

Need for Serious Planning in Technical education in Pakistan

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Outline

1. Introduction:

- A nation's progress is not determined by the number of its universities, but by the strength of its skilled workforce.
- Technical education, often referred to as vocational or career education, is a specialized form of learning designed to equip individuals with the practical skills and knowledge needed for specific professions and trades.
- Thesis Statement: There is an urgent need for serious planning in Pakistan's technical education to promote economic growth, achieve global competitiveness, harness youth potential, strengthen exports, and foster innovation. However, progress in this sector is obstructed by outdated curricula, untrained teachers, ~~structure~~ skill gaps, low investment, and

brain drain. These challenges can be overcome through updating curricula, teacher training programs, strengthened industry-academia collaboration, increased investment, and retention policies.

2- Why Planning is Needed in Technical Education of Pakistan

i) Harnessing Youth Potential and Employment:

Proper planning in technical education can transform Pakistan's large youth population into a skilled workforce, driving national productivity.

ii) Promoting Economic Growth and Industrial Development:

Effective planning in technical education strengthens industrial capacity, increases productivity, and supports sustainable economic growth.

iii) Expanding Economic Growth and Industrial Developments

Advancing technical education equips the workforce to produce high-quality, globally competitive

goods and boosting exports.

iv) Fostering Innovation And Technological Advancements

Well-planned technical education equips the workforce with modern skills, enabling innovation, improving industrial processes.

v) Achieving Global Competitiveness and Standards

Strategic planning in technical education aligns Pakistan's workforce with international standards, enhancing innovation and competitiveness in global markets.

3- Major Problems in Technical Education of Pakistan

i) Outdated Curriculum:

The outdated curriculum emphasizes theory over practical skills, fails to incorporate modern technologies, and restricts graduates from meeting industrial demands.

ii) Lack of Trained Teachers:

The shortage of qualified and trained instructors with industrial experience weakens

technical education, hindering students' skill development.

iii) Skill Gap and Weak Industry Linkages:

Limited collaboration between technical institutes and industries creates a skill gap, leaving graduates unprepared for modern workplaces & reducing national industrial competitiveness.

iv) Inadequate Investment:

Low financial allocation and investment in this sector results in outdated infrastructure, limited training capacity, and weakened human capital development.

v) Brain Drain of Talents

The brain drain of skilled engineers and technicians seeking better opportunities abroad deprives Pakistan of its trained workforce and weakens institutional capacity.

4- Remedial Measures for Strengthening Technical Education in Pakistan

i) Introducing Modern Curriculum:

Reforming the curriculum to include modern technologies, digital literacy and practical skill development can align Pakistan's technical education with global standards.

ii) Enhancing Teacher Training Programs

Hiring professionally developed and trained instructors can foster the effectiveness of technical education and ensure better-prepared graduates.

iii) Strengthening Industry-Academic Collaboration:

Building strong partnership between technical institutes and industries ensures practical training, bridges the education-employment gap, and enhances workforce productivity.

iv) Enhancing investment in Technical Education:

Through investment, increasing financial support and infrastructure development can modernize training facilities. It can promote innovation and strengthen Pakistan's technical education system.

v) Implementing Retention Policies:

Introducing competitive incentives and career growth opportunities can curb brain drain, retain skilled professionals, and foster Pakistan's innovation capacity.

5. Conclusion:

Essay

A nation's progress is not determined by the number of its universities but by the strength of its skilled workforce that transforms knowledge into productivity. When a country fails to equip its youth with technical competence, it loses the power to compete in the modern world of innovation and industry. Technical education, often referred to as vocational or career education, is a specialized form of learning designed to equip individuals with the practical skills and knowledge needed for specific trades and professions. In Pakistan, technical education holds immense potential to drive industrial and economic growth, yet its structure continues to suffer from poor planning and weak implementation. There is an urgent need for serious planning in Pakistan's technical education to promote economic growth, achieve global competitiveness,

harness youth potential, strengthen exports, and foster innovation. However, progress in this sector is obstructed by outdated curricula, untrained teachers, skill gaps, low investment, and brain drain. These challenges can be overcome through updated curricula, teacher training programs, strengthened industry-academia collaboration, increased investment, and retention policies.

To begin with, technical education is vital for harnessing the potential of Pakistan's large youth population and turning it into a productive workforce. With nearly two-thirds of Pakistan's population under the age of thirty, youth unemployment has become a pressing issue. Proper planning in technical education can equip young people with market-relevant skills, enabling them to secure jobs in industries and reduce the burden of unemployment on the economy.

The Pakistan Institute of Development

Economic (PJDE) reported in a 2024 review

that over 31% of young graduates in Pakistan were unemployed, highlighting the urgent need for structured vocational and technical programs. Therefore, effective planning in technical education can transform Pakistan's youth from a potential liability into a valuable asset for national development and employment generation.

In addition to, technical education is a key driver of Pakistan's economic growth and industrial advancement. A skilled workforce increases productivity and efficiency in industries, enabling them to adopt modern technologies and expand operations. Without proper technical training, industries struggle with low output and outdated practices. Planned technical education ensures that graduates can meet the evolving demands of the industrial sector. The State Bank of Pakistan (2024) highlighted that industries with technically trained employees have higher operational efficiency and contribute

significantly to GDP growth, demonstrating the critical role of technical education in economic development. Thus, investing in planned technical education directly contributes to industrial growth, economic stability, and national prosperity.

Moreover, the advancement of technical education is essential for expanding exports and strengthening Pakistan's fragile economy. Technical expertise enables the production of high-quality goods that can meet international standards, allowing Pakistan to diversify its exports beyond traditional sectors like textile. A technically skilled workforce improves manufacturing efficiency, promotes innovation, and enhances competitiveness in the global market. According to a World Trade Organization (WTO) trade review report (2024), Pakistan's export performance remains stagnant largely due to the low technological content of its products and the shortage of technically trained human capital. Hence,

Strengthening this sector is not merely an educational necessity but a strategic economic measure to enhance Pakistan's global trade performance and reduce its dependence on imports.

Furthermore, technical education is crucial for driving technological innovation in Pakistan. A workforce trained in modern technologies and practical application can develop new products, enhance industrial processes, and implement advanced solutions. Without adequate technical skills, Pakistani industries struggle to innovate, remain dependent on outdated methods, and fall behind global competitors.

Proper planning in this sector ensures graduates are equipped to drive research, development, and technological advancement across sectors.

The UNCTAD Technology and Innovation Report (2023), referenced by the UNDP, emphasized that developing countries must boost technical skills, scale up ICT infrastructure, and build capacities to harness frontier technologies to

spur economic growth and technological development. Therefore, strengthening technical education is vital in promoting innovation and positioning Pakistan as a competitive player globally.

Last but not least, effective planning in technical education is indispensable for achieving global competitiveness and aligning Pakistan's workforce with international standards of productivity and innovation. A workforce equipped with up-to-date technical skills enables industries to produce high quality goods and services that meet global benchmarks. Without proper technical training, Pakistani products struggle to compete internationally, limiting trade opportunities and economic growth. By aligning technical education with global standards, graduates can implement best practices and adopt modern technologies required for international markets. From a report by the Pakistan Council for Science & Technology, the First Industrial

National Innovation Survey 2021 shows that technical skills and human-capital development are among the lowest-scoring indicators for Pakistan's innovation ecosystem. Hence, reforming technical education to produce globally competitive professionals is vital for ensuring Pakistan's participation at ^{the} international level.

Despite the evident need for strategic planning in technical education, Pakistan continues to suffer from deep-rooted structural and administrative weaknesses. A number of persistent challenges have hindered the effectiveness and expansion of technical education across the country.

To begin with, the foremost issue in Pakistan's technical education is an outdated curriculum that fails to meet modern industrial standards.

Most institutes follow an outdated curriculum that focus on theoretical knowledge while neglecting practical and hands-on skills.

Students rarely gain exposure to modern technologies, digital tools, or innovative

industrial practices. This outdated approach prevents graduates from meeting contemporary work force demands. According to a study titled "Emerging challenges in Technical Vocational Education and Training of Pakistan in the Context of CPEC", many TVET (Technical and Vocational Education and Training) institutes in Pakistan continue to operate with outdated equipment and training programs because their curricula do not reflect current industrial needs. Hence, outdated curriculum resists practical skill development and prevents students from becoming capable to meet technological demands.

Next, the shortage of qualified and trained instructors poses a serious challenge to the effectiveness of technical education.

Most technical education institutes depend on instructors who lack industrial experience and professional training. Their weak motivation often stems from extremely low salaries and poor working conditions, which push qualified

professionals away from the field. As a result, outdated teaching practices continue, limiting student's exposure to real-world skills and innovations. According to the NIPA Peshawar (2024-2025) and IRJMSS (2024) reports, a major weakness in Pakistan's technical education lies in its shortage of qualified instructors. Many teachers lack formal training and industrial exposure, while limited funding prevents institutes from offering competitive salaries or professional development. Therefore, without an adequate trained teaching workforce, Pakistan's technical education system can't meet the evolving demands of the modern industrial economy.

In addition, a major problem in this sector is the persistent skill gap caused by weak collaboration between training institutes and industries. Most technical institutions are developed in isolation from market demands, producing graduates who lack practical exposure and job ready-skills. Without collaboration with industries, students remain unaware of technological

trends. This disconnect reduces the employability of graduates and undermines the very purpose of technical education. A 2024 report by the British Council in Pakistan, conducted under the EU-funded TVET Sector Support Programme, states that only 10% of IT graduates are employable due to a severe gap between academic training and industrial requirements. Hence, without bridging this academic-industrial divide, Pakistan's technical education will remain detached from real-world innovation and economic productivity.

Another pressing challenge is inadequate investment which continues to hinder its growth and modernization. Inadequate funding limits the development of technical institutes, resulting in outdated machinery, poorly equipped training centers, and minimal incentives for qualified instructors. As a result, most institutes fail to introduce advanced technical programs. This persistent underfunding weakens the overall quality of technical education, preventing it from

meeting industrial demands. According to recent estimates, Pakistan's total government expenditure on all levels of education, including technical and vocational training, has remained around 1.87% to 1.9% of GDP between 2023 and 2025, which is far below the UNESCO-recommended 4-6% benchmark. Thus, without increased educational investment, Pakistan's technical sector will stagnate, weakening human capital and also industrial competitiveness.

Finally, one of the critical problem weakening this sector is the persistent brain drain of skilled professionals. Thousands of technically trained individuals leave the country each year in search of better salaries, modern research facilities, and professional recognition. The lack of incentives and limited opportunities within the local market discourages graduates from serving the national economy. As a result, Pakistan loses the very minds needed to strengthen its industrial and

education base. According to the Bureau of Emigration and Overseas Employment (BEOE), in the first quarter of 2025 alone, 1,479 engineers and 3,474 technicians from Pakistan secured overseas employment. Consequently, the continuous migration of technical professionals not only weakens institutional capacity but also delays Pakistan's progress toward industrial and technological self-reliance.

Having identified the major challenges in Pakistan's technical education, it is clear that targeted interventions are essential. Implementing effective solutions is crucial to strengthen the system and prepare the workforce for national and global demands.

To revitalize technical education in Pakistan, the foremost step is the introduction of a modern syllabus that reflects the rapid advancements in technology. A restructured curriculum should integrate emerging technologies, digital literacy, and hands-on training aligned

with global standards. Regular curriculum reviews can ensure that technical programs remain relevant, practical, and updated.

Such an approach would replace rote learning with practical competence and creativity.

In this regard, NAVTTC has submitted recommendations to the federal government to

update technical curricula in line with global benchmarks. This proposal was presented during a two-day international dialogue titled

"TVET in the Shifting Socio-Economic Paradigms" held in Islamabad in October 2025, high-

lighting Pakistan's struggle to modernize its technical education sector. Accordingly, modernizing

the curriculum can transform this sector into a productive, future-oriented system that nurtures innovation and skilled workforce.

Another essential reform is enhancing teacher training programs to ensure instructors are competent and up-to-date with industry requirements.

Teachers are the backbone, yet many in Pakistan lack hands-on industrial exposure and

Structured refresher training. Comprehensive professional development programs can equip instructors with modern teaching methods and practical skills, enabling them to deliver high-quality education aligned with industry demands.

A 2024 report by the Pakistan Institute of Development Economics (PIDE) highlights that most technical instructors lack hands-on industrial exposure and structured refresher courses.

The report recommends establishing national-level training academies and industry partnerships to modernize technical teaching standards. Thus, by recruiting skilled teaching staff, this sector can improve instructional quality and produce graduates who are ready to meet contemporary industrial challenges.

Another vital remedy is strengthening collaboration between technical institutes and industries is essential to produce graduates equipped with practical skills. Without this linkage, technical education remains theoretical, leaving students unprepared for real-world challenges.

structured partnership, internships, and apprenticeship programs allow students to gain hands-on experience and understand workplace expectations. For example, in Germany, technical institutes maintain strong partnership with industries through apprenticeship programs, where students spend up to 70 percent of their training period in industrial settings. This approach ensures graduates acquire practical skills and are immediately employable, offering a model Pakistan can adopt.

By fostering industry-academia collaboration, Pakistan can bridge the gap between education and employment, enhancing both workforce competence and economic productivity.

Another essential requirement for improving this sector is enhancing investment to build strong infrastructure and quality training facilities.

Sustainable financial support is necessary to modernize laboratories, upgrade equipment, and expand access to technical institutes across the country. Without sufficient investment, institutions remain under-resourced hindering

innovation. Moreover, increased funding can promote public-private partnerships and attract foreign assistance to uplift the overall technical education framework. Countries like Malaysia have transformed their technical education systems by investing in modern infrastructure through initiatives such as the Malaysian Technical University Network (MTUN). The government upgraded laboratories and digital workshops, linking institutions with industries. This model shows how targeted investment can turn technical institutes into innovation hubs, a strategy Pakistan can effectively adopt. Therefore, persistent financial constraints undermine the inclusivity expansion of technical education across Pakistan, limiting its ability to meet industrial goals.

Equally important is implementing retention policies to prevent the brain drain of skilled professionals from Pakistan's technical education sector. Many talented instructors and graduates leave for better-paying opportunities abroad, weakening the domestic workforce. Competitive

salaries, career advancement opportunities, and recognition programs can help attract and retain skilled personnel in the country. Retention policies should also focus on creating a supportive work environment and professional growth paths to maintain motivation and loyalty. For instance, Turkey's Reverse Brain Drain Project, launched by TÜBİTAK (The Scientific and Technological Research Council of Turkey), provides returning scientists with research funding, housing support, and positions in national universities. This program has successfully attracted many Turkish researchers back home, strengthening country's technological innovation base. Thus, implementing effective retention policies can help preserve skilled human resources, ensuring technical education institutes contribute fully to national development and industrial growth.

In a nutshell, the need for serious planning in technical education in Pakistan cannot be overstated. A strong and skilled workforce reforms the foundation of industrial growth,

innovation, and economic stability. However, outdated curricula, untrained instructors, weak industry linkages, and persistent underfunding have hindered its potential. The country cannot meet the evolving demands of global competitiveness. Addressing these challenges through comprehensive reforms will not only produce a capable workforce but also drive industrial growth, technological innovation, and sustainable economic progress. A serious and well-coordinated plan for technical education is therefore not a choice but a necessity for Pakistan's national development. Thus, Pakistan can transform its technical education system into a dynamic engine of progress through efforts.

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