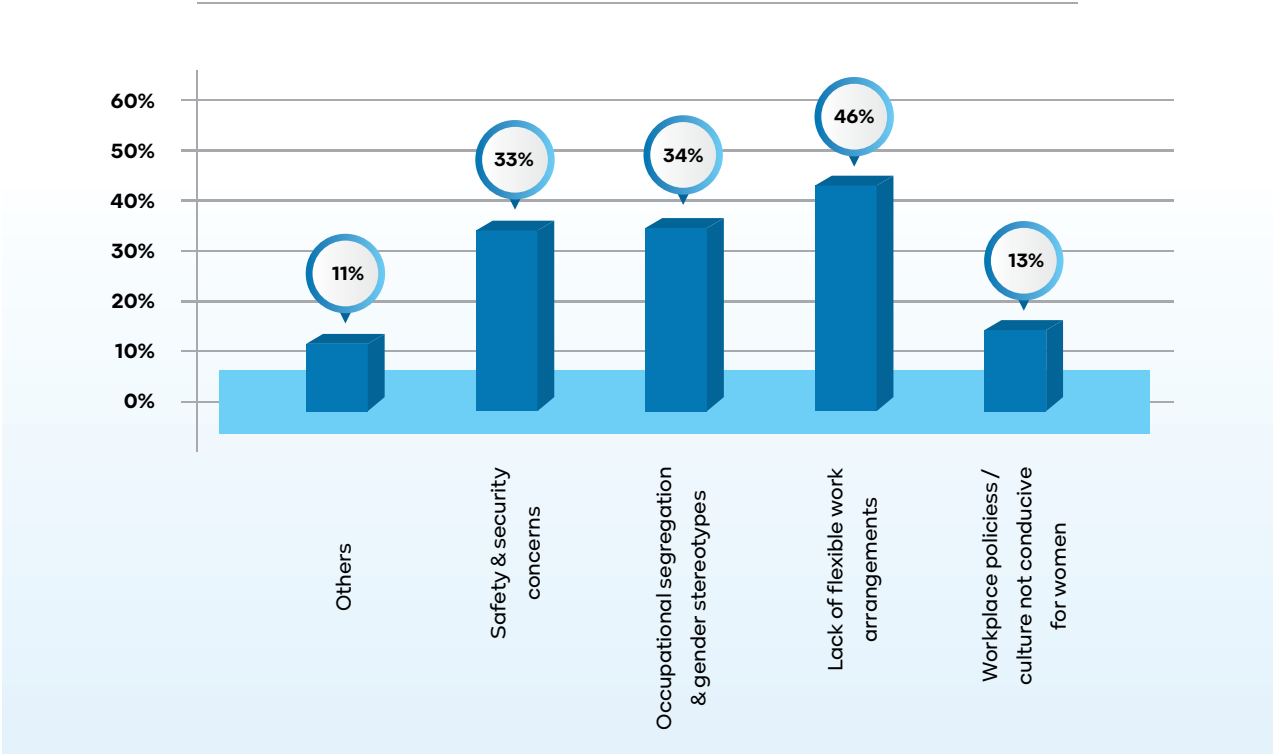
6.16.2. Disadvantaged Groups

The most reported problem for disadvantaged groups is accessibility of the health facilities with 52% of the respondents experiencing issues with physical access and transport (Figure 23). This goes to show that there is a serious and urgent problem of accessibility in the workplace and other public facilities for people from the disadvantaged group, especially the persons with disabilities. The other problem area is the absence of supportive policies and reasonable accommodation. 45% of the respondents reported this issue as a serious factor. This may suggest a need for a better understanding of policies, and changes that are made in workplaces so that the underprivileged employees can be enabled to practice their skills and feel valued in the society.

Eighteen percent of respondents reported facing social stigma and discrimination. Lack of skill training was deemed a challenge by 29% of the respondents. This implies that the existing training interventions should be refined to include programmes that help persons from disadvantaged groups acquire requisite skills for making successful transitions in the labor market. Lastly, 'other' factors were reported by 10% of the respondents that includes the nature of work being unsuitable for disadvantaged groups.

Figure 23: Challenges in hiring or retaining employees from disadvantaged groups
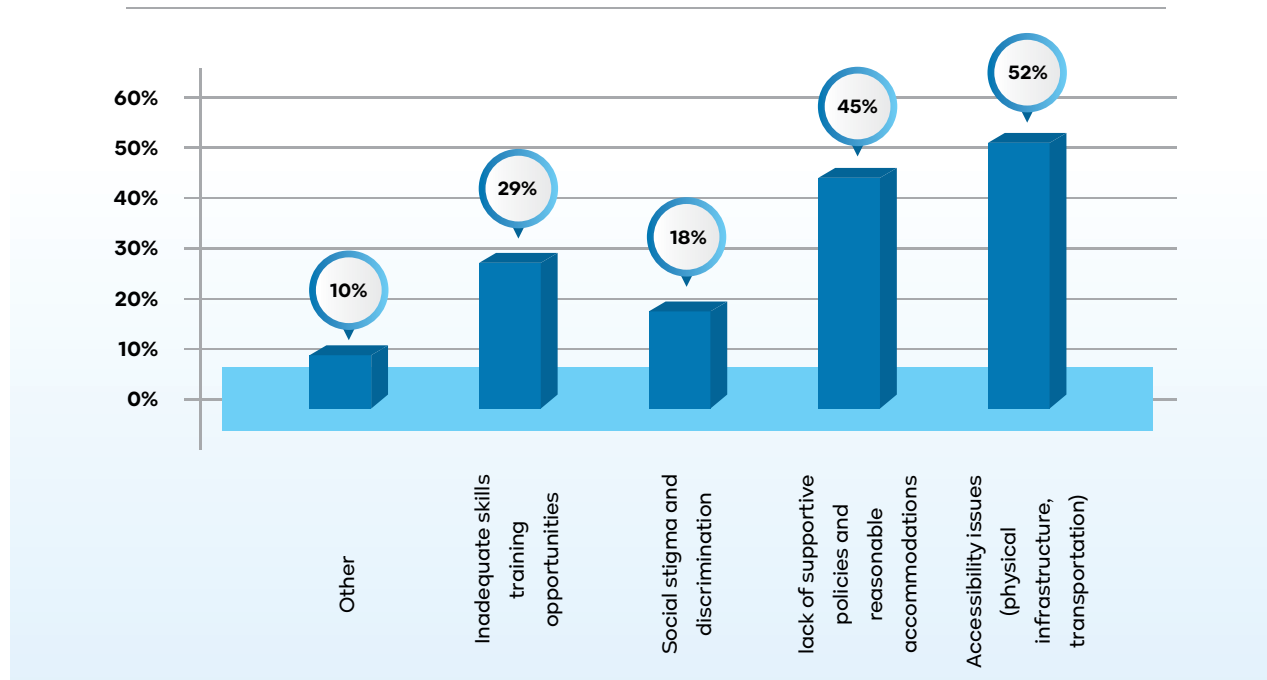
6.16.3. Workforce Development and Skills Acquisition

According to the 83% respondents, the biggest issue in workforce development and skills acquisition is the skills mismatch between training/education and job requirements. Rapidly changing technological landscape is the second challenge, according to 69% respondents. 63% respondents consider attracting and retaining talented workers a key challenge. Furthermore, limited training budget and resources is one of the key challenges, as suggested by 34% of the respondents. 'Other' issues were reported by only 2% of the respondents that call for increased collaboration between these core stakeholders is crucial for training programmes to be properly aligned to employment market needs and ensuring that the workforce can meet different job demands.
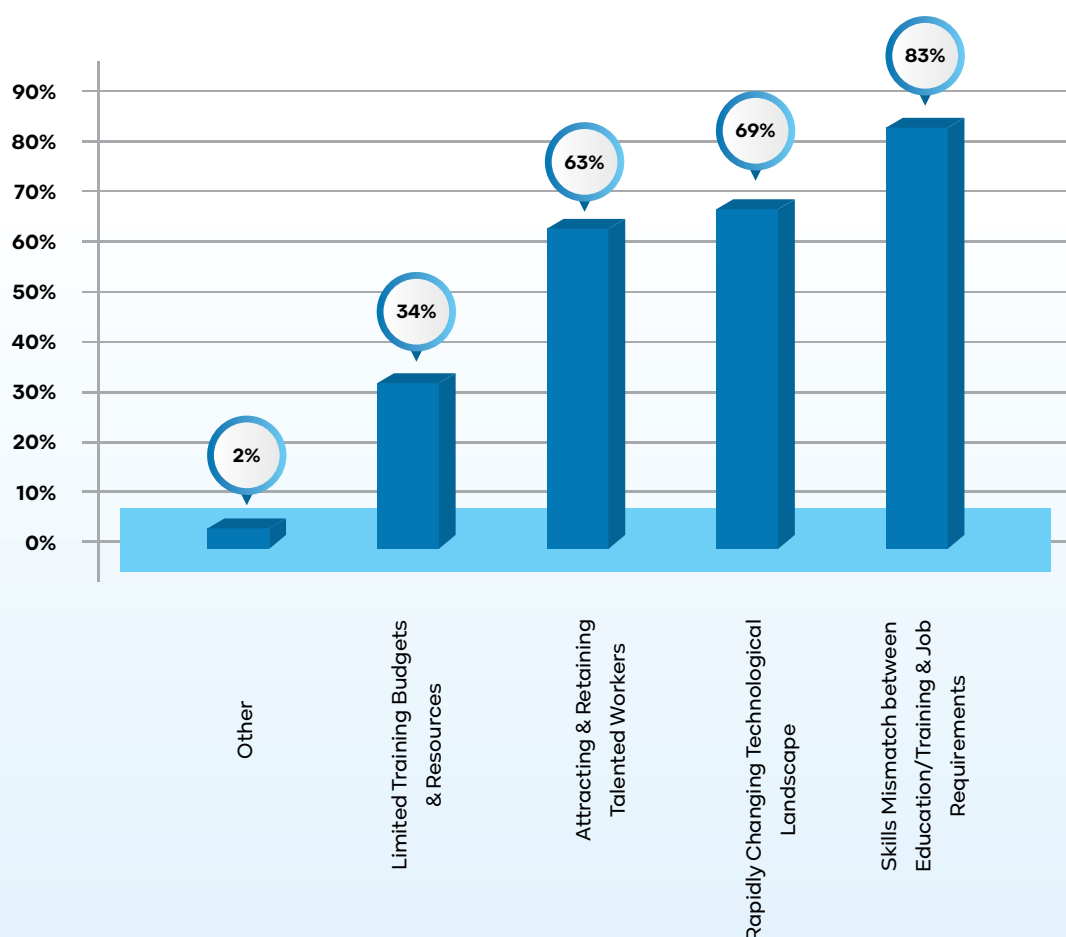
6.17. Suggestions for Improvement

6.17.1. Quality and Relevance of TVET Programmes

Figure 25 outlines suggestions to increase the quality and relevance of technical and vocational education and training in Punjab. The data indicates that there is a need to concentrate on the development of practical/hands-on skills as the most important factor, by 66% of respondents. Another important recommendation that can be drawn from the responses of 49% of respondents is change in curricula to meet the current requirements and needs of the industry. This underscores the need to enhance the existing TVET capacity for delivering Knowledge and Skills and Curriculum by making the programmes more responsive to the changing landscape of the job market.

The need to improve the quality of instructors/trainers has been reported by 52% of the respondents, suggesting a challenge in maintaining instructional quality within TVET programmes. Enhancing industry exposure and internships is also seen as critical, with 35% of respondents favouring this suggestion. This also points to a perceived gap in real-world industry exposure for students in Punjab. Finally, 'other' suggestions were minimal (2%).

Figure 25: Suggestions for improving the quality and relevance of TVET programmes
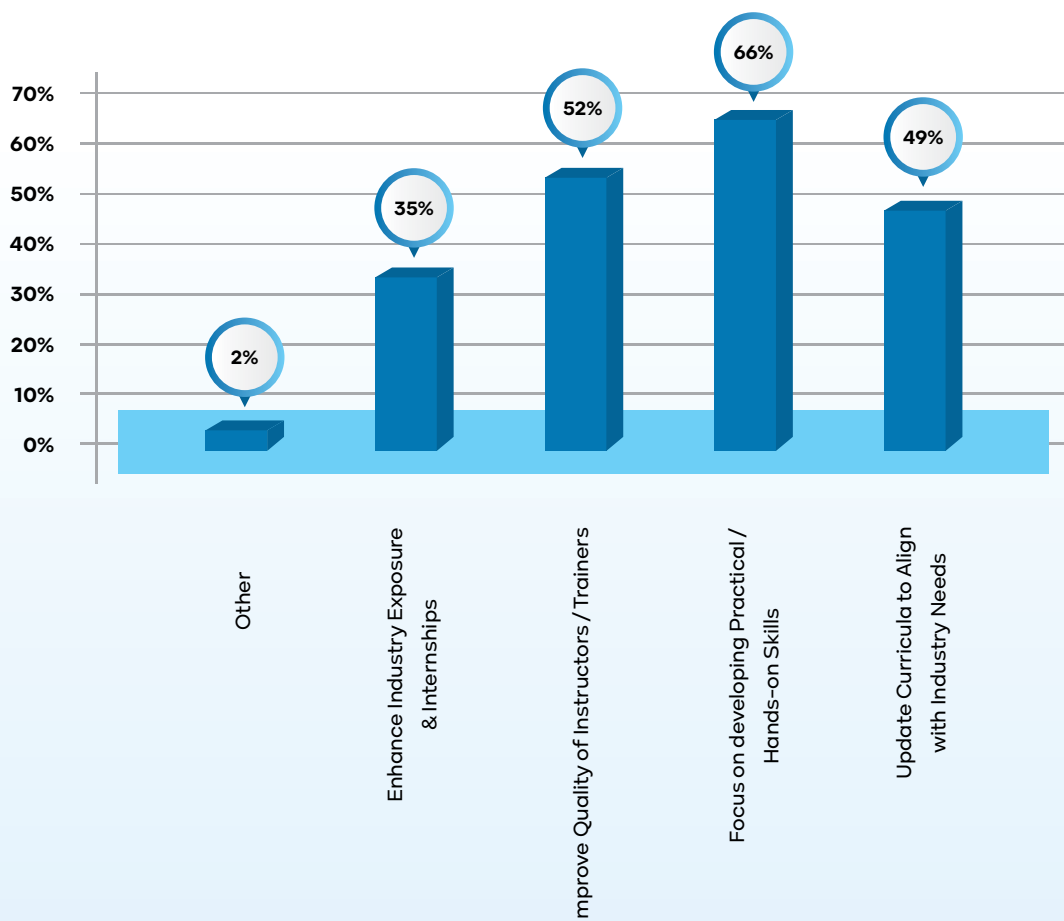
6.17.2. Green Skills

Figure 26 illustrates the growing emphasis on green skills across industries in Punjab, highlighting various skills as crucial. Energy efficiency practices top the list (54% respondents). This indicates a stronger focus on energy-saving measures, possibly driven by more industrialized processes that require optimization to reduce energy consumption. Another sector with relatively high recognition coming out of the data as important is waste management and recycling (46%). It may be due to growing consciousness regarding sustainable waste disposal, possibly due to environmental issues peculiar to the region.

Figure 26: Green Skills across industries
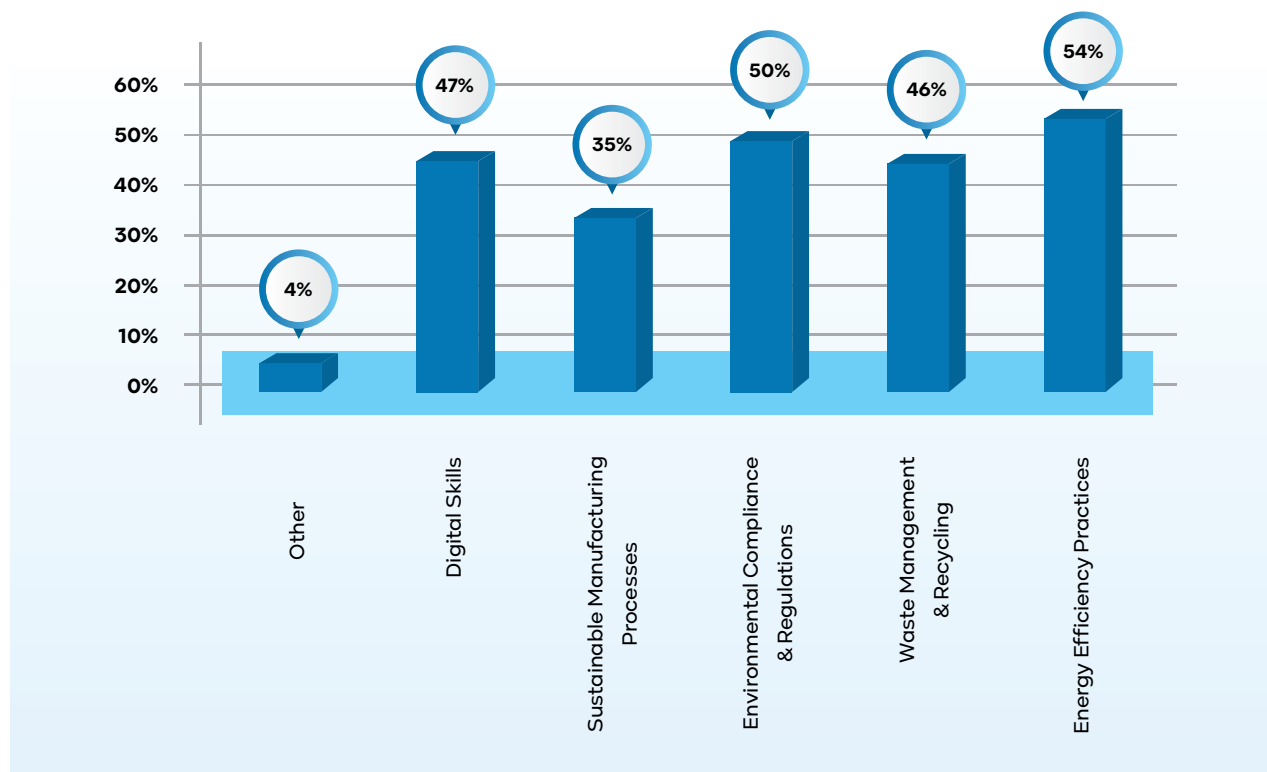
Importance of environmental compliance or regulations has been acknowledged by 50% of the participants. This may be due to increased enforcement of environmental regulation or large-scale industrial units. For digital skills, 47% of respondents agreed that digital skills are important in Punjab. Moderate attention was paid to sustainable manufacturing practices, with 35% of respondents opting for the option.

Other skills were reported by respondents in insignificant percentage (4%) indicating that emphasis is still on the core categories reported.

6.17.3. Introducing Green Skills in TVET Programmes

Figure 27 presents specific suggestions for incorporating green skills into TVET programmes across Punjab, focusing on several key areas for improvement. Fieldwork experience in green technologies was the most preferred idea supported by 65% of the respondents. This serves as a major indication of a growing need for practical experience in coverage practices as the market continues to demand personnel with adequate knowledge in the practical application of green technologies.

Partnerships with environmental charitable organizations are also valued, however, their importance has been noted by 43% of respondents. This indicates that collaboration with other external environmental organizations is considered to be strategic in the improvement of the TVET curricula with issues to do with the environment. The integration of unique green skills courses or modules is suggested by 41% of respondents. This means that many of them think that there should be discrete courses under the different programmes offered on TVET, and the courses should focus on sustainability and environmental literacy. Another important suggestion (by 39% of respondents) is to embed green ideas within those trades and disciplines. Finally, other suggestions are relatively minimal with 2%.

Figure 27: Suggestions for introducing green skills in TVET programmes
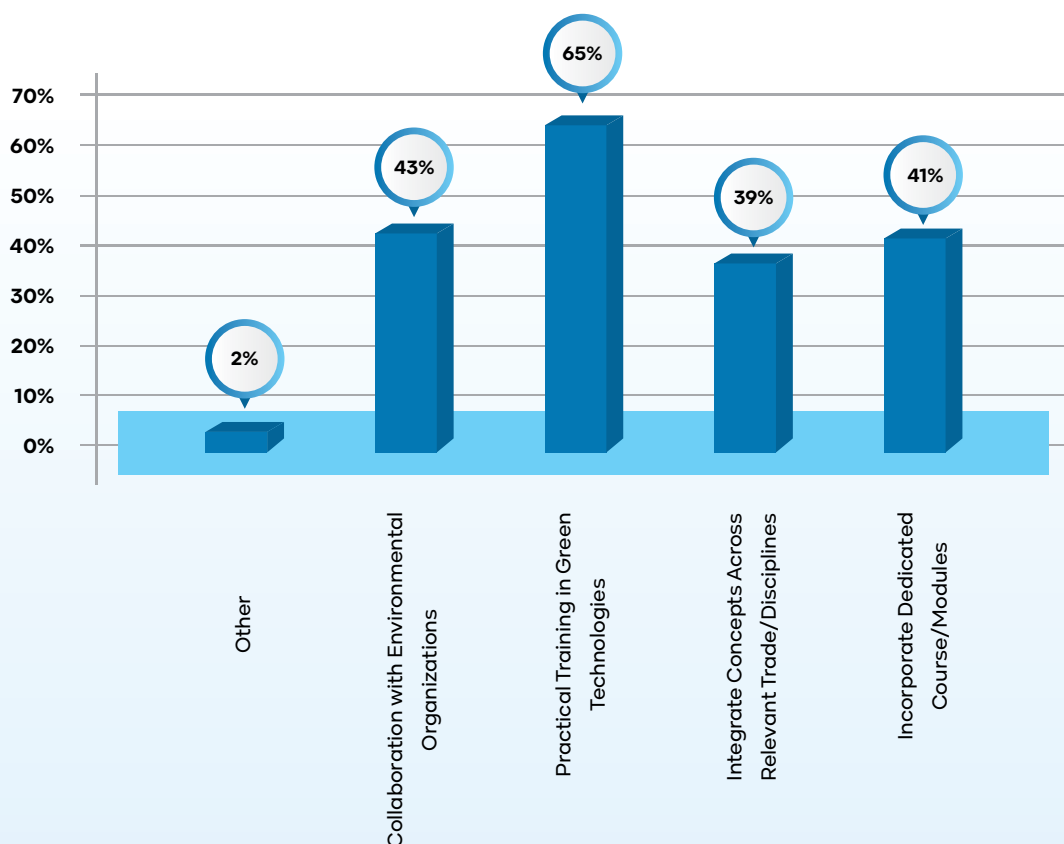
6.17.4. Improving the Overall TVET System

In Figure 28, suggestions for improving the overall TVET system in Punjab show a focus on strengthening collaboration between industry and educational institutions to enhance the quality and relevance of skills training.

Figure 28: Suggestions for improving overall TVET system
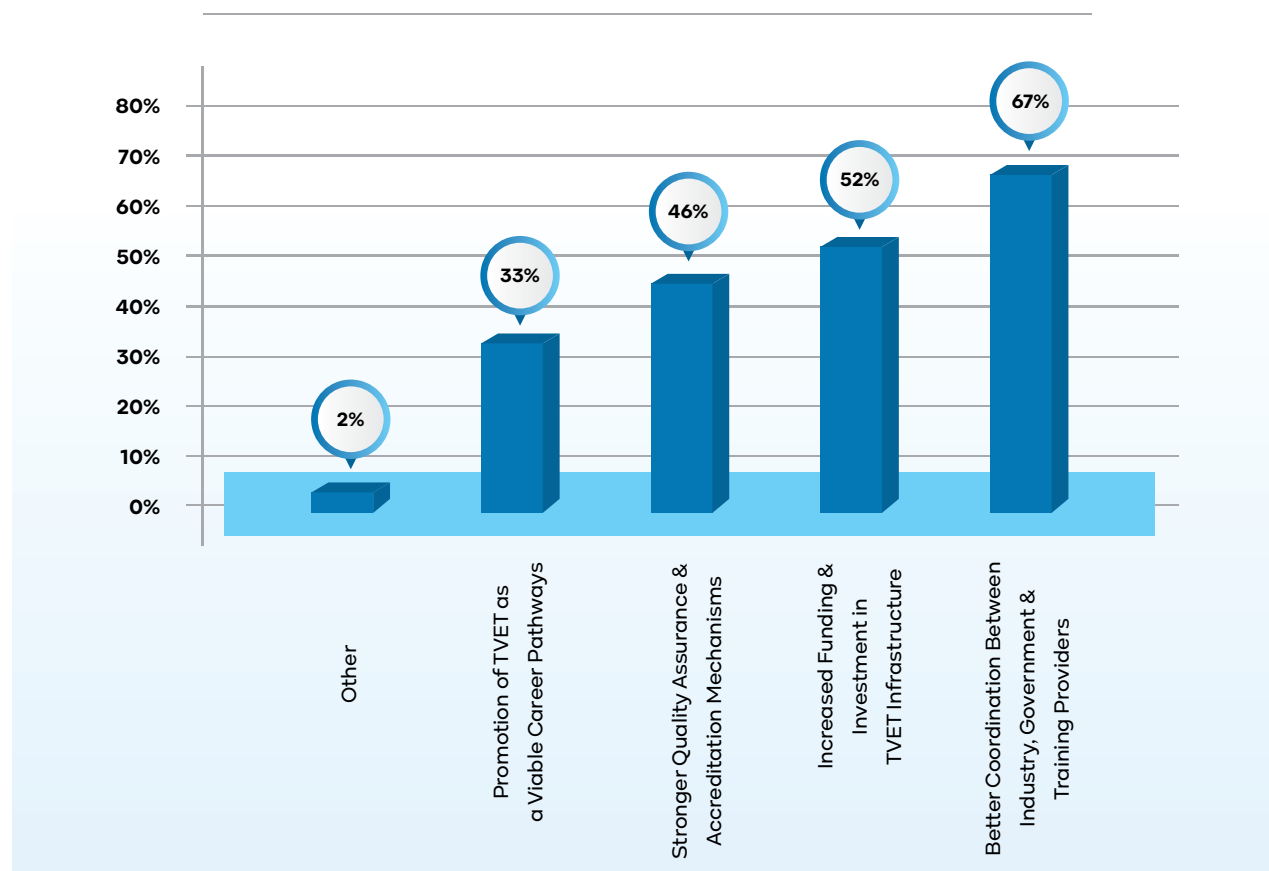
6.17.5. Promoting Greater Industry-TVET Collaboration

A key recommendation emanating from the data (Figure-29) is to facilitate more internship and apprenticeship opportunities, which is the most widely supported suggestion with 65% of respondents. This highlights the importance of practical, on-the-job training to bridge the gap between classroom learning and industry requirements. A second important suggestion (by 56% of respondents) is to include inputs from the industry for curriculum development and its review.

About 42% of respondents have suggested the formation of formal industry advisory boards/committees to ensure a constant flow of feedback between academic institutions and companies. Finally, 28% of respondents suggested encouraging industry contributions such as providing equipment, instructors and funding. It may contribute significantly towards training centres obtaining some of these modern facilities and equipment as they are fundamental in providing quality technical education.

Figure 29: Suggestions for promoting greater industry-TVET collaboration
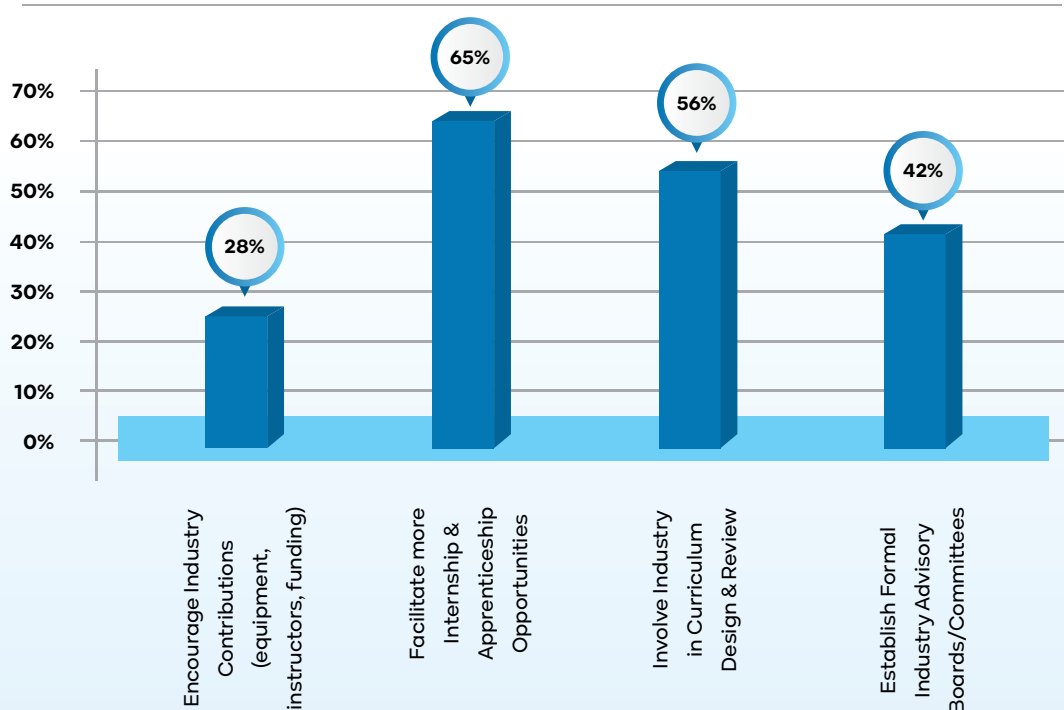
6.17.6. Promoting Industry-TVET Collaboration

Figure 30 summarises suggestions for increasing synergy between industry and TVET institutions in the light of survey data, highlighting the requirements of infrastructure and faculty development to better meet industry demands. There is an agreement of 59% of the respondents on working with technology companies to align governance of TVET programmes with technological advancements. Informal collaborations in this regard can help solve the problem by offering the best technologies, training solutions and the latest skills in technical education. Among the priorities discussed, 58% emphasized training of TVET instructors in new technologies.

Figure 30: Suggestions for promoting industry-TVET collaboration
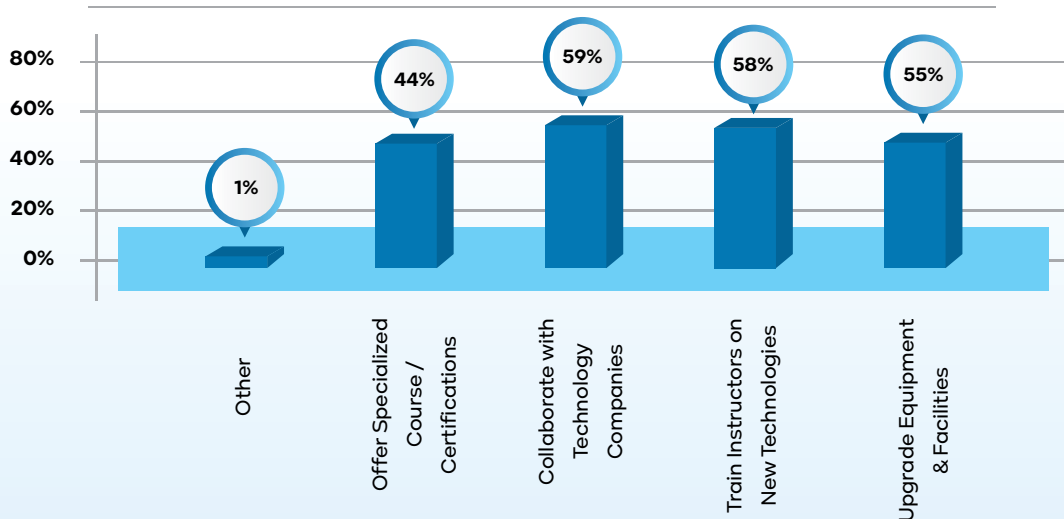
The second key recommendation coming from the data was about upgrading equipment and facilities with 55 percent responses. State-of-the-art equipment in the TVET institutes would mean that many learners are exposed to equipment common in the workplace, hence enhancing their marketability in their respective fields. The idea of offering special courses and certifications to meet the demand of industry was favoured by 44% of respondents. This would enable institutions offering TVET to equip their students with more specialized training in the relevant fields, thereby improving the chances of employment for the learners.

6.17.7. Enterprises having Dedicated Training Facilities

The data shows that only 15% of enterprises have training facilities (Figure 31). It points to a critical area for workforce development since internal talent management systems lack structure for developing and improving employees' skills. The Government may encourage industry enterprises through apprenticeship laws and incentivization to establish in-house training facilities to promote work-based trainings (WBT).

Figure 31: Availability of dedicated training department
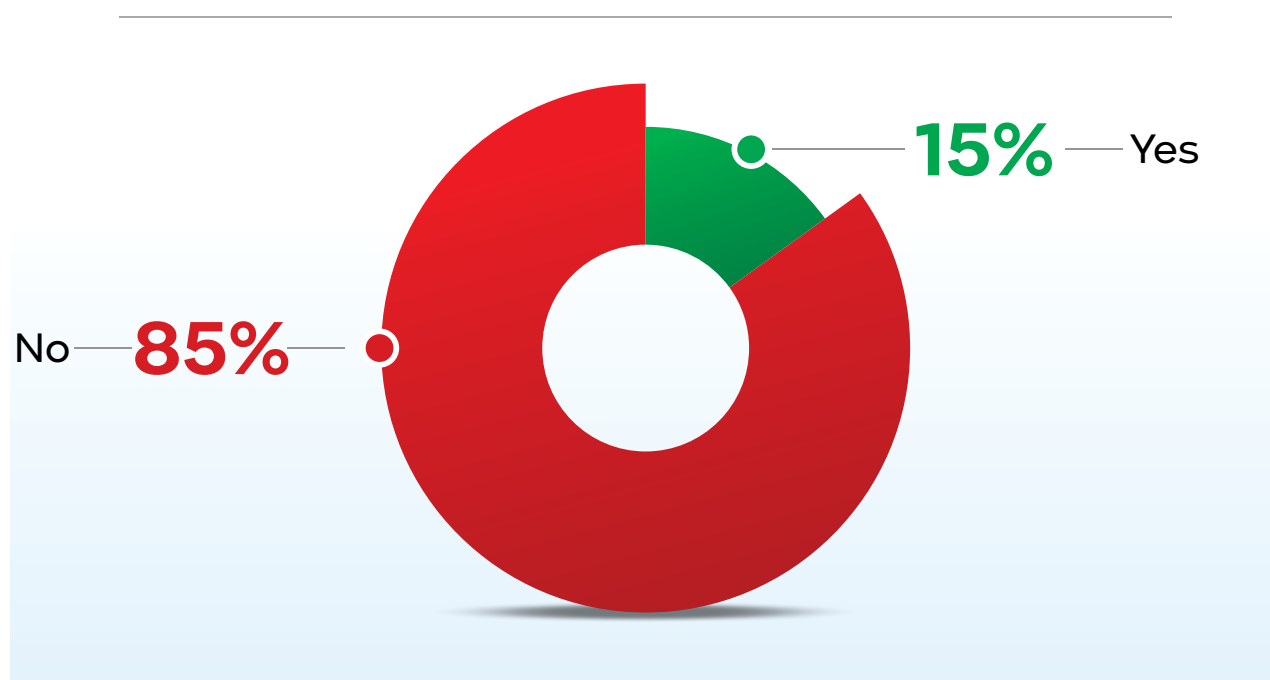
6.17.8. Identifying and Sourcing Potential Job Candidates

Figure 32 highlights differences in attitudes towards the best ways to find and attract potential employable candidates. Comparing across industries, and looking at informal methods at the state level, the most favoured one in Punjab is employee referral – 96% of organizations use it. It is indicative of a general trend towards 'word of mouth' recommendations within internal professional networks. Other methods such as online job portals (35%) and print media advertisements (34%) are used almost equally, indicating a moderate reliance on formal job posting platforms. Less commonly, campus recruitment drives (14%) and job fairs/career events (6%) are employed, showing limited engagement with academic institutions and external job placement events.

Figure 32: Preferred methods for Identifying and Sourcing Potential Job Candidates
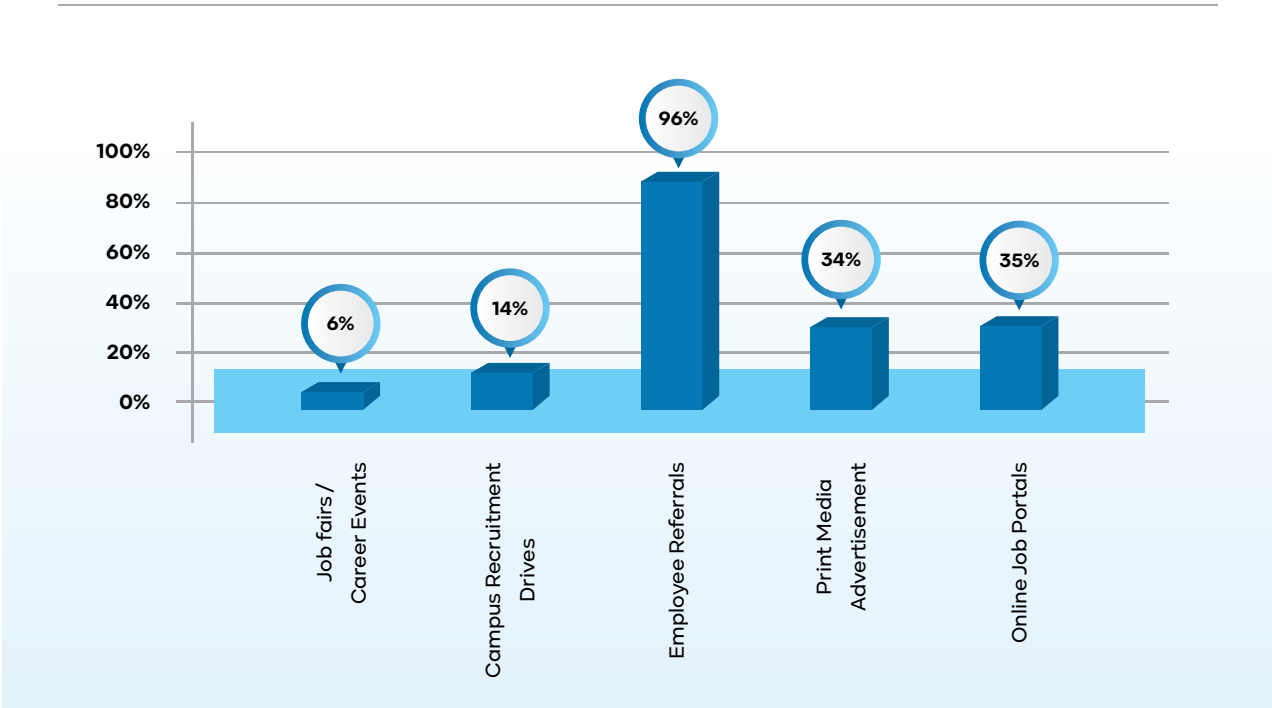
6.17.9. Competency Standards/Curricula

A slight majority of 52% of organizations expressed interest in actively contributing to the development or review of competency standards or curricula (Figure 33). However, the remaining 48% of organizations indicated no interest, highlighting a near-equal divide in engagement levels.

Figure 33: Interest in Participating in Development or Review of Competency Standards and Curricula

No **48%**   **52%** Yes

6.17.10. Employee Retention and Turnover

Only 7% of organizations report facing challenges with employee retention and turnover, while a substantial 93% indicate no issues in this area (Figure 34).

Figure 34: Challenges related to employee retention and turnover

7% Yes

No **93%**
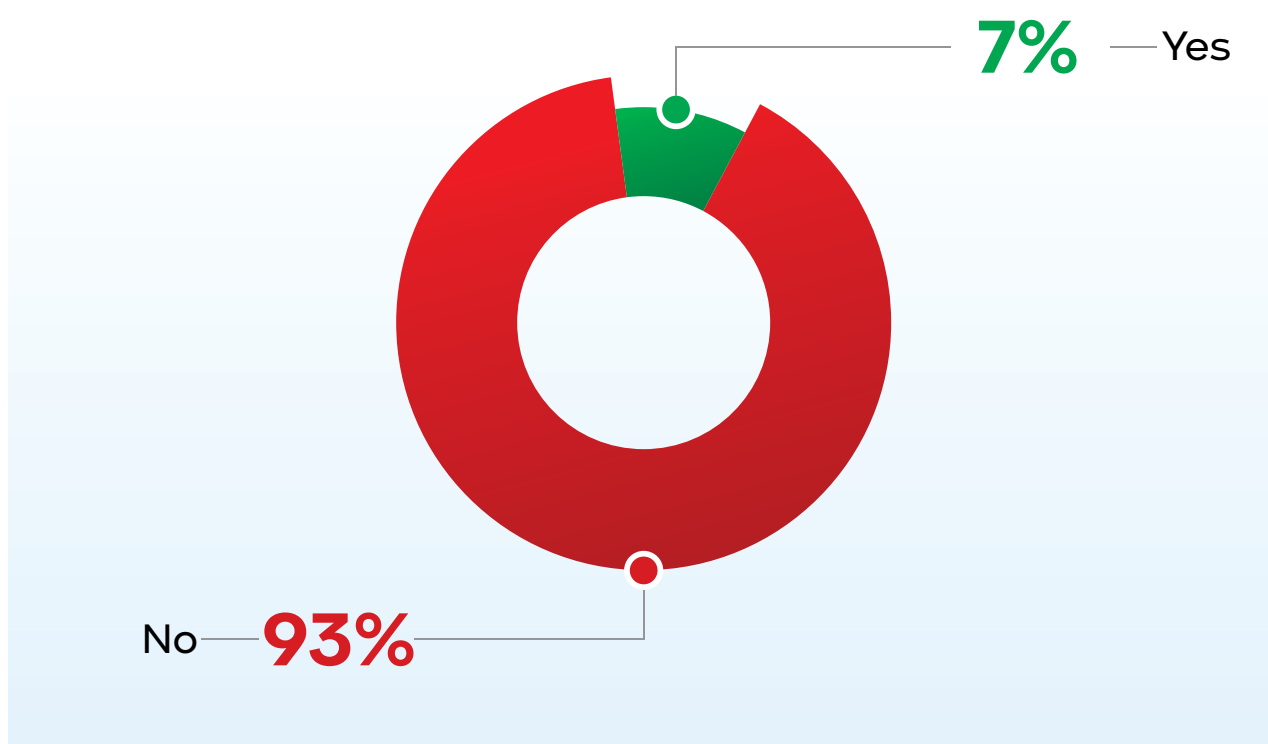
6.17.11. Digital/ICT Skills Workforce Demand

About 42% of enterprises consider digital and ICT skills to be very important, and 20% deem them extremely important, indicating a strong emphasis on these skills for workforce development. Moreover, 18% find them to be moderately important, while 11% rate them as slightly important and 9% see them as not at all important (Figure 35). This distribution reflects a general recognition of the growing role of digital competencies, though some sectors may still be slow to adopt digital transformation.

Figure 35: Importance of digital and ICT skills for current and future workforce
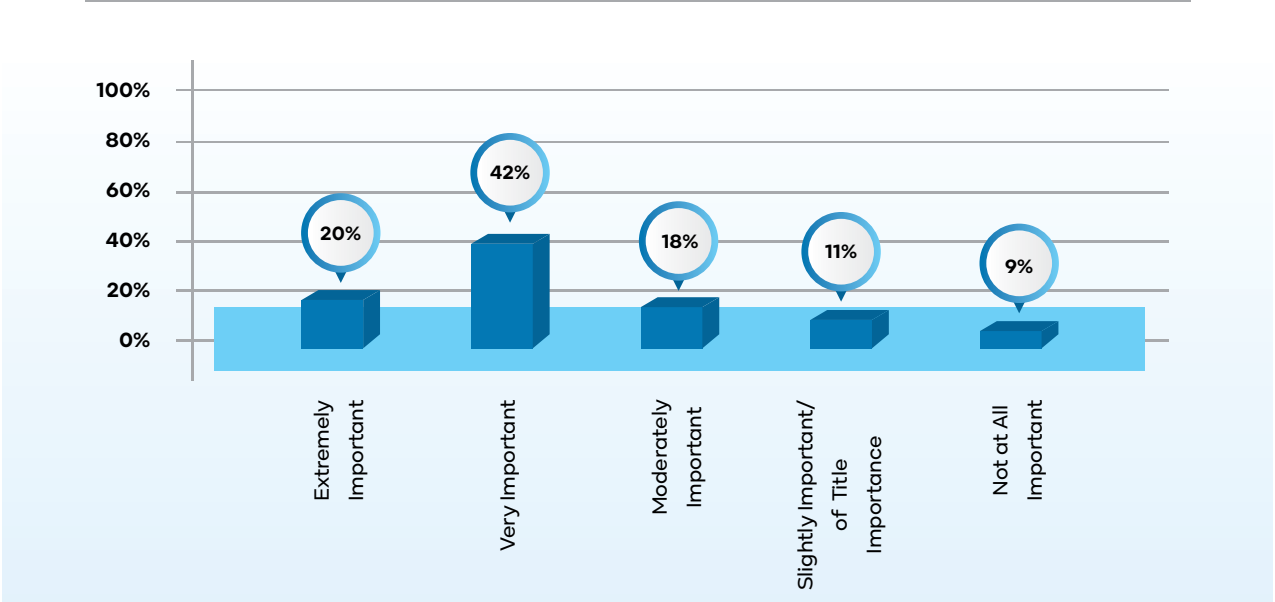
6.17.12. Digital/ICT Skills in TVET Programmes

About 23% of employers offered suggestions for improving digital/ICT skill development in TVET programmes, while a significant 77% did not provide any suggestions (Figure 36). This may indicate that most of them either feel that the current programmes are sufficient or are not fully engaged in the process of developing ICT-related competencies in TVET systems.

Figure 36: Digital/ICT skills in TVET programmes
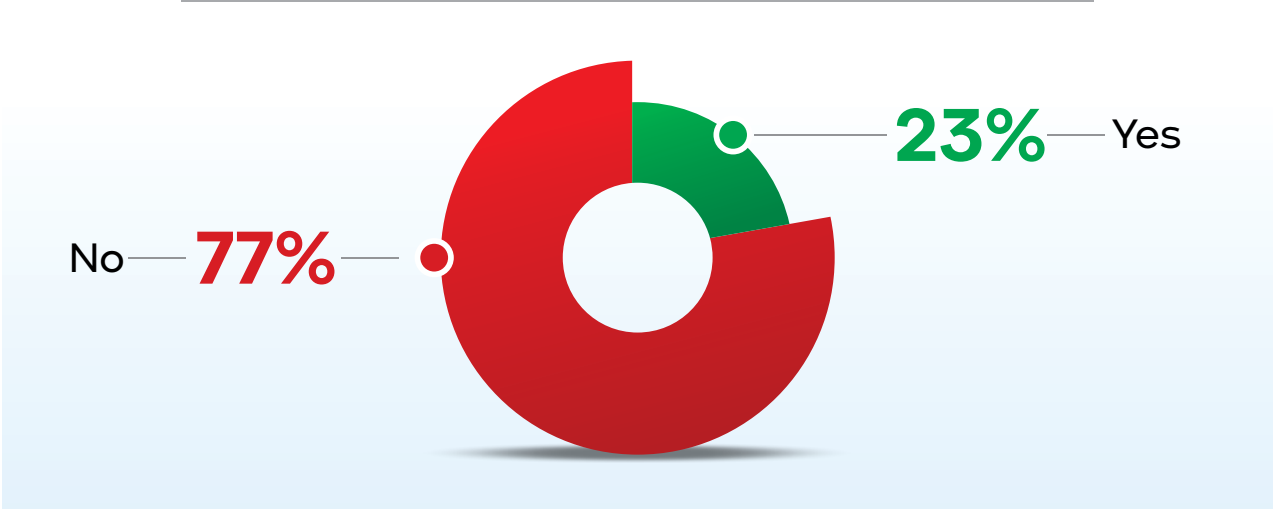
6.17.13. Demand for Future Digital Skills

Table 7 demonstrates a strong demand for advanced digital skills in Punjab, with Digital Corporate System Developers emerging at the top(227). This indicates that Punjab's industries are rapidly adopting corporate digital infrastructures, emphasizing the need for professionals who can develop and manage these systems. Similarly, Digital Marketing shows significant demand (100), reflecting the shift of businesses towards online platforms for marketing and customer engagement. In line with global trends, artificial intelligence (AI) (64), Machine Learning (32), and Cyber Security (26) are areas where Punjab has a growing demand. These emerging fields, which focus on automation, data-driven insights, and securing digital ecosystems, are increasingly vital as businesses seek to innovate and protect their digital assets. There is also notable demand for IT Experts (60), Software Developers (61), and Data Analysts (48), pointing to a broad need for IT-related skills across sectors.

Table 7: Punjab demand in niche and emerging areas

Trade	Frequency
Digital Corporate System Developers	227
Digital Marketing	100
Renewable Energy	66
Artificial Intelligence	64
Software Developer	61
IT Expert	60
Data Analysis	48
Graphic Designer	46
Laser Printing	45
E-commerce	43
Social Media Developer	40
Web Designing & Development	37
Machine Learning	32
Computer Operator	31
Cyber Security	26
Renewable Energy Engineering	24
Coding and Programming	22
Tele-health	21
Mobile App Development	16
ERP System	14
Auto-cad	13
Renewable Energy	13
AC & DC Electrician	12

Trade	Frequency
Eye Laser	12
Training for Food Hygienic	12
Designer	11
CNC Programming	11
Video Editing	11
Automation and Robotics	11
Apps Development	10
Composing	9
Develop Software's for Health Care	8
Research and Development	7
Robotic Machinery	6
Digital Marketing	6
Accounting Software	4
Cloud Computing	4
3d Printing	4
Advanced Diagnostic X Ray	4
C.T Scanner Machine Operator	4
Corel Draw	3
Business Analytics	3
CAD Design and Simulation	3
Amazon Expert	2
Building Information Modeling	2
4d Design for Building	2
Architect	2
Visualization	2
Anesthesiologist	1
Printing Machine Operator	1
Grand Total	1,216

Punjab's demand for E-Commerce Specialists (43) and Web Designing and Development experts (37) further emphasizes its focus on building a robust digital economy that supports online commerce and web-based services. The significant demand for IT Experts (60 in Punjab). Punjab expects growth in renewable Energy Expertise (66), Laser Printing (45), and Social Media Development (40), all of which are gaining importance as the province continues to diversify its industrial and digital landscape. These findings suggest that targeted educational and training programmes are essential to meet the unique needs of the province, ensuring that it can fully capitalize on the digital economy potential.

8. Conclusion

The findings from the sector-wise skilled workforce demand across Punjab highlight the province's unique economic structures and growth trajectories. Punjab's demand for skilled workers is concentrated in manufacturing, renewable energy, and textiles. On the other hand, punjab exhibits show more diversified demand across tourism, construction, and allied health sectors. It further reinforces the fact that workforce development programmes must be tailored to address the specific needs of each province's business environment.

In Punjab, where large and formalized industries dominate, there is a strong emphasis on technical, managerial, and operational skills. For example, the manufacturing sector alone requires 202,758 skilled workers, making it the largest contributor to workforce demand. Key roles include machine operators, stitching machine operators, and electricians, where targeted technical training is crucial to meet industry needs. The renewable energy sector also plays a significant role in Punjab's workforce demand, with 56,347 jobs required, emphasizing the need for solar power specialists, including electricians and solar technicians. To meet this demand, vocational training programmes must prioritize technical skills to ensure the workforce can adapt to evolving technologies in these sectors.

The demand-supply gap analysis across Punjab highlights significant mismatches between the skills produced by training programmes and those required by industries, reflecting both excess demand and excess supply in various sectors. In key areas such as healthcare, construction, manufacturing, and hospitality, there are severe shortages of trained professionals, notably for nurses, machine operators, restaurant managers, and technical roles like CNC Machine Operators and Agricultural Machine Operators. These gaps present opportunities for targeted vocational training to align workforce development with the actual demands of the economy.

Conversely, certain professions, such as beauticians, AutoCAD Designers, and food and beverage captains, face an oversupply of trained individuals, often due to an overemphasis on training programmes that do not align with market needs. This oversupply suggests the need for a strategic realignment of training curricula and better coordination with industry forecasts.

While imbalances exist, some sectors show a near-perfect alignment of supply and demand, such as industrial electricians, machinists, and carpenters. These balanced occupations indicate the success of well-targeted training programmes and highlight the potential for further optimizing workforce planning across other industries.

8. Recommendations

To strengthen the governance of institutions and align TVET programmes with industry needs, a robust interaction mechanism should be established between industry/employers (demand-side) and TVET institutions (supply-side). This can be achieved through the formation of Sectoral Working Groups and Institute Management Committees (IMCs) having representation from relevant industries.

These fora should aim to estimate, evaluate, and align training programmes with government-defined priority sectors like renewable energy, information technology, manufacturing, construction, and others.

Implementation Steps

Establish Institute Management Committees (IMCs)

Form IMCs at institute level comprising representatives from industry, government, and TVET providers to identify skill gaps, develop training plans, and monitor programmes effectiveness.

Conduct Regular Industry-Academia Dialogues

Organize quarterly seminars to discuss the prevailing labor market trends, identify skill shortages, and align training programmes with national and provincial development priorities.

Implement a Regular Feedback Mechanism

Establish a regular feedback mechanism between employers and TVET institutions to incorporate market demands into curricula.

Develop Sector-Specific Training Plans

TVET institutions should develop training plans for priority sectors, such as renewable energy, IT, and advanced manufacturing, addressing specific skill needs within each specialization.

Conduct Periodic Market Studies

Conduct annual market studies to assess emerging industry trends, identify skill demands, and evaluate the relevance of existing TVET programs. Based on these studies, introduce new programs in growing sectors and phase out those that no longer align with market needs or show declining demand.

Monitor and Review Training Programmes

A bi-annual review system may be devised to assess the performance of training programmes against market trends and make necessary adjustments accordingly.

1. **TEVTA must prioritize expanding vocational training programmes in high-demand technical fields, such as CNC machine operation (gap: 3,674), and Electrical Technician (gap: 7,465).**

These skills are crucial for Punjab's manufacturing and construction industries, and addressing the shortage of skilled workers in these areas will support the province's industrial growth. Additionally, introducing specialized programmes in automation technology (gap: 190) and electrical technicians (gap: 7,465) will help fill the existing shortfall and meet the rising demand for skilled labor in the province's expanding industrial base. Within this perspective, it would be more prudent to focus on urban centers which are hosting large scale housing societies and urban spread.

2. **The construction sector faces significant labor shortages, with unmet demand for masons (6,387 positions), and carpenters (3,557 positions).**

For instance, Multan, Lahore, Faisalabad, Rawalpindi, Bahawalpur, Gujranwala and Sialkot are important districts, where private sector housing societies and large-scale public-sector infrastructure projects demand labor with relevant skills. DHA, Multan alone covers an area of 9,500 Acres. Training providers should expand training opportunities in these trades, which are critical for ongoing infrastructure development. The manufacturing sector also needs more skilled welders (2,892 positions) and industrial painters (200 positions). By enhancing vocational training in these key trades, Training providers can ensure that infrastructure and manufacturing projects in Punjab are adequately supported with skilled labor.

3. **The renewable energy sector is experiencing rapid growth particularly in roles related to solar energy.**

Training providers may introduce specialized training programmes for solar photovoltaic system technicians (gap: 2,501), solar electricians (gap: 1,942), and DC electricians (gap: 658). This will support Pakistan's transition to cleaner energy sources and create employment opportunities in this emerging sector. Furthermore, integrating green practices across existing vocational programmes, such as energy efficiency and sustainable manufacturing techniques will prepare the workforce to meet the rising demand for eco-friendly technologies.

4. **Punjab's hospitality sector faces a substantial shortfall in skilled labor, having a shortfall of 12,493 chefs and 4,808 for waiters**

Increasing the capacity for training in these trades will support the growth of Punjab's tourism and service sector, providing pathways for sustainable employment in these high-demand occupations. Therefore, training providers may expand vocational programmes in hospitality, food services, and tourism-related skills.

5. **Training providers should focus on addressing workforce oversupply in IT-related fields, such as computer graphics (gap: -4,775), and social media marketing (gap: -1,505).**

There is an oversupply in certain trades related to IT sector where there is a need to rationalize the supply with actual demand of the employers. These trades include computer graphics (-4,775) and social media marketing (-1,505).

| 6. | It is important to capitalize on the potential of the food processing industry in Multan, which can be made possible by developing and implementing targeted training programmes. |

For instance, despite the presence of 200 food processing industries and 20 TVET training institutes, there is a gap in providing training that focuses on Programmable Logic Controllers (PLCs). Training provider can also independently come forward for the introduction of specialized training modules. However, collaboration with local food processing companies to create a curriculum can prove to be vigorous and aligns with industry requirements. This partnership can facilitate the establishment of practical learning centers that provide students with hands-on experience in real-world settings. Furthermore, Training provider should coordinate with the 20 institutes currently involved in training to create a unified approach that maximizes resource utilization and minimizes duplication of efforts.

| 7. | Lahore's textile and manufacturing sectors have substantial demand for roles like stitching machine operators (12,290), general machine operators (4,610), and washing operators (3,970). |

TEVTA should focus on enhancing its training for stitching, cutting machine operators (3,570), and packaging experts (3,340), as these occupations are vital to garments industry. Given the significant gap in the supply and demand for critical roles such as CNC machine operators (gap of 3,674), quality assurance specialists (gap of 11,089), and welders (gap of 2,892), training providers should prioritize courses in these areas. Expanding vocational programmes aligned with automated manufacturing processes will help reduce the reliance on imported labor and increase local employment in these high-demand sectors.

| 8. | Faisalabad's textile industry shows a critical demand for skilled machine operators (29,538), stitching machine operators (7,740), and boarding machine operators (3,600). |

TEVTA must focus on these areas to bridge the significant gap between supply and demand in these roles. Furthermore, increasing training for quality assurance (gap of 11,089), mechanical technicians (gap of 381), and computerized accounting (gap of 1,555) will be essential to meet the evolving needs of the city's modern manufacturing units. By addressing these gaps, TEVTA can contribute to the industrial growth of Faisalabad, ensuring the city maintains its competitiveness in global labor markets.

| 9. | **The food services and hospitality sectors in Gujranwala are growing, as reflected in the demand for restaurant managers (9,207) and fast-food chefs (a gap of 12,367).** |

Training provider should expand its hospitality management and culinary arts training to fill the substantial gap in chefs demand and supply . This will ensure that Gujranwala's industrial base can continue to grow sustainably by meeting both industrial and hospitality sector

| 10. | **In Sialkot, the demand for stitching machine operators (13,426) dominates due to the city's global role in sports goods production.** |

Training providers should improve training in this field, while also focusing on roles like import/export documentation (gap of 2,871) and quality assurance (gap of 11,089), which are crucial for maintaining Sialkot's high standards for export-oriented industries. CNC machine operators (gap of 3,674) and polishers (3,220) are also essential for the finishing stages of product development. With significant gaps in industrial stitching machine operators (gap of 1,558) and injection moulding machine operators (gap of 1,747), Training providers can strengthen its existing programmes to ensure that local industries have access to a skilled workforce capable of sustaining Sialkot's manufacturing excellence.

| 11. | **In Sialkot, the renowned cluster for sports goods manufacturing, TEVTA should implement targeted interventions to address the specialized skills needed within this industry.** |

With a substantial demand for stitching machine operators (13,426 positions) and industrial stitchers (3,066 positions), Training providers should enhance its vocational training offerings in garment production and stitching techniques. It is important to develop comprehensive training modules that may cover advanced sewing techniques, quality control, and textile handling. By doing so, it can be ensured that local workers are equipped to meet the high standards expected in the global sports goods market.

12.	To augment the competitive position of Sialkot in sports equipment production, Training providers also needs to offer training for Quality Assurance Specialist, needing 3,360 and Import/Export Specialists

Collaboration with the local manufacturers can provide opportunities for internships and practical experience to help students supplement their theoretical knowledge and learn about quality requirements necessary for export markets. In addition, Training providers needs to bring specific training for technical positions including CNC machine operators (2,086) and Industrial designers (2,758). It will enhance creation and accuracy in production lines, so vital for the sports industry in Sialkot. This strategic focus will lead to jobs creation hence boosting the economy of the Sialkot in particular and that of Pakistan in general to support the fact that Sialkot is the world's biggest producer of sports goods.

13.	Gujrat's industrial landscape, driven by roles like Polishers (4,950) and Machine Operators (2,400), reflects a growing demand for technical expertise.

There is a need to support machinery-heavy and craftsmanship-focused industries in the province. Training provider should focus on expanding programmes in polishing, weaving, and machine operations. Moreover, with significant gaps in occupations such as CNC machine operators (gap of 3,674) and press machine operators (gap of 9,685), specialized training programmes must be developed to support the city's diverse industrial base. By aligning its training with industry needs, TEVTA can help Gujrat maintain its competitive advantage in sectors like ceramics, cutlery, and furniture manufacturing.

14.	Training Provider should collaborate with local businesses to promote the establishment of women-friendly workplace policies and an inclusive organizational culture.

Given that 50% of respondents reported a lack of supportive workplace environments, Training provider can initiate programmes that educate employers on the benefits of gender inclusivity and the creation of supportive policies, such as anti-harassment measures, maternity leave, and focused mentorship opportunities. Additionally, Training provider should promote enhancement of vocational training programmes specifically designed for women, focusing on industries with male dominance, such as manufacturing, construction, and renewable energy. focused intervention can help close the gender gap in sectors such as textiles (where the demand for male workers is significantly higher) and sports goods manufacturing.

15. As 46% of respondents cited the absence of flexible work arrangements as a barrier to female employment, Training Providers should advocate for flexible work policies that can help retain women in the workforce.

Training providers can work with industries to promote shift flexibility, remote work options, and part-time job roles, which can be particularly beneficial for women balancing family responsibilities. Furthermore, to address the significant disparity in career advancement opportunities, Training providers should implement mentorship and leadership development programmes aimed at encouraging women to pursue higher-level roles within their fields. This can include training for quality assurance specialists and import/export professionals, which currently have a considerable gender imbalance.

16. To combat the challenges related to gender stereotypes and occupational segregation—identified by 34% of respondents Training providers should conduct awareness campaigns aimed at breaking down traditional perceptions about gender roles in various occupations

This can involve engaging local communities and schools to encourage girls to pursue education and training in fields such as construction, renewable energy, and manufacturing, where female representation is notably low. TEVTA can also partner with successful women in these industries to serve as role models and mentors for aspiring female workers.

17. Given that 33% of participants highlighted safety as a significant concern, Training Providers should advocate for improved safety measures in workplaces, particularly in sectors where female participation is limited

This can include developing training modules on workplace safety for both employees and employers, and ensuring that all workers, regardless of gender, feel secure in their work environments.

18.

To align with the growing demand for renewable energy and sustainable practices in Punjab, Training Providers should implement comprehensive policies that incorporate green skills into TVET programmes

The significant demand for roles such as solar panel installation technicians (3,217 positions), electricians (solar) (4,679 positions), and welders (2,094 positions) underscores the necessity for skilled personnel in the renewable energy sector. This can involve developing modules on solar panel installation, maintenance, and repair, which are crucial given the increasing reliance on renewable energy technologies. Collaborating with local renewable energy firms to provide hands-on training and internships will ensure that students gain practical experience and are well-equipped to meet industry demands. Furthermore, training programmes should address the technical aspects of related roles, such as DAE electrical technicians (326 positions), solar technicians (613 positions), and DC electricians (658 positions). This targeted approach will not only fill the existing skills gap but also promote career opportunities in a sector critical to sustainable development.

19.

In response to the survey data indicating a strong preference (65% of respondents) for fieldwork experience in green technologies, Training Providers should prioritize practical training components within its existing curricula.

By integrating green skills courses or modules that emphasize sustainability and environmental literacy, students can be prepared for the evolving job market. Pertinent Courses may focus on energy efficiency practices, waste management, and environmental compliance—areas recognized as crucial by respondents (54%, 46%, and 50%, respectively). Additionally, embedding green principles across various trades will help foster a culture of sustainability within TVET, encouraging students to adopt environmentally friendly practices in their future careers.

20.

To enhance the relevance and effectiveness of green skills training, Training providers should forge partnerships with environmental charitable organizations as suggested by 43% of respondents.

TEVTA should forge partnerships with environmental charitable organizations, as suggested by 43% of respondents. Collaborating with these organizations can facilitate knowledge sharing and provide resources to improve the curriculum, ensuring that training aligns with the latest environmental regulations and practices. Moreover, such partnerships can offer students opportunities for community engagement and real-world experience in sustainability projects, enriching their educational experience and broadening their career prospects.

21. **Given that 47% of respondents emphasized the importance of digital skills in implementing green technologies, TEVTA should incorporate digital literacy training within its programmes.**

This includes equipping students with skills to utilize software and tools essential for energy management, monitoring renewable energy systems, and data analysis in environmental compliance. By blending digital skills with green technology training, TEVTA can enhance the employability of its graduates and position them to thrive in increasingly tech-driven green sectors.

Proposed Action Plan

Short-Term

- Launch rapid upskilling programmes in high-demand sectors (manufacturing, tourism).
- Deploy mobile training units for remote areas.
- Implement gender-specific initiatives to increase female workforce participation.
- Promote small business and entrepreneurship training.

Medium-Term

- Strengthen industry-TVET partnerships for apprenticeships.
- Expand training for specialized trades (welding, stitching, electrical work).
- Incentivize private sector engagement.
- Bridge digital literacy gaps in key sectors.

Long-Term

- Establish region-specific training frameworks.
- Invest in TVET infrastructure and modern facilities.
- Continuously update curriculum for evolving industry trends.
- Develop long-term digital and green skills programmes.

Annexures

Skilled Workforce
Demand Side Questionnaires

The information given through format will be kept strictly confidential and will be used for research & Planning of National Skills Information System, NAVTTC, Government of Pakistan

Assalam-o-Alaikum,

My name is [Your Name], and I am representing TVET Sector Support Programme which is implemented by GIZ in close coordination with NAVTTC and TEVTAs in Punjab. The aim of this survey is to bring improvement in Technical and Vocational Education and Training (TVET) programs through identifying skills gaps in various sectors, weaknesses in the current offerings and growth sectors. As part of this endeavor, we are conducting this survey to gain a deeper understanding of the current state of the labor market, skills demand, and the effectiveness of the current TVET initiatives both in the public and private sectors. Your participation in this interview is crucial in helping us gather accurate and relevant information to guide policy planning and program implementation efforts. We greatly appreciate your time, your views and expertise in contributing to this important study."
Your participation in this survey is completely voluntary and there is no payment for your participation. Your answers will be completely confidential and anonymous, meaning that we will not be sharing your answers with others. The answers and views of the survey respondents will be used, analyzed, and reported in an aggregated manner without specifying the names and identities of the respondents.

Please ask if you would like more clarification about the study. You may also like approach the research coordinator of the survey if you have any questions or concerns.

His name is **Mr. Himat Ullah.** His phone number is 0334-5259088.

Do I have your consent/permission to continue with the interview:

☐ Yes   ☐ No

End Interview

Section A:

1.0: Basic Information

Name of organization:

Dated: Province: District:

Email:

Address of the establishment:

A 1.1:	**Size of the enterprise (establishment)** (Select only one answer):
1	Large (250 persons and more)
2	Medium (100–249 persons)
3	Small (10–99 persons)
4	Micro (less than 10 persons)

A 1.2:	**Enterprise ownership** (Select only one answer):
1	Public
2	Private

A 1.3:	Legal form of the enterprise (Select only one answer):
1	Limited liability company
2	Joint-stock company
3	Cooperative
4	Private enterprise
5	Public
6	Another form (write) _____

A1.4:	In which economic activity does the enterprise operate?	
A	Agriculture, forestry and fishing	1
C	Textile & Garments	2
D	Hospitality & Tourism	3
F	Construction	4
C	Printing and Packaging	5
J	Information and communication	6
L	Real estate activities	7
M, N	Professional, scientific, technical, administration and support services	8
O, P, Q	Renewable energy	9
R, S, T, U	Other services	10

A 1.5:	How many people are currently employed in your establishment (full-time and part-time)?		

		Full-time	Part-time
1	Currently (as ...., 2023)		
2	Last year (as ...., 2024)		

Section-B

B 2.1. Future Skilled workforce Demand

S.N	Occupation	Levels																				Number/Annum	
		Male										Female										Male	Female
		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10		
1																							
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

B 2.2: **Does your organization have a quota/reserved seats for disadvantage groups?**

Yes = 1, No = 2

B 2.3: **If "Yes", please give details in the following table.**

S.N	Occupation	Disadvantage group (minorities/transgender/ elderly)	No. of Seats
1			
2			
3			
4			
5			

Section-C

1	What is your level of satisfaction from the TVET graduate?	3.1: 1= Satisfied, 2= Not Satisfied, 3=Don't Know
2	Does your organization provide any in-house or on-the-job training programs?	1-Yes 2-No
3	If yes, what types of training programs do you offer?	
4	How do you currently assess the skills and competencies of job candidates during the hiring process?	1. Written tests/exams 2. Practical skills assessments 3. Personal interviews 4. Group discussions/activities 5. Other (please specify)
5	Do you have any specific suggestions for improving the quality and relevance of TVET programs?	1. Update curricula to align with industry needs 2. Focus on developing practical/hands-on skills 3. Improve quality of instructors/trainers 4. Enhance industry exposure and internships 5. Other (please specify)
6	If yes, please specify the green skills or environmentally friendly skills relevant to your industry.	1. Energy efficiency practices 2. Waste management and recycling 3. Environmental compliance and regulations 4. Sustainable manufacturing processes 5. digital skills 6. Other (please specify)
7	Do you have any specific suggestions for introducing green skills or environmental skills in TVET programs?	1. Incorporate dedicated courses/modules 2. Integrate concepts across relevant trades/disciplines 3. Practical training in green technologies 4. Collaborations with environmental organizations 5. Other (please specify)

8	If yes, what are the major challenges in hiring or retaining female employees?	1. Workplace policies/culture not conducive for women 2. Lack of flexible work arrangements 3. Occupational segregation and gender stereotypes 4. Safety and security concerns 5. Other (please specify)
9	If yes, what are the major challenges in hiring or retaining employees from disadvantaged groups?	1. Accessibility issues (physical infrastructure, transportation) 2. Lack of supportive policies and reasonable accommodations 3. Social stigma and discrimination 4. Inadequate skills training opportunities 5. Other (please specify)
10	What are the top 3 challenges you face in terms of workforce development and skill acquisition?	1. Skills mismatch between education/training and job requirements 2. Rapidly changing technological landscape 3. Attracting and retaining talented workers 4. Limited training budgets and resources 5. Other (please specify)
11	Do you have any suggestions for improving the overall TVET system in your region?	1. Better coordination between industry, government, and training providers 2. Increased funding and investment in TVET infrastructure 3. Stronger quality assurance and accreditation mechanisms 4. Promotion of TVET as a viable career pathway 5. Other (please specify)

11	Do you have any specific suggestions for promoting greater industry-TVET collaboration?	1. Establish formal industry advisory boards/committees 2. Involve industry in curriculum design and review 3. Facilitate more internship and apprenticeship opportunities 4. Encourage industry contributions (equipment, instructors, funding) 5. Other (please specify)
12	Do you have any specific suggestions for introducing new or emerging technologies in TVET programs?	1. Upgrade equipment and facilities 2. Train instructors on new technologies 3. Collaborate with technology companies 4. Offer specialized courses/certifications 5. Other (please specify)
13	Is there anything else you would like to add or suggest regarding TVET programs and industry collaboration?	1. Yes (please specify) 2. No
14	Does your organization/enterprise have a dedicated training/learning and development department or team?	1. Yes (please specify) 2. No
15	What is your preferred method for identifying and sourcing potential job candidates?	1. Online job portals 2. Print media advertisement 3. Employee referrals 4. Campus recruitment drives 5. Job fairs/career events 6. Other (please specify)
16	Would you be interested in participating in the development or review of competency standards/curricula for relevant trades/occupations?	1. Yes (please specify) 2. No
17	Does your organization/enterprise face any challenges in terms of employee retention and turnover?	1-Yes, if yes, please specify the major reasons_____ 2-No

18	How important are digital/ICT skills for the current and future workforce needs of your organization?	1. Not at all important 2. Slightly important/Of little importance 3. Moderately important 4. Very important 5. Extremely important
19	Do you have any suggestions for enhancing the development of digital/ICT skills in TVET programs?	1. Yes 2. No c)
20	What are the 3 digital skills you think will be in demand in future	1_____ 2_____ 3_____

Annex-B:

Table 8: Occupation-wise seats for disadvantaged group

Occupation	Punjab
Sweeper	1,832
Packing worker	4,440
Security guard	492
Office boy	12
General Worker	1,212
Cook	84
Lab Technician	229
Nurse	24
Receptionist	132
Storekeeper	60
Stitcher	36
Waiter	24
Computer oprator	36
Record keeper	24
House Keeping	12
Attendant	336
Room Services Staff	300
Machine operator	240
Sales man	192
Accountant	156
Helper	120
Skilled Labor	96
Cushion Taller	60
Polisher	60
Designer	48
Driver	48
Human Resource	48
Malli (gardeners)	48
Carpenters	36
Cashier	24
Feeders	24

Occupation	Punjab
Floor Manager	24
Furniture Polisher	24
Aya	12
Booking counter	12
Grand Total	10,812

Annex-C:
Demand-Supply Gap in Punjab

Table 9: Occupations with excess demand

Occupation	Supply	Demand	Gaps
Agriculture farm Manager	70	1308	1,238
Architecture	441	949	508
Asset Health Management	55	60	5
Barista Skills (Fast Food)	325	669	344
Building Electrician	282	588	306
Carpenter	330	3887	3,557
Chef	1283	13650	12,367
CNC Machine Operator	567	4241	3,674
Computer Operator	7353	9693	2,340
Computerized Accounting	1390	2945	1,555
Customer Service Representatives	108	340	232
Chemical Technician	1002	2190	1,188
Food Technician	140	216	76
Drill Press Operator	50	182	132
E Commerce	70	308	238
Electrical Envoter System	40	42	2
Electrical Technician	542	8007	7,465
Fabric Inspector	50	250	200
Fitter General	1094	1959	865
Food Safety Officer	30	334	304
Graphic Designer	513	4297	3,784
Heavy Machinery Operator	130	450	320
House Keeping	275	1381	1,106
Import / Export Documentation	1021	3892	2,871
Industrial Electrician	1236	1470	234
Industrial Electronics	193	1015	822
Industrial Stitching Machine Operator	1508	3066	1,558
Injection Molding Machine Operator	68	1815	1,747
Instrument Technician	150	329	179
Knitting Machine Operator	50	2993	2,943

Occupation	Supply	Demand	Gaps
Land Surveying	50	102	52
Laundry Man/Vallet Boy	35	450	415
Machinist	1306	1687	381
Marketing expert	789	1373	584
Mason	132	6519	6,387
Material Handler	75	319	244
Meat Technology	20	81	61
Milking Machine Oprator	75	1270	1,195
Office Management	711	3288	2,577
Pipe Fitter	200	512	312
Press Machine Operator	20	9705	9,685
Printing Technician	150	164	14
Quality Assurance	455	11544	11,089
Quality Control	65	202	137
Receptionist	40	2163	2,123
Rigger	50	66	16
Sales Man	178	3856	3,678
Screen Printing Machine Operator	165	2806	2,641
Shuttering Carpenter	160	196	36
Solar Photovoltaic (PV) system for power Generation	110	2611	2,501
Steel Fixer	110	2866	2,756
Textile Designer	918	1928	1,010
Tile Fixer	50	809	759
Waiter	75	4883	4,808
Weaving Machine Operator	210	2910	2,700
Welder	3494	6386	2,892

Occupation	Supply	Demand	Gaps
2D & 3D Drafting using AutoCAD	725	400	(325)
2-Yrs.' Post –Matric Diploma in	279	0	(279)
Adda Work	1260	400	(860)
Air Ticketing	300	0	(300)
Aluminum & Steel Fabricator	117	78	(39)
Android Application -	761	69	(692)
Application & Games Developer	1240	0	(1,240)
Art & Crafts Accessories	40	20	(20)
Artificial Intelligence Data Technician-Level-I	50	40	(10)
Auto & Farm Machinery Mechanic	296	0	(296)
Auto CAD Designer	2932	477	(2,455)
Auto Electrician	675	20	(655)
Auto Machanic	1151	164	(987)
Auto Mechanic (Diesel)	187	0	(187)
Auto Mechanic (Petrol)	95	0	(95)
AutoCAD Level-III	216	0	(216)
Automation Technology	190	0	(190)
Basic Beading	175	0	(175)
Basic Dress Designing & Making	1221	0	(1,221)
Basic PLC	175	0	(175)
Beautician	13093	0	(13,093)
Beauty Care (Beauty Therapy), Level-2	649	0	(649)
Beauty Care (Skin Care), Level-3	35	0	(35)
Bio -Medical Technology	100	9	(91)
Book Keeping	100	0	(100)
Boutique Planning & Production	100	0	(100)
Cabinet Making	23	0	(23)
CAD Designer	75	27	(48)
Call Center Representative	728	0	(728)
Camera man	25	0	(25)
Candle Making	25	0	(25)
Certificate in MS-Office	3672	0	(3,672)
Chemical Technology with Sp. in Sugar	100	0	(100)

Occupation	Supply	Demand	Gaps
Chinese Language	953	0	(953)
Chunri Making	125	0	(125)
Civil Draftsman (AutoCAD)	708	0	(708)
Civil Surveyor	1275	793	(482)
Clay Body And Glaze Making	60	0	(60)
Commercial Arts & Graphics	207	0	(207)
Computer Applications	15037	0	(15,037)
Computer Graphics	4966	191	(4,775)
Computer Hardware (Repair & Maintenance)	1065	0	(1,065)
Computer Literacy with JAWS	75	0	(75)
Confectionery, Bakery & Sweets	548	0	(548)
Cook	1870	0	(1,870)
Cooking & baking	2874	425	(2,449)
Civil Technician	8231	2601	(5,630)
Electrical Technician	9328	5471	(3,857)
Electronics Technician	2541	327	(2,214)
Information Technology Technician	3325	1330	(1,995)
Mechanical Technician	4705	3002	(1,703)
Diploma in Bio Medical Technology	185	0	(185)
Diploma in Computer Hardware & Network Engineering	335	0	(335)
Diploma in Culinary Arts	995	0	(995)
Diploma in Hotel Operations	1044	0	(1,044)
Diploma in Professional Baking and Patisserie	600	0	(600)
Diploma in Tourism & Airport Operations (DTAO)	675	0	(675)
Diploma Information Technology (DIT)	2822	0	(2,822)
Diploma Vocational Girls	1857	0	(1,857)
Diploma Vocational Teacher Development (DVTD)	312	0	(312)
Domestic Tailoring	8585	0	(8,585)
Draftsman Civil	394	110	(284)
Draftsman Mechanical	405	0	(405)
Dress Designing & Making	2077	0	(1,399)
Dress Making	6188	0	(6,188)
Dyes and Mould Maker LevelII	50	0	(50)
Early Childhood Care & Education	195	0	(195)

Occupation	Supply	Demand	Gaps
Electrician	7990	5048	(2,942)
Electrician construction Level-2	225	0	(225)
Electronic Automotive Diagnostic	50	0	(50)
Electronic Home Appliances Technician, Level-2	125	0	(125)
Electronics & Computer	20	0	(20)
Electronics Applications	712	0	(712)
English Course (1st & 2nd Year) for Special Edu.	30	0	(30)
Fabric Cutting Expert	2284	0	(2,284)
Fabric Printing	465	0	(465)
Fashion Designing	3987	1176	(2,811)
Financial Markets Employability , under MoU with M&M	25	0	(25)
Fine Arts (Painting), Level-2	150	0	(150)
Fire Safety Technician	75	0	(75)
Floriculture	40	0	(40)
Food & Beverage (F&B) server	570	0	(570)
Footwear Technology	50	0	(50)
Forging shop Operator	90	0	(90)
Front Office Assistant	1456	0	(1,456)
Furniture Design & Technology	25	0	(25)
Gear Manufacturing Mechanic	50	0	(50)
Glazing & decoration Techniques in Ceramics	45	0	(45)
Hair & Beauty L-2	956	0	(956)
Hair & Beauty L-3	110	0	(110)
Hair & Skin Care (for Male)	50	0	(50)
Hand & Machine Embroidery	25	0	(25)
Hand & Machine Embroidery L-3	50	0	(50)
Hand Embroidery	1496	0	(1,496)
Hardware Computer	665	0	(665)
Heat Treatment of Auto-Parts	75	50	(25)
Home Appliances Repair	595	0	(595)
Horticulture	146	0	(146)
Hospitality (Food and Beverage Captain)	21340	90	(21,250)
HVAC Technician	3119	47	(3,072)
Industrial Automation-Level IV	75	0	(75)

Occupation	Supply	Demand	Gaps
Industrial Instrumentation	15	0	(15)
Industrial Merchandizer Level (III)	50	0	(50)
Information & communication	150	0	(150)
Instrumentation Technology	280	28	(252)
Inventory Control	236	207	(29)
Kiln & firing Techniques in Ceramics	25	0	(25)
Land & Mines Surveying Technology	40	0	(40)
Leather Processing	25	0	(25)
Leather Technology	50	0	(50)
Leather Work	10	0	(10)
Livestock farm Manager	130	0	(130)
LTV/HTV Driving	575	0	(575)
Machine & Hand Embroidery	705	0	705)
Machine Embroidery	691	0	(691)
Manual Jewelry design	30	0	(30)
Material Evaluation & Mechanical Testing	80	0	(80)
Matric Technical	480	0	(480)
Matric Vocational	1164	0	(1,164)
Matric-Vocational (Hotel Operations)	85	0	(85)
Mechanical Tech. (Power) with sp.	105	0	(105)
Mechanical Tech. with sp. in Construction Machinery	120	0	(120)
Mechanical Tech. with sp. in Foundry & Pattern Making	60	0	(60)
Mechanical Tech. with sp. in HVAC & R Technology	360	0	(360)
Mechanical Tech. with sp. in Metallurgy & Welding	218	0	(218)
Mechanical Tech. with sp. in Mining	40	0	(40)
Mechanical Tech. with sp. in Precision Instruments	80	0	(80)
Mechanical Tech. with Sp.Cast Metal & Foundry Technology	60	0	(60)
Mechanical Tech.(Power) with sp.in Auto & Diesel	800	0	(800)
Mechanical Tech. Dies & Mould Tech. with spz. in sp.purpose machines	130	0	(130)
Mechanical Technology (HVAC), Level-2	190	0	(190)
Mechanical Technology (Machinist), Level-2	188	0	(188)
Mechanical Technology (Welding), Level-2	25	0	(25)
Mechatronics Technology	340	0	(340)
Micro-Entrepreneurship	90	0	(90)

Occupation	Supply	Demand	Gaps
Millwright	500	0	(500)
Mining Technology	40	0	(40)
Mobile Phone Technician	1140	0	(1,140)
Motor Cycle Mechanic	1895	0	(1,895)
Motor Winder	566	81	(485)
Non-Linear Editor (NLE)	55	0	(55)
Nutrition Sciences & Hygiene	835	0	(835)
Office Assistant	50	20	(30)
Optical Fibre Networking	215	0	(215)
Painter Building	920	876	(44)
Pattern Making & cutting	1780	0	(1,780)
Petroleum Technology	170	0	(170)
Pipe & General Fitter	10	0	(10)
Pipe & Plate Fabricator	355	0	(355)
PLC	50	0	(50)
Plumber	2154	1667	(487)
Plumbing cum Solar Water Heating Technology Level 1	45	0	(45)
Post Press Operations – (Packaging) (Level-V)	60	0	(60)
Quality Inspector	88	0	(88)
Quantity Surveyor	770	40	(730)
Rice Milling Plant Operator	50	0	(50)
Rural Poultry	50	0	(50)
Safety Inspector	1689	387	(1,302)
Sales & marketing	20	0	(20)
Scaffolding	465	0	(465)
Secretarial Studies	60	0	(60)
Shoe Designing & Modeling	30	0	(30)
Silk Painting	150	0	(150)
Skin & Beauty Therapy (replaced old Beautician)	1813	0	(1,813)
Social Media Marketing	2061	556	(1,505)
Solar Energy Designing,	155	0	(155)
Spinning Technology	50	0	(50)
SPOKEN AND BUSINESS ENGLISH	179	0	(179)
Spoken Arabic	50	0	(50)

Occupation	Supply	Demand	Gaps
Spoken English	2175	0	(2,175)
Tailoring (Cutting & stitching)	1394	100	(1,294)
Telecom Technician	425	0	(425)
Telecommunication Technology	359	0	(359)
Textile Wet Processing (Level-	25	0	(25)
Textiles (CADCAM Operator), Level-2	150	0	(150)
Textiles (Fashion Designing), Level-3	74	0	(74)
Textiles (Pattern Drafting & Grading), Level-2	115	0	(115)
Tourism Management (Level)	25	0	(25)
Tractor Mechanic	215	0	(215)
Tractor Operator	205	60	(145)
Turner	75	62	(13)
TV journalism	49	0	(49)
UPS Repair Mechanic	175	0	(175)
Video Production	745	0	(745)
Virtual Assistant (for Amazon)	1364	0	(1,364)
Waste handling & Re-Cycling in packaging Industry	60	0	(60)
Web Designing and Development	6394	1454	(4,940)
Wood work	50	0	(50)
Wood Working	30	0	(30)
Work Place Skill and Occupational Health & Safety	188	0	(188)