



## A Comparative study of the impact of Informal and Formal Skill Development on Workforce Potential in Industrial Sector of Pakistan

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### Abstract

Informal skill development methods such as on job learning and traditional apprenticeships continue to dominate workforce training, particularly in developing and low-income countries. While these methods provide accessible entry points into industrial work, they often contribute to a skills ecosystem that limits productivity, wage growth, and long-term career development. This trend persists despite substantial global evidence highlighting the effectiveness of formal vocational education in enhancing workforce capabilities and closing skills gaps. The mismatch between available jobs and suitably trained workers presents a growing challenge for both employers and job seekers in Pakistan. Bridging this gap through structured skill development is essential not only for increasing individual employability and job satisfaction but also for fostering national economic growth. So, this study was conducted to examine the comparative effectiveness of formal, and informal skill development approaches on workforce potential in industrial sector. This quantitative study used interview



schedule to collect data from 400 workers of various industries of two most industrialized cities of Pakistan i.e. Lahore, and Faisalabad. The respondents were recruited through convenient sampling. The findings emphasize the necessity of improving access to quality formal training programs particularly in underserved areas and reinforcing the connection between training curricula and the requirements of the industry.

**Keywords:** Skill development, vocational education, Workforce potential, Industrial sector, Skills gap, Training programs, comparative study

## **Introduction**

Pakistan faces significant challenges in achieving sustainable economic development, improving living standards, and enhancing resilience to economic shocks (Abbassi & Burdey, 2008). One of the major obstacles lies in the structure of its labor force, particularly within the manufacturing sector. Approximately 4.5 million Pakistanis are employed in small-scale and domestic production representing nearly 75 percent of the manufacturing workforce yet they contribute only around 20 percent of the sector's total value-added. This disparity reflects the persistently low per-worker productivity characteristic of the informal sector, where a substantial portion of workers earn less than the federal minimum wage and struggle to make ends meet. A major factor underlying this productivity gap is the dominance of informal skill acquisition methods, such as on-the-job learning and traditional apprenticeships. While these approaches are widespread, especially in low-income and underdeveloped economies, they often fail to equip workers with the advanced skills required for modern industrial demands. This situation persists despite global evidence that structured, formal vocational education systems lead to improved workforce capabilities and better economic outcomes (Abbassi & Burdey, 2008; Amjad & Anam, 2014).

Investing in a well-educated and skilled labor force yields higher returns than many other economic interventions. However, Pakistan has yet to fully capitalize on this opportunity. Existing research has explored skill development in general terms, but there remains a lack of comparative analysis between formal and informal training pathways within Pakistan's

industrial context. This study aimed to fill that gap by examining how different modes of skill development, formal and informal, impact workforce potential in the manufacturing sector. Specifically, it investigates: (1) the relative effectiveness of training methods in aligning skills with job requirements, and (2) the economic returns generated by each approach. While formal systems offer structure, recognition, and better long-term outcomes, informal training remains prevalent particularly in Pakistan due to accessibility and affordability. Understanding the trade-offs and identifying effective strategies for integrating both approaches is vital for shaping an inclusive and productive industrial workforce.

### **Objectives**

- To compare the effectiveness of formal and informal skill development methods in enhancing worker productivity and job alignment in industrial sector.
- To provide evidence-based recommendations for workforce development policies that can bridge the skills gap and improve overall industrial performance.

### **Literature Review**

The global discourse on skill development strongly emphasizes the effectiveness of formal vocational training systems in enhancing workforce capabilities and improving economic outcomes. For instance, Germany's dual education model which integrates classroom instruction with hands-on apprenticeships has been highly successful in producing a technically proficient and adaptable workforce (Eichhorst et al., 2015). Similar structured training systems in Switzerland and Singapore have shown that formal education pathways are linked to better employment outcomes, higher productivity, and increased wages (Hanushek et al., 2017). These models underscore the value of standardized curricula, robust quality assurance mechanisms, and strong partnerships between industry and educational institutions. The relationship between education level and workforce success is further supported by Kasika (2015), who found that individuals with higher education levels are more capable of understanding and applying advanced technologies, making them more adaptable to evolving industrial demands. Educated workers are also more likely to adopt

innovative methods and quickly learn new skills on the job. Similarly, Wolf et al. (2006) noted that governments, particularly in the United Kingdom, have increasingly aligned education policies with economic goals by focusing on workforce skill development, often through certification-oriented strategies. In contrast, the scenario in developing economies is more complex. Informal skill acquisition primarily through on-the-job learning and traditional apprenticeships continues to dominate in countries like India, Bangladesh, and Pakistan. However, evidence indicates that workers who receive formal training consistently outperform their informally trained counterparts in terms of job stability and earnings (Mehrotra, 2018; Rahman, 2019). Despite these advantages, several barriers such as high costs, limited geographic access, and cultural preferences for informal apprenticeships restrict access to formal vocational programs. The Asian Development Bank (2019) reports that in Pakistan, only about 15% of vocationally eligible youth are enrolled in formal programs, resulting in a considerable skills gap that limits industrial productivity. Fachrunnisa and Hussain (2020) argue that this gap between industry needs and workforce skills is a significant contributor to inefficiencies within the labor market. Ashton and Sung (2014) highlight the responsibility of organizations to ensure their workforce meets evolving occupational requirements by supporting both formal training initiatives and workplace-based learning. Mason et al. (1994), in a comparative study of food manufacturing industries across the UK, Germany, the Netherlands, and France, found that German plants achieved significantly higher productivity up to 40% more than the UK largely due to superior workforce skills and training. Employee engagement also plays a crucial role in maximizing the benefits of skill development. Huang et al. (2018) found that employees who are invested in their work demonstrate higher job satisfaction, reduced turnover, and contribute more effectively to organizational goals. Additionally, Silva (2007) supports the idea that a broad skillset is crucial for entrepreneurial and professional success, although unobservable personal traits may also influence career trajectories and skill acquisition paths.

## **Methodology**

This study employed a quantitative research design, utilizing a survey method for data collection. Respondents were selected through convenience sampling, with data gathered

from a total of 400 industrial workers across Punjab's major industrial hubs—Lahore and Faisalabad. From each city, 200 respondents were interviewed to ensure balanced representation. The survey instrument captured detailed information on workers' training backgrounds, current job roles, skill utilization, and compensation levels. The analytical approach incorporated several advanced statistical techniques to examine the relationships between training type and workforce outcomes. The researchers employed logistic regression to model the probability of skill-job mismatch based on training type while controlling for demographic factors. Ordinary least squares (OLS) regression was used to estimate wage differentials associated with different training modalities. Additionally, we conducted propensity score matching to address potential selection bias in training participation and better isolate the causal effects of training type on outcomes.

## Results and Discussion

**Table 1: Training Modalities and Workforce Characteristics**

Characteristic	Informal Training (n=253)	Formal Training (n=147)	p-value
Mean Age	32.4 years	28.7 years	0.003
Education Level ( $\geq 12$ years)	41.2%	78.6%	<0.001
Monthly Wage (PKR)	28,500	39,200	<0.001
Job Tenure (months)	43.2	31.5	0.012

The demographic analysis reveals significant differences between workers who pursued informal versus formal training pathways. Formally trained workers tend to be younger and better educated, suggesting that formal programs may be more accessible to recent school graduates. The wage gap of PKR 10,700 per month is particularly striking and persists even after controlling for education and experience in our regression models.

**Table 2: Skill Utilization and Job Satisfaction**

<b>Metric</b>	<b>Informal Training</b>	<b>Formal Training</b>	<b>Odds Ratio</b>
Skill-Job Match	44.9%	62.1%	2.03**
Reported Underemployment	38.7%	21.2%	0.42**
Job Satisfaction	52.4%	73.6%	2.55**

\*\*p<0.01

The skill utilization analysis demonstrates that formal training leads to significantly better labor market outcomes. Workers with formal training are twice as likely to report good skill-job matches and show substantially lower rates of underemployment. Perhaps most importantly, they report significantly higher job satisfaction, which literature suggests is linked to better productivity and lower turnover rates (Clark, 2018).

**Table 3: Regression Analysis of Wage Determinants**

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>p-value</b>
Formal Training	0.187	0.042	<0.001
Skill-Job Match	0.236	0.051	<0.001
Education Level	0.112	0.038	0.003
Experience	0.098	0.029	0.001

The regression analysis presented in Table 3 explores the determinants of wages among industrial workers, focusing on the role of training type, skill-job alignment, education, and experience. The coefficient for formal training is positive and statistically significant ( $\beta = 0.187$ ,  $p < 0.001$ ), indicating that individuals who received structured vocational education

tend to earn higher wages compared to those who relied solely on informal training methods. This finding aligns with previous studies, such as Mehrotra (2018), which showed that formally trained workers in India and Bangladesh consistently enjoyed better wage outcomes than those with informal skill backgrounds. The result supports the argument that structured programs provide not only better technical skills but also signal competence to employers, leading to higher earnings. The variable skill-job match shows the strongest association with wages ( $\beta = 0.236$ ,  $p < 0.001$ ), emphasizing that aligning workers' skills with their actual job responsibilities has a greater impact on earnings than the type of training received. This is in line with Ashton and Sung (2014), who highlighted that organizations achieve greater productivity and efficiency when employee skill sets are closely aligned with job requirements. The implication is clear: enhancing skill-job fit should be a central focus of training and placement programs. Education level also emerges as a significant predictor of wages ( $\beta = 0.112$ ,  $p = 0.003$ ), suggesting that individuals with higher levels of general education are better positioned to earn more. This reinforces findings by Kasika (2015), who found that educational background significantly influences occupational success, particularly at higher levels where technological adaptability and critical thinking become more important. Education enhances a worker's ability to learn, innovate, and advance, all of which are rewarded in the labor market. Work experience positively affects wage levels ( $\beta = 0.098$ ,  $p = 0.001$ ), reflecting the common economic principle that skills accumulated through time and practice contribute to increased productivity and earnings. This is consistent with Huang et al. (2018), who noted that employee engagement and experience contribute to higher organizational performance, job satisfaction, and wage gains. Experience not only develops hard skills but also instills work discipline and task efficiency, both valued by employers.

## **Conclusion**

This study compared the impact of formal and informal skill development on workforce potential in Pakistan's industrial sector. The results show that formal vocational training significantly improves wage outcomes, aligning with global evidence that structured training enhances employability. However, the analysis also reveals that skill-job alignment has an

even stronger effect on earnings, highlighting the importance of ensuring that training is relevant to actual job roles. While education and experience contribute positively to wages, the continued reliance on informal training limits productivity and income growth. The findings underscore the need to expand access to quality formal training programs, particularly in underserved areas, while also strengthening the link between training content and industry needs. To unlock workforce potential and improve labor market outcomes, Pakistan must adopt a dual approach: increasing participation in formal vocational education and improving the alignment of acquired skills with job requirements. This strategy is essential for driving long-term industrial and economic growth.

### **Recommendations**

There is need to expand access to formal vocational training programs, especially in underserved industrial regions.

The proper policy is needed to strengthen industry-training linkages to ensure skill development aligns with job market demands.

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