

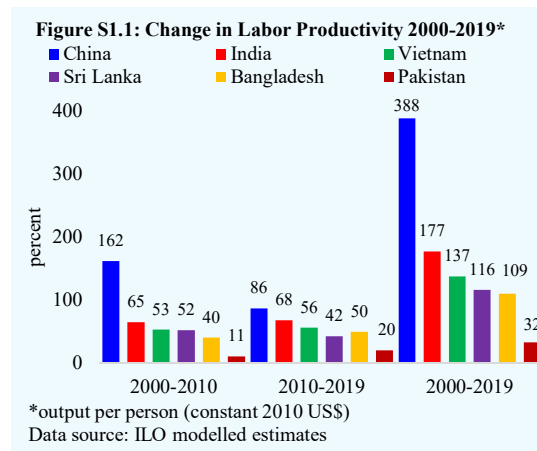
Special Section: Technical and Vocational Education and Training (TVET) in Pakistan: Issues and Challenges for Productivity Enhancement¹

Labor productivity levels in Pakistan lag behind regional countries and the poor state of human capital is considered a major binding constraint towards achieving the country's export-driven growth and industrialization objectives. While a low level of basic education compromises the training acquisition abilities of workers, the contribution of the private sector has also remained underwhelming in scaling up the quality of the vocational curriculum. Furthermore, not only do a minority of incoming and existing employees get proper vocational and technical training, but even those that do often end up acquiring skills that are not relevant to current and emerging work scenarios. While a skill gap exists in various manufacturing industries, it cannot be filled by the existing TVET ecosystem in Pakistan, which is characterized by lack of skilled trainers, weak infrastructure, technological obsolescence and, more importantly, inadequate coordination between the formal TVET sector and industry players.

S1.1 Introduction

Pakistan's economy is at a crossroads. A significant uptick in investment activities and an increase in the level of export-orientation is required to lead the country towards a sustainable growth direction. Likewise, the focus on liberalizing trade policy, diversifying exports base, reducing overdependence on locally available resources, and digitizing production processes needs to increase substantially. However, the crucial ingredient for all this to work is to have a domestic market structure that is not only competitive, but also conducive for businesses to embrace productivity and innovation.

When it comes to productivity, the poor state of human capital development is cited as one of the major binding constraints for Pakistan. With education and training on the lower side, the existing and incoming labor



¹ Authors are thankful to Waqas Ahmed (Lead Economist, SBP), Mazhar Khan (Senior Economist, SBP) and Muhammad Omer (Economist, SBP) for their valuable feedback.

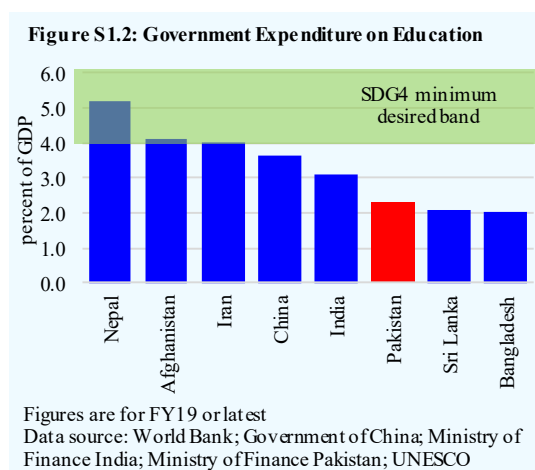
force does not have the desired level of capacity to effectively participate in economic activities. This is also evident from labor productivity levels in Pakistan lagging behind regional countries (**Figure S1.1**).²

Here, it is important to highlight that the inadequate human capital development is not the binding constraint in itself. Instead, it is symptomatic of the deep-rooted challenges that are more structural in nature. To start, Pakistan currently stands far from achieving the goal of universal primary and secondary education – in the context that the lack of basic education compromises the ability of labor force to effectively acquire the needed

vocational and technical skills.³ Though steady progress has been noticed over the past decades, educational indicators of Pakistan in general remain weak.

Importantly, around one-fourth of primary school age children are out-of-school, with overall literacy rate hovering around 60 percent (age 10+) (**Table S1.1**). Here, much of the responsibility falls on the

government, as public spending on education has consistently remained on the lower side; the current level also falls significantly short of the prescribed level laid out in the SDG's Education 2030 Framework for Action (**Figure S1.2**).



The role of the corporate sector has not been much supportive either. Importantly, the underwhelming extent to which the business community has got itself engaged in the formal TVET sector limits the scope, coverage and effectiveness of technical and vocational education in the country. As business surveys illustrate, most firms do not appear particularly keen on skill-building amongst their

² For details, refer to Special Section 1 titled, “The Importance of Human Capital in the Context of CPEC” in SBP’s Second Quarterly Report for FY19 on the State of Pakistan’s Economy.

³ For example, see (i) Desjardins, R., Milana, M., & Rubenson, K. (2006) “Unequal chances to participate in adult learning: International perspectives”. UNESCO; and (ii) Grotlüschen, A., et al. (2016), "Adults with Low Proficiency in Literacy or Numeracy", *OECD Education Working Papers*, No. 131, OECD Publishing, Paris

employees and appear mostly content with the existing human resource. Probably this represents their own disinclination towards adopting modern production processes (particularly in manufacturing firms) and innovation activities, and overall weak business dynamism (particularly in the sense of diversifying product base). Add to this the existing undersupply of formal vocational/training institutes and negligible involvement of the private sector in the setting of vocational curriculum, and Pakistan is left with an ecosystem that is ill-equipped to produce the workforce compatible with the country's growth and industrialization objectives. Importantly also, the domestic TVET system has not been able to contribute significantly to improving the competitiveness of the country's manpower exports either. This is worrying, considering that workers' remittances continue to remain an important source of foreign exchange earnings for the country.

Criteria	Selected Indicators	Reasons
Access to Education	23 percent of primary school age children are out of school 33 percent of the enrolled students drop out before finishing primary school	Family poverty Insecurity Natural disasters Shortage of nearby schools
Quality of education	Amongst Grade 8 students, only 31 percent are proficient/advanced in Urdu reading and 2 percent are proficient/advanced in Urdu writing In Mathematics, only 23 percent are proficient or advanced at Grade 8 level.	Acute shortage of well-trained and motivated teachers Unavailability of quality learning materials Poor school environment curricula/assessment systems promote rote learning Teacher absenteeism
Inequity in Opportunities	Persistent gender gap in all aspects of education Early childhood education (ECE) higher for boys than for girls Adult female literacy is shockingly low (18 percent) in Balochistan, with significant gender gaps in all four provinces	Large inequities exist by district, rural/urban location, socioeconomic background, religious, linguistic and caste affiliation, disability and nomadic or refugee status Degree of inequity in education is not always fully understood due to lack of comprehensive data
Weak governance and budgetary constraints	Education spending (2.6 percent of GDP) is below the average of 3.0 percent across South Asia and far below the lower end of the range of 4 - 6 percent recommended in the Incheon Declaration District education planners lack the required expertise and need training Community participation in school matters not widespread.	Higher incidence of non-discretionary spending given the country's huge bill on defense spending, interest payments and energy needs Lack of proper training of staff
Data source: UNICEF (2017) Sustainable Development Goal 4 Gap Analysis: Pakistan		

While acknowledging this external dimension that warrants additional examination, this special section is focused on issues arising in the domestic market due to a suboptimal TVET ecosystem. In particular, this section intends to:

(i) underscore the importance of Technical and Vocational Education and Training (TVET) education with regards to human capital development, export competitiveness and economic growth; (ii) describe the current TVET ecosystem of Pakistan; (iii) highlight the skills gap situation in the labor market of Pakistan, particularly focusing on the manufacturing sector; (iv) analyze both supply and demand side dynamics to capture the structural impediments affecting skill building of the workforce; and (v) provide suggestions to correct the trends.

SS1.2 Vocational and Technical Education was a Crucial Element of Export-led Development Strategies of Asian Economies

The state of TVET in Pakistan is particularly concerning when compared with the trends witnessed worldwide. Businesses and public sector institutions in both advanced and emerging economies have focused heavily on actively training their labor forces. Concepts such as adult education (AE) and lifelong learning (LLL) are gaining traction amongst researchers and policymakers, particularly since its inclusion as an objective in the UN Sustainable Development Goals (SDGs) agenda (**Box S1.1**).

This is because in some cases, such as those of the Asian Tiger economies, LLL activities contributed crucially to their export-led and successful economic development trajectory.⁴ Here, the integration between academic and vocational institutions in Taiwan, which aimed at ensuring the supply of skills at a desired level alongside basic education at each developmental stage and across industries; the “picking winners” approach of South Korea of investing in skill-building of workers under the Heavy Chemical and Industrialization Plan in 1970s; and the continued learning initiative of Singapore in the 1980s to reskill labor force, increase focus on math and IT education, and ensure that citizens completed their education, all are cited as successful forays into AE and LLL. Importantly, such “schemes for lifelong learning constituted an integral part of the conscious attempt to enhance and diversify the industrial base of the economy and to ensure that the move during the 1980s in the direction of higher-value-added forms of production was not held back by inadequacies in work-force skills” (Green et al, 1999).⁵

⁴ Organization for Economic Co-operation and Development. (2001). *Economics and Finance of Lifelong Learning*. OECD Publishing.

⁵ Green, F., Ashton, D., James, D., & Sung, J. (1999). The Role of The State in Skill Formation: Evidence from the Republic of Korea, Singapore, and Taiwan. *Oxford Review of Economic Policy*, 15(1), 82-96.

Box S1.1: The Importance of Lifelong Learning (LLL)

Nowadays, governments, businesses and international organizations are working actively to increase the focus on lifelong learning (LLL) of the labor force. Lifelong learning may be defined as, “all general education, vocational education and training, non-formal education and informal learning undertaken throughout life, resulting in an improvement in knowledge, skills and competences within a personal, civic, social and/or employment-related perspective. It includes the provision of counselling and guidance services”.⁶

The 1996 United Nations Delors Report is known as one of the most important landmarks in the pursuit of making education and skill-building of the workforce key priorities in terms of economic development and growth. According to the report, LLL should comprise of the following characteristics:

Learning to know: getting to know the needs of tomorrow and being able to prepare accordingly

Learning to do: acquiring not only occupational skills, but also, more broadly, the competence to deal with many situations and to work in teams

Learning to live together: carrying out joint projects, managing conflicts, establishing and minting long-distance work relationships, perceiving things as win-win, etc. This is particularly important with respect to the growing importance of Global Value Chains.

Learning to be: developing people’s personality and ensuring that no aspect of a person’s potential goes disregarded. This includes focus on memory, reasoning, aesthetics, physical capacities, communication skills, etc.

While initial training provides core working skills and general knowledge that helps workers transition from education to work, LLL keeps those job-related and interpersonal skills and abilities relevant as the nature of work, technology and skill requirements evolve over time. The importance of LLL is further strengthened by its inclusion as a central feature of the 2030 agenda for sustainable development goals (SDGs). SDG Goal 4 states that member states are to ensure “inclusive and equitable quality education and promote lifelong learning opportunities for all.

This is considered important for four major reasons. First, good quality education serves as a foundation for job placement and future training. Second, proper provision of training helps closely match skills supply to the needs of enterprises and labor markets. Third, it enables workers and enterprises to adjust to improvements in technology and work operations. Fourth, it readies firms and workers for the skill needs of the future. Resultantly, LLL enables people to seize employment opportunities, raises enterprises’ productivity levels, and boosts future innovation and development potential of the economies.

References

Hager, P. (2011). ‘Concepts and Definitions of Lifelong learning’, in London, M. (ed.) Oxford Handbook on Lifelong Learning, Oxford University Press, Oxford.

⁶ European Commission (2011). The Lifelong Learning Programme 2007-2013 Glossary.

ILO (2019). Lifelong Learning: Concepts, Issues and Actions, International Labour Office, Geneva.

UNESCO (1996). Learning: The Treasure Within, the Report of the Delors Committee, UNESCO Publishing, Paris.

UN (2015). Transforming Our World: The 2030 Agenda for Sustainable Development, United Nations, New York

It is not surprising to see that this was the time during which firms from the Asian Tiger economies, alongside Japan, leapfrogged their US counterparts and began to dominate the emerging industries such as that of consumer electronics. For example, American companies served around 96 percent of the U.S. radio-set and TV market in 1955. By 1965, the share declined to 30 percent, and around 1975, it had fallen to almost zero. By the 1990s, all the domestic TV manufacturers had been replaced by foreign companies, most notably Motorola's television brand by Matsushita (Japan), and LG Electronics (South Korea) (Greenspan and Wooldridge, 2019).⁷ Failure to change the management practices of the firms (Hayes and Abernathy, 1980),⁸ and ineffectiveness of the public sector investments in training the workforce "compared to the magnitude of the skill deficiencies that policymakers are trying to address" (LaLonde, 1995)⁹ are considered the reasons for the demise of popularity of US based firms.

S1.3 Investments in TVET Lead to Increased Productivity and Economic Growth: Theoretical and Empirical Foundations

Human capital plays a vital role in the pursuit of sustainable economic growth. Alongside education, skill-building of workforce is also vital for economic development. From an individualistic viewpoint, skilled workers (existing or incoming) are not only more employable, and so have more opportunities, but are also more adaptable to evolving working conditions. From the perspective of businesses, presence of a skilled labor force enables them to gain a competitive edge over other firms in terms of better research and innovation, easier adoption of latest technologies, improved management practices, and diversification of the product base.

From a macroeconomic standpoint, this results in an improvement in the total factor productivity (TFP) of the country. Besides increasing the labor

⁷ Greenspan, A., & Wooldridge, A. (2019). *Capitalism in America: A History*. Penguin Books.

⁸ Hayes, R. H., & Abernathy, W. J. (1980). Managing Our Way to Economic Decline. *Harvard Business Review*; (United States), 58(4).

⁹ LaLonde, R. J. (1995). The Promise of Public Sector-Sponsored Training Programs. *Journal of Economic Perspectives*, 9(2), 149-168.

productivity, skill-building also helps make the interplay of capital and labor inputs more efficient and effective. Empirical literature points towards solid evidence indicating that workforce training helps increase the labor productivity (**Table S1.2**). This improvement in productivity, in certain cases, then leads to firms becoming more competitive and export-oriented. This association has been attributed to improved R&D activities, conscious investment decisions to improve technical efficiency, better quality of products, and improved innovation decisions.

Human capital investments are also important because recent literature demonstrates that research productivity (in case of firms, described as the impact of R&D expenditures on sales revenue, market capitalisation, and revenue labor productivity) declines over time and that a higher volume of research activity is required just to maintain the growth in economic activity at an existing level (Bloom et al. 2020). This means that businesses/economies have to continuously focus on skill-building and research/innovation practices to establish/maintain their competitive edge.¹⁰

Table S1.2: Literature Review on the relationship between Human Capital, TVET, Productivity and Exports Growth	
<i>Human Capital Development is crucial for economic growth and development</i>	
Becker, G. S., Murphy, K. M., & Tamura, R. (1990). Human Capital, Fertility, and Economic Growth. <i>Journal of Political Economy</i> , 98(5, Part 2), S12-S37.	Societies where there exists a scarcity of human capital, family size is bigger and investment on each member lower. Thus, economic growth and development is influenced by factors such as investments in human capital, choices over family size, and the interplay between human and physical capital, etc
Manuelli, Rodolfo E., and Ananth Seshadri. 2014. "Human Capital and the Wealth of Nations." <i>American Economic Review</i> , 104 (9): 2736-62.	Differences in outputs between different countries can, to a considerable extent, be explained by a variation in the quality of human capital. This is because people in poor countries do not only get fewer years of education, but they also acquire less capital per year of schooling compared to people in richer countries
Gennaioli, N., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2013). Human Capital and Regional Development. <i>The Quarterly Journal of Economics</i> , 128(1), 105-164.	Analyzing a database of 1,569 subnational regions from 110 countries, Gennaioli et al (2013) find that human capital (represented by regional education levels) is a major determinant of the differences in regional development (GDP per capita) both among countries and within regions in a single economy.
<i>Alongside education, TVET is important to increase total factor productivity...</i>	
Sala, H., & Silva, J. I. (2013). Labor productivity and Vocational Training: Evidence from Europe. <i>Journal of Productivity Analysis</i> , 40(1), 31-41.	While analyzing a multi-country multi-sectoral firm level database from Europe, they find that an extra hour of training per employee increases productivity growth by around 0.5 percentage points
Dearden, L., Reed, H., & Van Reenen, J. (2006). The Impact of Training on Productivity and Wages: Evidence from British panel data. <i>Oxford</i>	Studying a panel of British industries between 1983 and 1996, the authors find that raising the share of trained

¹⁰ Bloom, Nicholas, Charles I. Jones, John Van Reenen, and Michael Webb. 2020. "Are Ideas Getting Harder to Find?" *American Economic Review*, 110 (4): 1104-44.

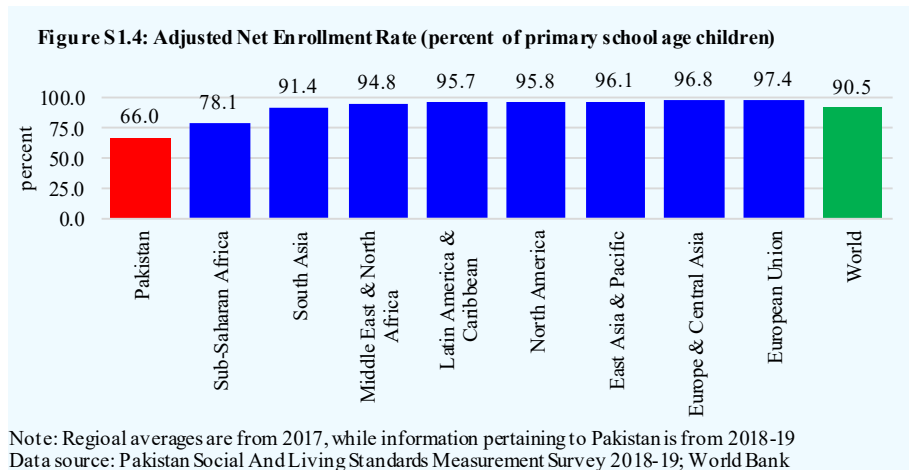
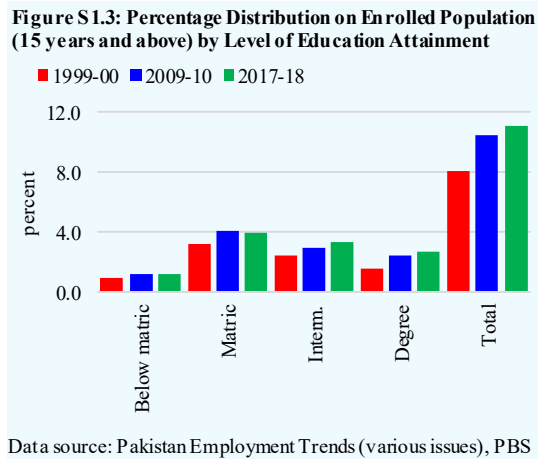
Bulletin of Economics and Statistics, 68(4), 397-421.	workers by one percentage point was associated with an increase in per worker value addition of about 0.6 percent
Konings, J., & Vanormelingen, S. (2015). The impact of training on productivity and wages: firm-level evidence. <i>Review of Economics and Statistics</i> , 97(2), 485-497.	Examining a panel of Belgian manufacturing and non-manufacturing firms from the period 1996-2006, authors find that productivity premium for a trained worker relative to an untrained worker is 23 percent
... which makes firms more innovative, research focused and quality-conscious...	
Griliches, Z. (2007). R&D and productivity: The Econometric Evidence. <i>University of Chicago Press</i> .	Analyzing data on over a hundred US firms, and then on a similarly constructed French data, authors come to the finding that there is a strong relationship between firm productivity and the level of its past R&D investments
Foster, L., Haltiwanger, J., & Syverson, C. (2008). Reallocation, Firm Turnover, and Efficiency: Selection on Productivity or Profitability? <i>American Economic Review</i> , 98(1), 394-425	Studying the data of 11 firms listed in the census of manufacturers (CM) during the years 1977 and 1997, the authors conclude that exiting businesses have lower prices and lower productivity (either revenue based or physical quantity based) than incumbents or entrants.
... as well as export-oriented	
Cassiman, B., Golovko, E., & Martínez-Ros, E. (2010). Innovation, Exports and Productivity. <i>International Journal of Industrial Organization</i> , 28(4), 372-376.	Higher productivity leads to improved innovation decisions. Product innovation then induces small non exporting firms to enter the export market. Data on 1,487 Spanish firms using the national survey.
Yang, C. H., & Chen, Y. H. (2012). R&D, Productivity, and Exports: Plant-level Evidence from Indonesia. <i>Economic Modelling</i> , 29(2), 208-216.	The relationship between R&D/exports and productivity is found from both sides, indicating self-selection of firms for exports as well as learning-by-exporting
Falk, M., & de Lemos, F. F. (2019). Complementarity of R&D and Productivity in SME Export Behavior. <i>Journal of Business Research</i> , 96, 157-168.	The relationship between R&D activity and export performance is stronger in cases of higher productivity levels

S1.4 In Pakistan, Growth Diagnostics Reveal that the Focus on Human Capital Remains One of the Weakest Links

In Pakistan, the poor state of human capital proved to be a major hurdle towards achieving high growth and development. For example, Abbas and Peck (2008) demonstrate that human capital development accounted for just under one-fifth of the increase in Pakistan's GDP per capita during the period 1961-2003. In fact, the contribution turned negative during the period 1991-2000. During this period, "Rapid labor force growth was not matched by expansion of secondary education, so that the proportion of the educated workforce declined. As the opportunities for benefiting from world technology increased, Pakistan's ability to reap the advantages deteriorated".¹¹

¹¹ Abbas, Q., & Foreman-Peck, J. S. (2008). Human Capital and Economic Growth: Pakistan 1960-2003. *Lahore Journal of Economics*, 13(1), 1-27.

The situation has improved only marginally since: the share of population aged 15 and above enrolled in any stage of education stands at just 11.1 percent as of 2017-18 (**Figure S1.3**). If we compare internationally, the adjusted net enrollment rate of primary school children in Pakistan, calculated by dividing the number of children in the official primary school age who are enrolled in primary or secondary education by the population of the same age group and multiplying by 100, is the lowest when compared to all regional averages (**Figure S1.4**).



This has impacted the overall performance of businesses in the country severely. Let us take the case of the textiles sector. Studying the firms situated in the knitwear cluster in Lahore, Rehman (2012) found that the presence of highly educated entrepreneurs and a skilled workforce was associated with higher productivity, more innovations, bigger firm size and better marketing strategies

that helped attract and book more product orders.¹² Furthermore, Khan (2005) makes the case that alongside better investment policies and stronger institutions, a much higher human capital quality is what led the East Asian miracle economies to perform much better, concluding that “Pakistan could have achieved higher growth rates, had it invested more in its human capital”.¹³

This dimension has strong historical foundations. Since inception, with severe resource constraints and a high share of agriculture sector workers, “Pakistan's post-Independence economic development strategy gave virtually no attention to labor, except as an industrial input to be drawn from rural areas at subsistence wages”.¹⁴ Resultantly, public policies were oriented towards “creating the circumstances which lead the *share of profits* in the national income to increase”.¹⁵ This agenda continued during the 1960s, with the government regarding the wealth maximizing element of economic growth a “functional justification for inequality of income”, i.e. initial concentration of capital was deemed necessary to reap equitable socio-economic welfare later. Interesting to note is the fact that while Pakistan was experiencing healthy growth rate in the 1960s, the unemployment levels rose and real wages in the industrial sector actually declined by a third.¹⁶ This was the time when the high concentration of wealth in the country became a widely debated issue.

However, over the period of time, the government started focusing extensively on workforce welfare, social security, and productivity enhancement. In particular, virtually all the national and later provincial labor policies have included clauses on ensuring employees’ learning and development. This is primarily why the technical and vocational training in Pakistan has come to revolve around a broad-based and multi-layered ecosystem.

¹² Rehman, F. (2012). Human Capital and Multifaceted Innovation: Evidence from the Lahore Knitwear Cluster in Pakistan. *Lahore Journal of Economics*, 17(2), 63-86.

¹³ Khan, M. S., Amjad, R., & Din, M. U. (2005). Human Capital and Economic Growth in Pakistan. *The Pakistan Development Review*, 455-478.

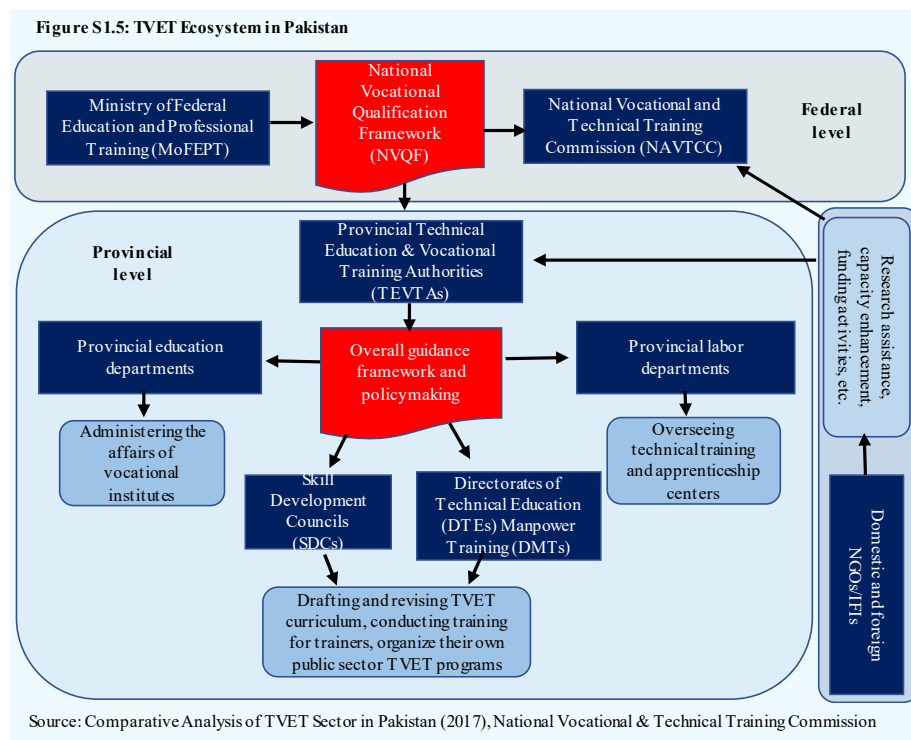
¹⁴ Candland, C. (1995). Trade Unionism and Industrial Restructuring in India and Pakistan. *Bulletin of Concerned Asian Scholars*, 27(4), 63-78.

¹⁵ Rahman, H. (1962). *Growth Models and Pakistan: A Discussion of Planning Problems*. Allies Book Corp..

¹⁶ Haq, Mahbub ul - *Articles and Speeches (1971 - 1977)*, 1651847, World Bank Group Archives, Washington, D.C., United States.

S1.5 The State of Workforce Training in Pakistan

Pakistan has a complex TVET regulatory and operational ecosystem (**Figure S1.5**). The National Vocational and Technical Training Commission (NAVTTCC) is the main regulatory body for technical and vocational education at the federal level. With TVET a provincial matter, each province also has a Technical Education & Vocational Training Authority (TEVTA) to promote and provide such trainings for the existing and incoming workforce. The TVET institutions have to operate under the roadmap developed by the provincial TEVTAs. The affairs of *vocational* institutes are administered by the provincial education departments, while provincial labor departments oversee the *technical* training and apprenticeship centers.

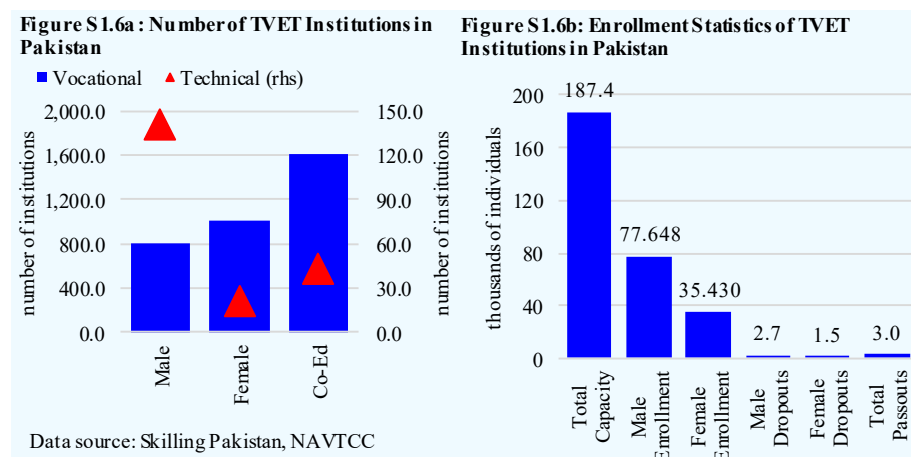


Furthermore, the autonomous Skill Development Councils and the provincial Directorates of Technical Education and Manpower Training are tasked with drafting and revising TVET curriculum and conducting training for trainers. In between, different domestic and international donor agencies help the government carry out research and capacity enhancement activities pertaining to the sector.

In what follows, the analysis presented is based on the 2018 skills gap surveys conducted by NAVTCC and provincial TEVTAs, the National Skills for All Strategy introduced by the MoFEPT, and the annual labor force surveys conducted by the Pakistan Bureau of Statistics (PBS).

The supply side leaves a lot to be desired

The existing vocational and technical training ecosystem of Pakistan is not adequate to meet the needs of the present and incoming labor force. This is because of various issues. There are 3,740 institutions in the country, including both from the public and private sectors, having a combined enrollment capacity of 187,393 (Figure S1.6). However, Pakistan had 3.8 million people from its workforce as unemployed as of 2018, with 1.8 million being added into the unemployed pool every year.¹⁷



Furthermore, a majority of the TVET institutions is situated in major urban centers, which makes acquiring skills for the people in far-flung areas difficult. This proves particularly challenging for the female labor force, as they often cite distance to workplace/training institute as one of the principal barriers to employment. Transport facilities are usually provided to address this issue, and 22 percent of the institutions in Punjab offer this service. However, this is followed by just 3 percent in Sindh and 1.4 percent of institutions in FATA and GB providing such facilities.¹⁸

¹⁷ National “Skills for All” Strategy: A Roadmap for Skill Development in Pakistan (2018). Ministry of Federal Education & Professional Training, Pakistan.

¹⁸ Comparative Analysis of TVET Sector in Pakistan (2017). National Vocational & Technical Training Commission, Pakistan.

It is also important to note that in the manufacturing sector, TVET graduates are also getting harder to find. If we look at the data for the top 30 most demanded occupations by the manufacturing sector firms in Punjab and Sindh (provinces having the largest share in total employment), the TVET supply against such occupations is substantially low. In Punjab, the total supply for such occupations meets just 10.6 percent of the total demand; while in Sindh, it is only 20.7 percent (Table S1.3).¹⁹

Table S1.3: Demand and Supply Gaps (2018) in Top 30 Demanded Manufacturing Sector Occupations in Punjab and Sindh

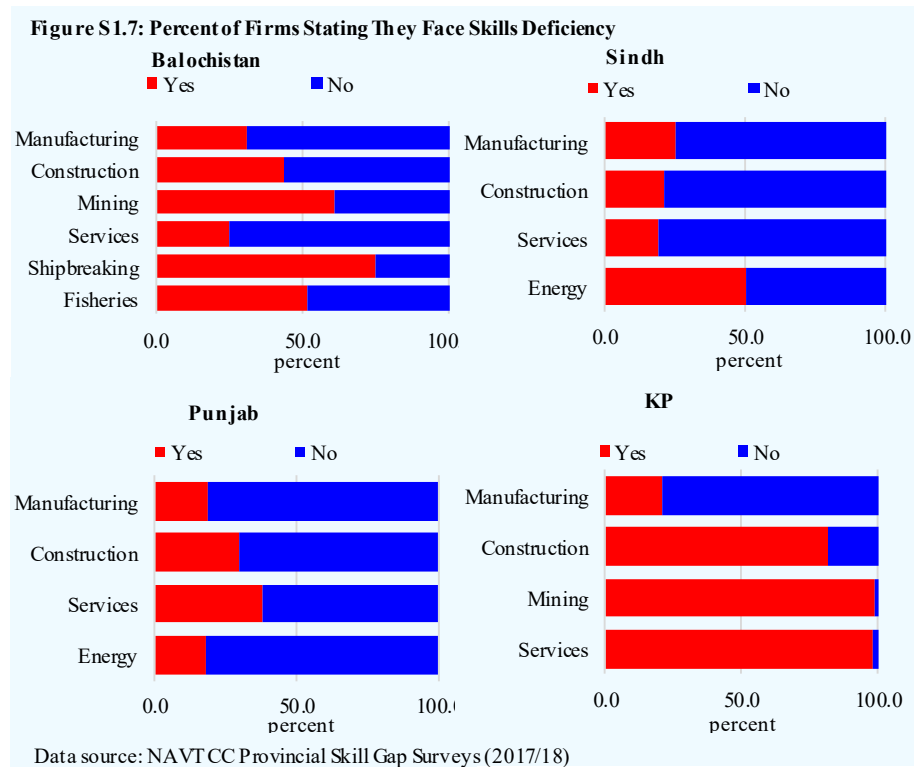
Punjab			Sindh		
Occupation	Demand	Supply	Occupation	Demand	Supply
Stitcher	19,382	240	Machine Operator	8,890	671
Machine Operator	18,956	11	Plant operator	5,975	0
Welder	14,021	4,864	Boiler Operator	3,205	0
Electrician	9,481	4,219	DAE Mechanical	2,765	4,761
Fitter	8,360	111	Steel Fixer	2,195	0
Cutter	8,215	0	Printing machine operator	2,150	0
Machinist	6,773	1,073	General Fitter	1,890	274
Lab Technician	6,519	46	Welding	1,870	926
Polisher	6,310	0	Lather Machine operator	1,505	0
Garments Designer	4,556	0	Stitching machine operator	1,260	233
Designer	4,335	0	Dyeing & Bleaching	1,120	0
Mixer Machine Operator	4,309	0	DAE Chemical	910	422
Packing Machine Operator	3,371	0	Tiles Fixer	875	0
DAE Mechanical	3,208	4,555	Dyeing Maker	840	0
Wood work	2,729	99	Mill Technician	805	0
Steel Fabricator	2,605	0	CNC Operator	792	0
Leather Garment Stitching	2,515	202	Garments making	658	906
Plant Operator	2,412	0	DAE Apparel Merchandizing	630	77
Press Machine Operator	2,221	0	Forman	595	0
Mechanical	1,861	0	LMO machine operator	595	0
Design & Patternmaker	1,807	0	Fitter (Press)	556	0
Fabricator	1,709	0	Weaving Operator	490	0
Surgical Instrument Fitter	1,485	0	Spray painter	455	0
Pattern Making	1,437	0	Wood Working	450	456
Finishing and Polishing	1,264	0	Injection molder	420	0
Loader Machine Operator	1,260	0	Pattern making	385	0
Mechanical Technician	1,180	49	DAE Garments Technology	356	298
Production Manager	1,148	0	Textile Designing	350	0
Die Fitter	1,144	0	Injection Blow	275	0
Leather Cutter	985	0	Mix machine operator	250	0
Total	145,558	15,469	Total	43,512	9,024

Data source: National Vocational & Technical Training Commission (NAVTC), various skill gap surveys

¹⁹ One thing to keep in mind is that it is not necessary for TVET students graduating with manufacturing sector training to actually pursue a career in manufacturing sector. Same is the case with non-manufacturing training programs.

Despite the apparent skill gap, businesses seem content with the quality of the workforce employed – the demand for TVET

Business executives pertaining to industrial and services sectors in Pakistan surprisingly appear mostly satisfied with the quality of skills of their employed workforce. Here, the share of satisfied executives in the manufacturing sectors is one of the highest across sectors and provinces (**Figure S1.7**).



It is imperative here to first establish the context within which this survey finding is to be analyzed. In Pakistan, level of competition in the market is low, businesses are predominantly domestic market-oriented, incentive for research and innovation is minimal, informality in the market is high, and production processes and management practices are not up-to-date (**Box S1.2**). This means that firms do not face pressure or feel adequately incentivized to focus on productivity enhancement, of which training of the workforce is a crucial component. This needs correction, because without a commensurate demand for skill development

from the employers, there will be limited incentive for prospective as well as present workers to improve their knowledge base and skill levels.

Box S1.2: Why Businesses in Pakistan Focus on Surviving rather than Thriving? Do Market Failures Exist in TVET?

Inadequate provision of training to the labor force can be described as a market failure in an economy. Therefore, like all market failures, it needs to be properly diagnosed before relevant policy actions can be taken to help address it.²⁰

Poaching and matching externalities in the labor market: First comes the imperfection in the labor market. Suppose if all employers desire a particular skill in the workers, and there exists perfect competition in the market, then those skills become fully transferable and employees can fully appropriate the returns on the training. On the other hand, if there are certain types of training that can only be employed by a certain employer, then those skills become non-transferable and this time employers fully appropriate the returns. In real life, however, trainings fall in between these two extremes and hence there is suboptimal investment by both parties. Firms underinvest because workers can be “poached” by competitors (poaching externalities). Workers underinvest because they do not receive remuneration commensurate to increased productivity levels (matching externalities)

Credit constraints in the capital markets: Access to finance can also play a deterministic role in training provision of the workers. In particular, there is evidence that training decisions of low-income workers are negatively affected by lack of financing.²¹ One option is to borrow, and it could be feasible if the rate of return is higher than the cost of borrowing. Financial institutions, however, usually have negligible information about the effect of training on the wages and creditworthiness of the individual seeking funding. Resultantly, they decide against lending. There can also be the case that financial markets are not developed enough to offer such financing avenues.

Coordination failures: It is well established that more skilled workers help improve the quality of R&D activities of firms and help make them more productive (for details, refer to Section S1.3 above). However, workers may not invest in those high-skill trainings because the firms might not demand them. This would be a case in an economy with poor competitiveness characteristics, where many firms do not focus on innovations and productivity enhancements and instead manipulate with their market power to earn excessive profits and engage in rent-seeking activities. In such a situation, there would simply be not enough jobs for high-skilled workers.

²⁰ Almeida, R.; Behrman, J.; Robalino, D. (2012). *The Right Skills for the Job? Rethinking Training Policies for Workers*. Human Development Perspectives. Washington, DC: World Bank

²¹ Greenhalgh, Christine, and George Mavrotas. 1994. “The Role of Career Aspirations and Financial Constraints in Individual Access to Vocational Training.” *Oxford Economic Papers* 46(4): 579–604.

Decision-making failures: Workers and businesses may not have complete information regarding the type of skills that might be required to keep performing well in the near future. This can result in making wrong investment decisions: they might spend money and time on acquiring skills that might not be needed going forward due to technological advancements, for instance. Even in the case where such information is properly accessible, issues can arise when workers do not have knowledge about the quality of training institutes and end up choosing one that fails to enhance their abilities to the desired extent.

Such market failures are prevalent in Pakistan economy. Following points highlight this further.

Weak competition environment: The competition environment in the country has historically not been favorable for productivity enhancement and growth. With high degree of market concentration, direct and indirect government involvement in key economic sectors, and legal and policy uncertainty that hampers investment decisions and influx of multinational enterprises, the focus on quality enhancement, research and innovation and productivity enhancement has been below-par. Low competition in the domestic market, coupled with entrenched anti-export bias, means that firms do not see any incentive to become more efficient and productive.²²

Management constraints, particularly in small firms: Management practices is an often over-looked determinant of firm productivity and revenue growth. Management practices are strongly associated with differences in performance across firms and countries.²³ In Pakistan, management practices have been found to be a major determinant of inequality in productivity and performance. As came out from Management and Organization Surveys in more than 2,000 establishments in Punjab, management practices are less structured in small (and medium sized) firms compared to large firms, especially with respect to decentralization of decision-making, data-driven performance monitoring, target- and incentive-setting, and usage of data for decision-making.²⁴ This means that production processes and work methods are not revised to a desirable extent, and firms go out-of-touch with the emerging trends and best practices. This adversely affects their competitiveness.

Financing constraints: The overall bank credit to GDP in Pakistan is one of the lowest among emerging market economies, with large corporates constituting the largest clientele

²² For more information, refer to Special Section 1 titled, “The State of Competition in Pakistan” in SBP’s Second Quarterly Report for FY20 on the State of Pakistan’s Economy

²³ For example, see Black, S. E., & Lynch, L. M. (2001). How to Compete: The Impact of Workplace Practices and Information Technology on Productivity. *Review of Economics and Statistics*, 83(3), 434-445 and Bloom, N., & Van Reenen, J. (2007). Measuring and Explaining Management Practices Across Firms and Countries. *The Quarterly Journal of Economics*, 122(4), 1351-1408.

²⁴ Source: Lemos, R., Choudhary, A., Van Reenen, J., Bloom, N., (2016) Management in Pakistan: First Evidence from Punjab, IGC

of bank lending.²⁵ Small and medium enterprises (SMEs) have a share of only 5.4 percent in banks' lending portfolio (at end December 2019). Overdependence on own savings or informal channels of funding means that small firms disproportionately face financing constraints as well as considerable difficulties to expand their operations. As a result, innovation, productivity enhancement and diversification take a back seat in terms of organizational goals.

High degree of informality: In Pakistan, higher incidence of informality in the product and labor market further discourages innovation. This is because adherence to intellectual property rights is negligible and replication of ideas and products is common practice. Regulation and monitoring in terms of consumer protection laws is also considerably weak, which means that there is negligible pressure on firms to follow quality standards protocols. Furthermore, with employment not contractual and the share of temporary workers high, investment on training and labor productivity enhancement is not attractive for the employers as they fear that their workers might leave or get poached by competitors.²⁶

Within this context, it is hence not surprising to find a low incidence of employers providing either on-the-job or off-the-job training to their employees. According to the 2017-18 labor force survey conducted by the Pakistan Bureau of Statistics, the percent of employees working in the manufacturing sector that had received any type of on-the-job training stood at 12.4 percent, of which around half had acquired any training more than 8 years ago. Similar was the case with those having off-the-job training experience.

This means that not only are a majority of incoming and existing employees not getting proper vocational and technical trainings, but those that have received some training have skills that are often not relevant anymore to the current and emerging work scenarios. This trend is visible in all the non-agricultural sectors of employment (**Table S1.4**).

This leaves businesses detached from the TVET sector, thereby reducing the effectiveness of training programs

With businesses not deeming training of the workforce as a priority objective, their involvement and interaction with the TVET sector has remained

²⁵ According to the 2017 Global Findex database, the share of adults in Pakistan who accessed formal banking channels to borrow for business inception, conduct or expansion was zero percent for young adults and only 2 percent for older adults.

²⁶ Afraz, N., Hussain, T., Khan, U., (2013). Barriers to the Growth of Small Firms in Pakistan: A Qualitative Assessment of Selected Light Engineering Industries Lahore Journal of Economics, *The Lahore School of Economics*, Vol.19 (Special Edition), pages 135-176, September, 2014.

Table SI.4: Training Status (percent) of the Labor Force in Pakistan

Years ago →	With on the job training						With off the job training						Total
	during the last year	2-3 years	4-5 years	6-7 years	8 or more years	Total	during the last year	2-3 years ago	4-5 years ago	6-7 years ago	8 or more years ago	Total	
Share of total manufacturing employees	0.8	1.7	2.3	1.4	6.3	12.4	0.5	1.9	1.8	1.4	10.0	15.6	28.0
Share of trained manufacturing employees	2.9	5.9	8.2	4.9	22.4	44.3	1.9	6.6	6.5	5.1	35.5	55.7	100.0
Share of non-manufacturing employees	0.3	0.6	0.6	0.4	2.4	4.3	0.4	1.8	1.8	1.8	9.9	15.6	20.0
Share of trained non-manufacturing employees	1.6	3.0	2.8	2.2	12.0	21.7	1.9	9.1	8.8	9.1	49.3	78.3	100.0

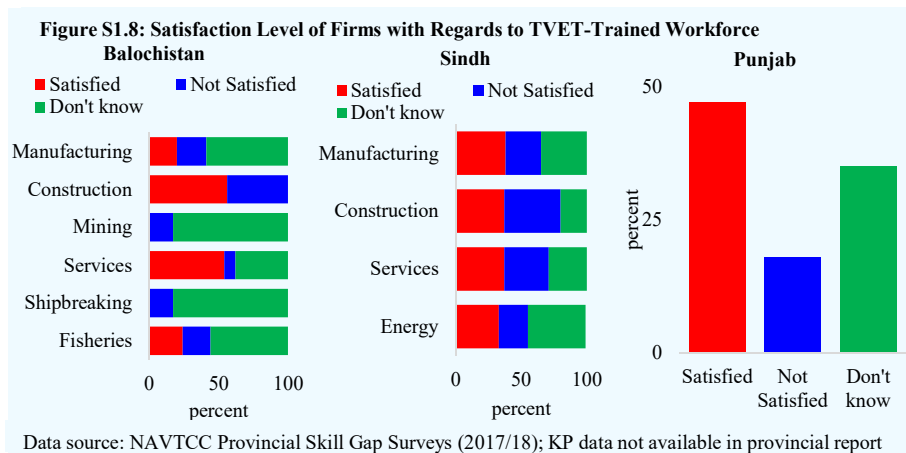
Data source: Pakistan Bureau of Statistics; authors' calculations based on LFS 2017-18

unsatisfactory. As the 2019 National Skills for All Strategy roadmap of the government puts it, “In Pakistan, technical and vocational training primarily takes place in time-bound, theory-based, teacher-led classroom environments, in virtual isolation from industry”.²⁷

This has three major implications. First, the curriculum of the institutions is not aligned with the requirements of the industrial work, which results in existing workers not observing a noticeable improvement in productivity after graduating. Second, the skill-imparting programs are skewed towards theoretical teaching compared to practical learning, which particularly affects the incoming labor force and leaves them ill-equipped in terms of hands-on experience and unattractive in the eyes of potential employers. Third, and perhaps more important, there is the potential of a vicious cycle whereby businesses, disappointed with the results of such training programs, get further alienated from the institutions. With consistent aloofness of the industry, the curriculum remains outdated and/or incompatible with the emerging requirements, and the graduates continue to suffer in terms of productivity gains and job placement.

²⁷ Reference: navttc.org/wp-content/uploads/2019/03/National-Skills-for-All-Strategy-2018-1.pdf

It is not surprising, hence, to find a sizable share of senior executives not satisfied with the design and impact of off-the-job technical and vocational training programs. Equally alarming is the notable share of executives responding with a “Don’t know”. This can be either because employees of these firms did not have any recent experience with TVET institutions, or because the executives of those businesses simply have no link or contact with such training providers. Both the answers are worrying on their own merits (Figure S1.8).



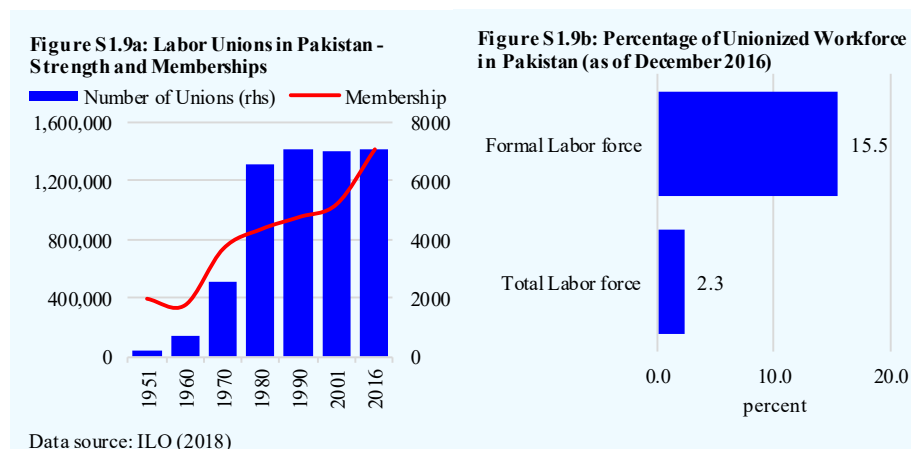
Industrial sector also does not focus on the multi-skilling of workforce

Multi- or cross-skilling of the labor force has been identified as one of the reasons for the industrial sector success of countries such as Japan and Germany in the 20th century, and the rise of China in the 21st century. In a multi-skilled labor force, workers tend to possess a range of skills which allow them to participate in more than one work process. While the federal government spearheads the multi-skilling framework in some economies, in others, employers lead the initiative. In Japan, for example, the employers take advantage of plant-level *oyakata* craftsmen and apprenticeship providers to help impart the desired skills to employees via on-the-job training programs.²⁸ A crucial component of Japan’s industrialization strategy since the 1980s has been to make occupations broadly defined and job rotations frequent, so as to instill the motivation for pursuing multiple skills in employees.²⁹

²⁸ Thelen, K. (2004). *How Institutions Evolve: The Political Economy of Skills in Germany, Britain, the United States, and Japan*. Cambridge University Press.

²⁹ Gregg, C., Jansen, M., & Uexkull, E. V. (2012). *Skills for Trade and Economic Diversification: A Practical Guide*. Geneva: International Labor Organization.

Another dimension that merits a discussion here is the role of labor unions in the TVET domain. Union involvement in training programs can help encourage a “productivity coalition” among management, unions and the workforce. Labor unions are also “often well placed to help run training programs in a way that appears fair and wins the trust of the workforce”.³⁰ Germany, for example, is cited as a success story in this regard. Labor unions in Germany are involved in a tripartite vocational education ecosystem with the government and employers and actively establish occupational groupings, revise training curriculums, and set recruitment targets based on future skill needs at a firm and even plant level basis. Turkey has a similar system, whereby unions and employer groups mutually oversee the quality and delivery of apprenticeship programs, while the Vocational Training Councils serve as a platform where all the TVET stakeholders can get together and provide policy recommendations to the government.³¹



In Pakistan, however, the same is not the case. The number of unions in Pakistan has continued to noticeably rise in terms of both strength and membership (**Figure S1.9**). However, the proportion of union membership in the non-agriculture workforce has remained low at 6 percent throughout the period and has declined to 5.5 percent during the recent past, and their focus on employee learning and development has been negligible. Both legal restrictions and the anti-union bias

³⁰ Katz, H. C., Kuruvilla, S., Turner, L., Katz, Harry C. (1993). Trade Unions and Collective Bargaining. Policy, Research Working Papers; no. WPS 1099. Education and Employment. Washington, DC: World Bank.

³¹ Towards a Model Apprenticeship Framework: A Comparative Analysis of National Apprenticeship Programs. (2013). New Delhi: International Labor Organization, International Bank for Reconstruction and Development/ the World Bank.

among employers are the reasons behind this trend. Although emphasis on trade unions and training was part of virtually all the labor policies drafted by the government since the start, those policies were never actively implemented in full spirit by the federal and later provincial governments.³² In Pakistan, thus, neither the labor unions are so involved in skill-building and occupation defining activities nor is rotation and “multi-skilling” of employees a prevalence in the industrial workplaces.

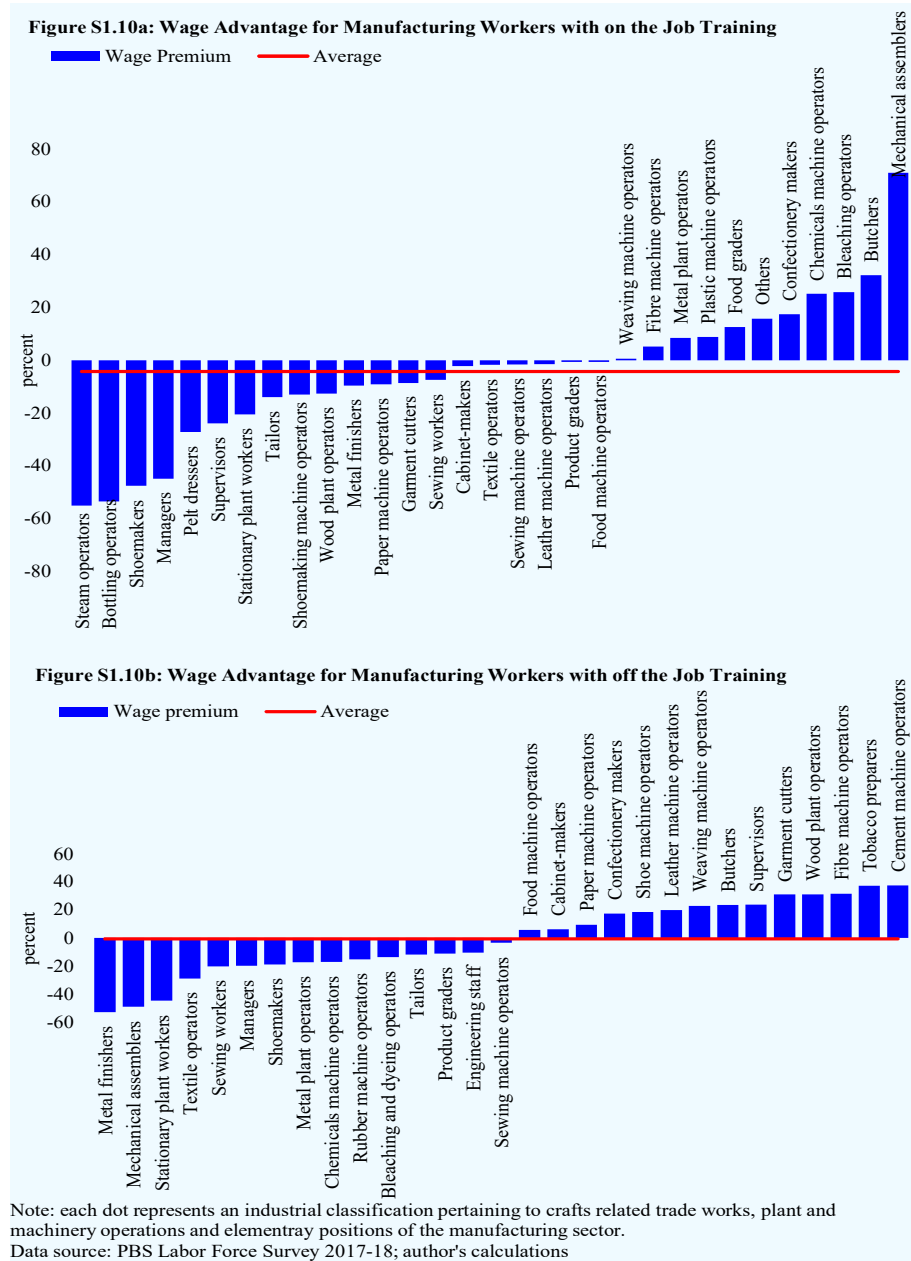
In this environment, employees see limited incentive to improve skills on their own

As previous sub-sections have established, employers are not actively focusing on providing either in-house or off-the-job training to their employees. An alternative could be for workers to pursue such training on their own. However, attraction for undertaking such an endeavor is hampered by the fact that there are negligible gains in terms of wages between formally trained and untrained workers.

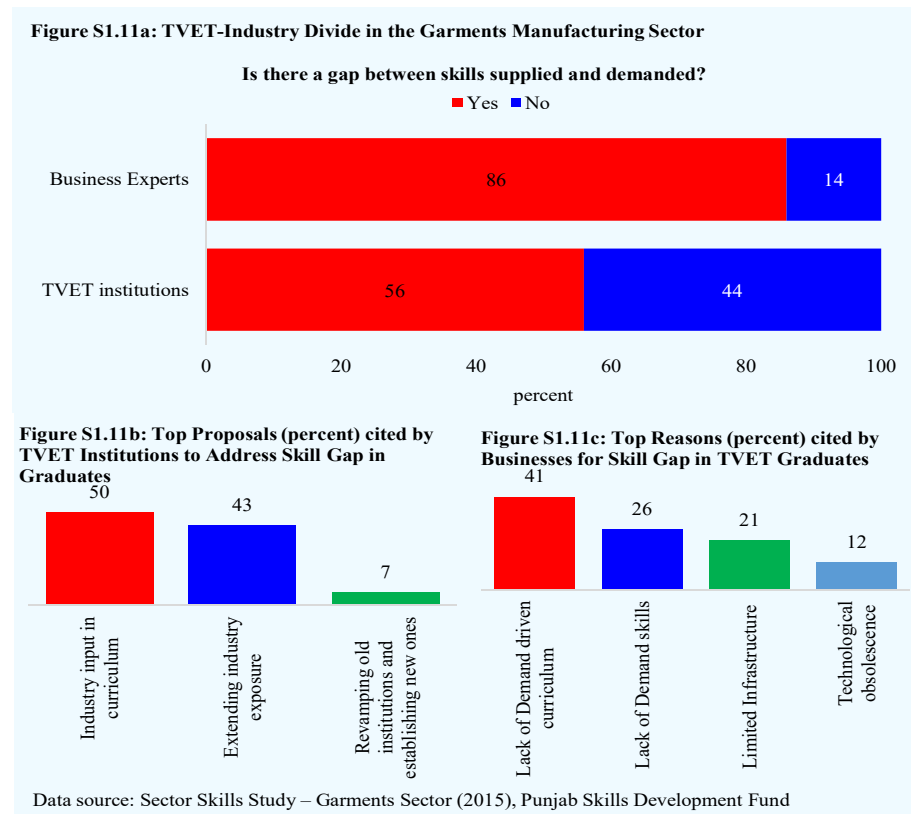
We analyze the wage differentials between trained and untrained workers employed in elementary occupations, working as plant and machinery operators and/or involved in crafts related trade activities in the manufacturing sector of Pakistan. Using the information available in the Labor Force Survey 2017-18, we find that in many industries/occupations, there is little to no difference in wages when we consider either on-the-job training or off-the-job training (**Figure S1.10**). There are some industries where we find a positive wage gap, such as in mechanical assembling, cement, tobacco and fabric processing, but in many industries wage incentive (if any) does not appear to be large.

Consider the case of the readymade garments industry of Pakistan. According to a 2015 Punjab Skills Development Fund (PSDF) sector study regarding the effectiveness of TVET, 56 percent of the training service providers (TSPs) reported that there was a gap between the skillset being taught to the students and that required by the garment sector. The business experts in their response to the survey highlighted this issue in a more pronounced manner, with 86 percent of them saying there existed a skill-gap. Two of the most important reasons cited were lack of skilled teachers in the TVET institutions and poor coordination between the TSPs and industry players. While TSPs suggested increasing industrial sector’s input as a vital condition for improving the efficacy of training

³² Khalil, Z. K. (2018). A Profile of Trade Unionism and Industrial Relations in Pakistan. International Labor Organization.

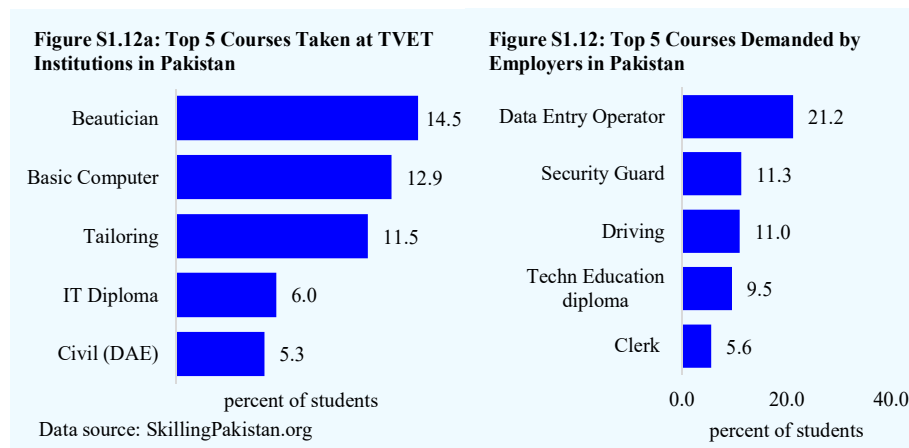


programs, business experts highlighted the lack of demand driven curriculum, technological obsolescence and poor infrastructure of TSPs as the major impediments (**Figure S1.11**).



And their interest is instead shifting towards self-employment opportunities

Courses that may generate self-employment opportunities are the most popular among TVET-enrolled individuals. These include beautician courses, basic computer learning and tailoring, etc. This contrasts with the courses most demanded by the employers, such as data entry operations, driving, and clerical works (**Figure S1.12**). This demonstrates both the increasing importance of services sector in the country and the much lower than required job growth levels in the country.



According to a 2018 World Bank South Asia Focus report, 1.4 million additional jobs would be required every year in Pakistan for it to maintain the existing employment rate from 2015 to 2025. Worryingly, the report finds that the actual level of employment rate in Pakistan is around 13 percent lower than what may be expected given the level of income per capita. This is because of both the very low levels of female labor force participation (the gap is closed to 30 percentage points) and the very high share of public sector jobs (around 35 percent) in regular wage jobs, indicative of the fact that the private sector is simply not producing the levels of jobs that are required.

S1.6 Policy Implications and the Way Forward

Keeping in view the dynamics of the TVET sector mentioned above, reforms are needed along the following lines:

Industrial cooperation should be enhanced

First, the business community should exercise greater control over the curriculum building and training delivery channels of the TVET programs through closer collaboration. This is because training in isolation from the trends and demands of the industrial sector cannot achieve the desired results of efficiency and effectiveness.

As we have discovered, problems exist at both the supply and demand ends in this regard. A solution could be to establish a common platform (such as a coordination committee or a joint task force) between the TVET institutions and

businesses whereby specific skills requirements are highlighted by the industries and then the curriculum is developed by the institutions with constant feedback and participation from the business executives.

Meanwhile, there is also a need for firms to develop and/or upgrade their on-the-job training programs. This would be important in two major ways. First, as any particular firm would be training its own workers, it would know the exact requirements for the curriculum and would be able to structure the contents and duration of the program accordingly. Second, from the employees' perspective, it may also increase their job satisfaction and self-actualization levels, which would implicitly make them more committed to the tasks at hand. Palpable gains from both these developments would enable firms to recognize the benefits of training and thus help break the cycle of labor force going under-utilized.

Businesses and training institutions should be forward-looking and prepare for emerging trends

A particularly worrying trend is that many firms are satisfied with the level of skills their employees have and some are not even sure if those skills are adequate enough. In this regard, businesses need to adopt a forward-looking approach to identify skill gaps that may help the firms not only compete in the international market but also adopt the latest production and operational processes. Without properly trained employees, these would be difficult.

According to a 2017 McKinsey report, around 15 percent of jobs (400 million workers) might end up getting potentially displaced all over the world because of digitization of the economy. Moreover, the spending on digitization would continue to increase, which is likely to result in the creation of up to 50 million new technology jobs by 2030. All this means that the focus on acquiring and improving worker's skills would become more and more important.

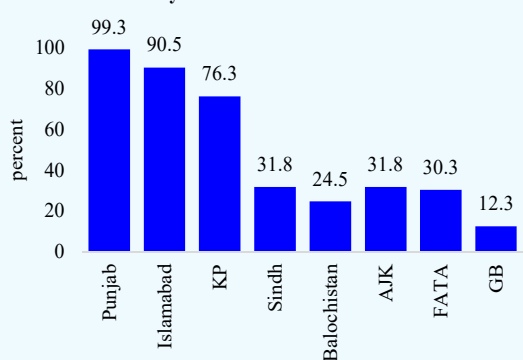
A possible way of increasing the skill building of employees could be to include employees' training and development as a part of companies' corporate social responsibly (CSR) programs. Employer involvement in workers' learning and development also increases the latter's satisfaction and motivation levels and makes them less inclined to search for other jobs. According to the LinkedIn's 2019 Workplace Learning Report, 94 percent of employees surveyed stated they would stay at a company longer if it invested in their learning and development. Furthermore, employees who spent more than five hours per week learning were more likely to know where they wanted to go in their careers (74 percent of the

responders), to find their work purposeful (48 percent), and to feel less stressed (47 percent).³³

Including training as a CSR objective could help address another potential bottleneck: workers being hesitant of asking employers to assist in training provision. According to the edX 2019 Reskilling Trends survey, while around a third of workers feel that employers should be responsible for making sure that the workers are prepared for the jobs of the future with the right skills, nearly half of them do not feel comfortable asking their employer to pay for the learning costs.³⁴

Businesses also need to focus on emerging technologies, such as those pertaining to the Fourth Industrial Revolution (4IR). The government has indicated in many official planning and policy documents that adoption of 4IR would be a strategic priority. However, without a workforce properly equipped to handle such technology this cannot be achieved. Here, it is pertinent to note that apart from Punjab and KP, the share of TVET

Figure S1.13: Share of TVET Institutions having Internet Connection Facility



Data source: (NAVTCC, 2017)

institutions having internet access is very low (**Figure S1.13**). This not only hinders the skill building of existing and potential workforce but also limits the reach of such training programs due to the lack of infrastructure for online/distance learning facilities, etc.

Public sector should increase efforts towards national skill building

Without direct public sector focus on skill building, the TVET sector cannot function effectively. For example, many businesses, especially those belonging to the SME sector, cannot afford to provide formal training to their workforce. Here, measures such as subsidies or tax breaks from the government can prove helpful. Similarly, the authorities must invest in the TVET institutions to equip them with the latest machineries and systems and to train the teaching staff accordingly.

³³ Source: [2019 Workplace Learning Report. \(2019\). LinkedIn.](#)

³⁴ Source: <https://blog.edx.org/edx-announces-results-new-survey-reskilling-trends/?track=blog>

This would aid in preparing the incoming batches with the latest and in-demand skills. On the workers' end, the authorities can widen the scope of financial aid and scholarships to ensure affordability of such programs for the lower and lower-middle income portion of the population.

Encouragingly, some positive developments are taking place in this regard. For instance, the National Skills for All Strategy prepared by the Ministry of Federal Education & Professional Training provides a roadmap to: (i) broaden the scope of targeted skills development programs, (ii) increase the participation and input from the private sector in curriculum design and training delivery, (iii) enhancing female labor force participation; and (iv) implementing apprenticeship laws around the country. In this context, the government launched the *Hunarmand Jawan* program and the Digi-Skills initiative, via which it aims to equip the youth with the skills required to effectively take part in the existing and emerging job requirements in the country. Salient features of *Hunarmand Jawan* include: (i) training 50,000 of the youth labor force belonging to less developed areas of country; (ii) creating 100 smart tech labs across Pakistan for distant learning programs in technical & vocational education; and (iii) establishment of 50 Business Incubation Centers to promote self-employment and entrepreneurship in skilled youth.

Another encouraging development is that the National Vocational and Technical Training Commission (NAVTCC) of Pakistan has launched officially defined skill-set categorizations to help improve the placement and skill matching in the domestic labor market. Under the revised National Vocational Qualifications Framework (NVQF), an assessment criterion has been developed to classify workers according to skill-sets and to facilitate their gradual promotion to higher levels. Similarly, NAVTCC is also in the process of setting up institutional accreditation process for TVET institutions. The training service providers would be assessed based on indicators such as affiliation/accreditation with relevant bodies; adequacy of training facilities; teaching staff quality; type of trades being offered; employability of graduates; alignment with NVQF; and health and safety requirements, etc. The objective is to foster a sense of healthy competition amongst the training institutes to bring overall improvement in the sector.