

POWER TRANSFORMER ENGINEERING SERVICES UNIT (PTESU)

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HISTORY OF PTESU

In 1979, the Power Transformer Reclamation (PTESU) Workshop was established by WAPDA. Initially, they started with minor repairs of Power transformers. Between 1979 and 1981, they successfully repaired 7.5 MVA transformer. Later, during 1981 PTESU has been transfer under the control of Pakistan WAPDA Foundation (PWF) which is an independent body of WAPDA, established to support widows of WAPDA workers through welfare programs.

PTESU is headed by a Manager, there are about 200 employees working under the control of the Manger the unit have sections of repairing, oil testing/ laboratory, VPD, and winding etc.

History reveals that: In 1983 they installed a drying oven this allows them to improve the efficiency of the unit. They also began assembling imported winding and even started cannibalizing winding for repair purposes.

Recognizing the need for further expansion, in 1990, WAPDA set up dedicated sections for winding and testing. This allowed for more focused and specialized services. As the workshop continued to grow, in 1994, they added an insulation Paper Wrapping Machine. This addition further enhanced their capabilities and improved the quality of their repairs.

In 2006, PTESU underwent significant expansion projects. They constructed a new repair bay, introduced advanced vapor phase drying technology, purchased new testing equipment, and established an Oil Diagnostic Lab. These developments allowed PTESU to provide state-of-the-art services to their clients.

Finally, in 2008, the workshop was officially renamed as the Power Transformer Engineering Services Unit (PTESU). This name change reflected their growth, expertise, and commitment to excellence in the field of power transformer engineering.

BACKGROUND

Operating the Power Transformer Engineering Services Unit (PTESU) in Pakistan is entirely within the control of the Water and Power Development Authority Foundation (PWF). Located in the Walton Test Lab in Lahore, PTESU is an independent profit center that has been in operation since 1979 and is regulated by the Managing Director of the WAPDA Foundation.

The WAPDA Foundation owns all of PTESU's equity, setting it apart from other state-owned businesses. Pakistan's Ministry of Water and Power is in charge of the esteemed WAPDA. Senior WAPDA officials and other professionals serve up the PTESU board of directors, which sets the organization's strategic direction.

PTESU has tested and repaired the massive 500kV and 220kV transformers as well as smaller distribution units that are used in Pakistan's network stations on several instances. Experts in technology and management supervise more than 300 full-time employees at PTESU. Among the best in the world, these innovative facilities have received ISO certification for testing, production, and maintenance.

PTESU has been providing inspection and maintenance services for over 8,000 transformers to both public and private enterprises in Pakistan for the past 40 years. In addition to utility corporations and independent electricity generators, you can discover both public and private enterprises here. PTESU's cheap rates and excellent quality draw in a lot of customers from the Middle East, Africa, and Central Asia. Dedicated to being Pakistan's top provider of modern power infrastructure, PTESU has yearly sales of over PKR 1 billion.

Evolution of Power Transformer Engineering Excellence

The Power Transformer Engineering Services Unit (PTESU) is an important hub in the intricate power grid that runs through Pakistan and is a vital part of the country's energy infrastructure. Initially established in 1979 as a small, specialized unit, the Power Transformer Testing and Repair Unit (PTESU) has developed into a crucial part of the country's power transformer testing and repair system.

PTESU's unwavering objective is to become the best in the field of transformer repair and testing. The state-of-the-art Walton Test Lab in Lahore is where they are located. PTESU described its operational philosophy, which is based on the values of being reliable, accurate, innovative, and cooperative, in its 2012 Company Profile. Our transformer engineering services are of the highest caliber thanks to their dedication to this strategy. Nothing less than perfection will do for them.

One of PTESU's key differentiators is the extensive range of transformers it offers. Their knowledge of transformers is comprehensive, ranging from large power transformers required for the 500kV and 220kV national grid stations to small-scale distribution transformers. The device's versatility is evidenced by its ability to accurately and proficiently operate a wide range of transformers, as shown in the comprehensive 2015 "*Testing Facilities*" documentation.

PTESU's success and its investment in human resources both directly convert into skilled workers. According to the "*HR Statistics*" from 2022, PTESU employs more than 300 skilled people since they appreciate expertise and experience.

PTESU's committed faculty and staff are more than merely a resource; they are the engine powering the remarkable rise to prominence of the institution.

PTESU offers innovative physical facilities that enable the conversion of knowledge into actual results. The unit's outstanding ISO 9001:2015 and ISO/IEC 17025 certifications, which confirm its unwavering commitment to quality, are in line with worldwide standards. 2019's "*ISO Certifications*" solidify PTESU's position as a reliable guardian of production, maintenance, and testing processes.

In the previous forty years, PTESU has tested and restored over eight thousand transformers, a statistic that the 2017 "*Performance Statistics*" report claims serves as a tribute to the company's competence. An impressive outcome like this demonstrates the unit's technical proficiency and commitment to the nation's electrical infrastructure.

PTESU has distinguished itself in Pakistan's dynamic energy market with an unwavering dedication to reliability and efficiency.

PTESU provides much more than simply statistics and routine maintenance. The vital function it plays in preserving the nation's electrical infrastructure guarantees the continuous supply of energy to residences, businesses, and industries. As a result, PTESU is now a crucial component of the country's energy independence plan.

PTESU considers its illustrious past and looks forward to continuing to be a leader as it marks 40 years of service. The trajectory of the unit not only demonstrates technical skill but also a commitment to ongoing adaptation to the dynamic energy situation. PTESU is still Pakistan's dependable partner in its quest for energy excellence as it ventures into unknown

territory because of its long history of unwavering commitment, expertise, and encouragement (Figure 1).

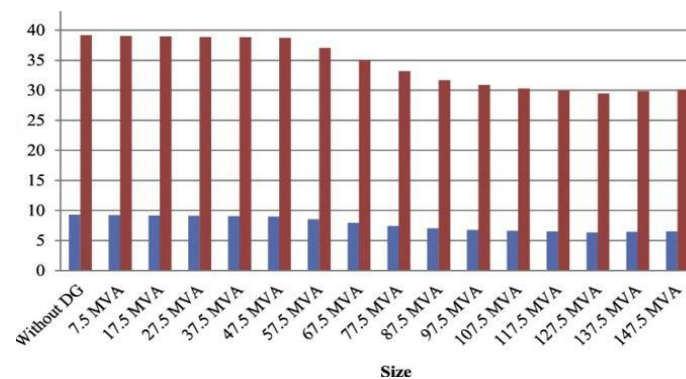


FIGURE 1
EVOLUTION OF POWER TRANSFORMER ENGINEERING

STRATEGIC DECISIONS AND CHALLENGES

Expansion of Testing and Repair Capabilities

PTESU (Power Transformer Engineering Services Unit) prudently recognized in the early 2010s that it needed to enhance its transformer testing and maintenance skills to satisfy the growing demand. Khan et al. (2020) explained the explanation for Pakistan's growing number of power transformer failures. He blamed the growing demand for the national system and the aging transformer fleet. According to research conducted in 2013, Pakistan had severe power outages as a result of inadequate production and transmission capacity.

PTESU, a leader in the field of short circuit testing, set out to improve its capacity for transformer design flaw detection in order to address these issues. Its status as Pakistan's leading center in this sector was cemented in 2013 with the installation of an innovative 20MVA short circuit tester, which signified the completion of this much-awaited project. Obtaining access to this advanced technology greatly aided PTESU in achieving its goal of creating power transformers that are as stable and dependable as possible.

Major expenditures were made to increase the maintenance infrastructure and the capacity to manufacture coils, as detailed in the 2016 "*Expansion Initiatives*" report. These changes were essential for PTESU to fulfill domestic demand surges and expand into international markets. As to the 2015 "*Export Growth*" report, the unit's updated capabilities and status in the business are highlighted by the extended export of trained professional services to the Middle East and Central Asia.

These measures affect more than just increasing operational efficiency. Sales increased from PKR 450 million in 2010 to an incredible amount that surpassed PKR 1 billion by 2016, according to PTESU's "*Revenue Statistics*" from 2022. This led to a significant shift in the company's financial position. This illustrates the increased power and wider market presence of the unit. It highlighted PTESU's successes and how it enhanced Pakistan's electrical infrastructure and financial adaptability.

Early in the 2010s, PTESU emerged as the leading provider of transformer testing and repair services in the area because to strategic planning, targeted expenditures, and technological advancements. These kinds of projects make PTESU a global leader in the rapidly evolving sector of power transformer engineering, which is full of new obstacles.

Strategic Partnerships

In the 2019 "*CEO Interview*," the Power Transformer Engineering Services Unit (PTESU) said that to counteract the growing level of competition in the transformer business, it was prudent to establish alliances and collaborations with renowned international individuals. We are grateful for this distinction. For PTESU, it was a turning point that would lead to innovation, splendor, and global recognition.

To improve its technological skills, PTESU sought to form technical relationships with European companies. Their goal was to have access to the expertise of reputable transformer technology specialists. The "*Technical Partnerships*" dossier from 2021 claims that these collaborations produced a number of innovative results, such as notable advancements in the processes of design, production, and testing. This not only showed PTESU a new standard of excellence, but it also exemplified the unit's creative thinking in applying international best practices to their work.

In 2018, PTESU advanced by sending its young engineers to specialized training programs abroad. They recognized the value of developing talent and maintaining a constant flow of information. PTESU's "*Foreign Training*" program not only improved communication but also exposed staff members to a range of international perspectives and methods related to the transformer sector. With this exposure to a variety of cultures, the unit was able to cultivate an environment that valued adaptability and innovative concepts.

PTESU has affiliations with prominent academic institutions including UET Lahore and NUST in addition to ties to regional businesses. These partnerships were formally established in 2017 under the name "*Academic Collaborations*," to strengthen and improve research and development projects. PTESU's goal was to improve the transformer industry with modern technology by fusing academic research with real-world commercial expertise.

These strategically placed relationships had far-reaching effects that were obvious. Having credibility and influence beyond national boundaries was an unparalleled accomplishment of PTESU's 2020 "*International Expansion*" trip. PTESU has shown to be a dependable collaborator for international projects and has produced consistently excellent outcomes because to its vast global contacts

PTESU's commitment to innovation and quality is further evidenced by its global engineering training programs, academic partnerships with esteemed universities, and technical partnerships with leading European industrial organizations. These calculated moves strengthened PTESU's standing as a leader in the sector and raised the company's image globally. As it combines local creativity with worldwide expertise in the exciting field of power transformer engineering, the unit's trajectory demonstrates the trans-formative potential of strategic collaborations.

OPERATIONAL STRATEGIES AT PTESU

Marketing Initiatives

The management of PTESU recognized the need to implement innovative marketing techniques to attract clients from both domestic and international markets, taking into consideration the dynamic nature of power transformer engineering. Direct marketing using email, brochures, and in-person meetings was the primary focus of the main shift that was implemented in the "*Marketing Strategy*" in 2014. A significant number of nations from Central Asia, Africa, and the Middle East and North Africa region participated in this global outreach initiative.

PTESU was able to tip the scales in the appreciation of utilities in 2016 by providing less costly plans with the option to defer payments, which increased its appeal to potential renters. PTESU has developed a reputation for being a cost-effective option that appeals to consumers with tight budgets as a result of the execution of these initiatives. As part of the "*Client Relations*" concept, professional account managers were established in 2015 to ensure flawless execution from the moment of inquiry to the point of delivery and enhance the customer experience overall.

The "*Expo Participation*" report, which was released in 2022, states that PTESU took part in several international trade shows and expos to showcase its skills on a worldwide level. The attendees had the chance to network with other influential members of the sector, which may have resulted in the acquisition of new clients. Furthermore, there was an increase in the event's visibility. The "*Export Growth*" plan was the driving force behind the explosive growth in sales to non-US countries, which went from 12% in 2010 to an astounding 30% in 2015.

Quality Management: A Commitment to Excellence

PTESU's commitment to service quality and standardization was demonstrated by the Walton test lab's compliance with ISO 9001 Quality Management System (QMS) and ISO 17025 criteria, according to the 2019 "*ISO Certifications*" report. These certifications show PTESU's commitment to quality and provide customers confidence in the caliber of its services.

As per the "*Quality Policy*" of 2018, PTESU ensures high-quality control by implementing comprehensive inspections at every stage of its operations, including design, production, testing, and repair. The unit invested a significant amount of money in automation initiatives in 2020 with the goal of digitizing equipment history cards for improved analysis and expedited testing procedures. Specific clients all around the world now turn to PTESU because of these advances, which allowed it to significantly increase its operating efficiency.

Further information on PTESU's online customer feedback system may be found under "*Customer Feedback System*". That was implemented in the year 2017. An example of PTESU's dedication to ongoing innovation is the creation of this system. To identify and address issues more quickly, PTESU was able to get client input in real-time. Reputable international organizations including the World Bank, USAID, and the Asian Development Bank have awarded the unit consultant projects because of its quality certificates. As stated in the 2016 "*International Consultancy Projects*" report, this provides proof of the unit's dedication to quality.

Financial Strategies

Between 2010 and 2016, PTESU's management implemented several initiatives that saw the implementation of the company's multi-pronged financial strategy, which was designed to guarantee financial sustainability. The 2015 "*Outsourcing Initiatives*" report claimed that outsourcing non-core manufacturing and repair duties resulted in significant cost reductions. PTESU was able to reduce expenses without compromising its capabilities by changing its emphasis and putting in place a more effective plan.

Systems for automated and Just-In-Time (JIT) inventory management were established by a research project named "*Inventory Optimization*" in 2019. This method freed up working capital reserves and improved financial health by streamlining processes. In response to updated guidelines for the depreciation of testing infrastructure, as indicated in

the "*Financial Statement Analysis*," an attempt was made in 2021 to enhance financial planning.

PTESU responded to the financial challenges encountered by utilities in 2017 by implementing creative financing alternatives, including credit guarantees, special project financing, and delayed payment choices, which are described in detail in the "*Creative Financing Options*" research. These actions garnered PTESU additional customers by establishing the company's reputation as a dependable and trustworthy partner for utilities going through hard times.

Production of distribution transformers is scheduled to start in 2022, according to the "*New Business Lines*" study. This enterprise needs less money to run. PTESU expanded into new markets in order to diversify its income sources in response to the changing market conditions.

According to the "*Financial Performance*" report dated 2203, PTESU's tactics resulted in a notable increase in earnings and sales between 2010 and 2016. These proactive initiatives improved PTESU's financial status and increased its competitiveness in the power transformer engineering industry.

According to its operational strategies, which included marketing campaigns, quality control procedures, and accounting plans, PTESU eventually climbed to the top of the power transformer business. Because PTESU's leadership had the foresight to see through looming challenges, the Unit emerged from them stronger than before. A thorough analysis of these strategies shows PTESU's commitment to being resourceful, creative, and a high-quality product manufacturer to keep its position as the market leader in power transformer engineering (Figure 2).

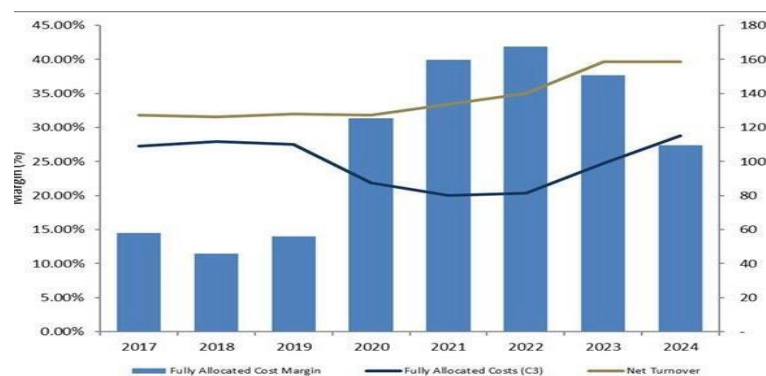


FIGURE 2
FINANCIAL STRATEGIES

REFLEXIVE ANALYSIS

PTESU is an example of a prosperous state-owned organization (SOE) when it comes to forging strategic relationships and launching innovative products, says Rafique (2022). The story of PTESU's development tells of a state-owned company that defies bureaucratic rules and is instead driven by creative thinking that puts the needs of its customers ahead of convention (Jensen, 1993).

During the strategy-level sessions, significant decisions regarding PTESU's future were made. PTESU used Pakistan's status as a growing economy, as opposed to a developing country, by boosting its capacities, forming international partnerships, and utilizing flexible marketing strategies (Zaidi, 2021). This change in public opinion proved to be more than just lip service for PTESU; it gave the business a competitive edge that changed the dynamics of the industry and cemented its leadership in the power transformer segment. By prioritizing

sophisticated certifications such as ISO, PTESU was able to set itself apart from rivals in the private sector and conform to international quality standards. At PTESU, we aim for excellence in all that we undertake.

PTESU's organizational philosophy has undergone a significant shift, as shown by a critical analysis. It was an agency of the government, formerly hidden, but it had an amazing revolution when it became client-focused. This was a significant departure from traditional public sector approaches, with customer-centric tactics taking precedence over administrative processes, according to Jensen (1993). The operational methods of PTESU, which prioritized efficiency, innovation, and continual improvement, can serve as a model for other state-owned firms seeking to reduce bureaucracy.

The case study also challenges the belief that there is no hope for issues like skill shortages and funding cuts in the public sector. Thanks to its innovative administrative strategies and unwavering commitment to excellence, PTESU overcame challenges unique to the public sector to become a renowned university (Saleem, 2018). PTESU and other state-owned companies (SOEs) should serve as role models for public sector leadership and management, encouraging them to think outside the box and pursue ambitious goals.

According to Williamson (2020), PTESU and other such models are becoming increasingly well-known as Pakistan transitions from a frontier market to an emerging economy. While much emphasis is focused on private sector success stories, PTESU demonstrates that effective transformation is possible even in the public sector. This trip is a great example of how state-owned companies can adapt to changing market conditions by being creative, developing strategic partnerships, and putting their customers first.

However, PTESU continues to encounter challenges. Shah, (2022) emphasized in 2022 that Pakistan's economic problems were a threat to PTESU's stability and growth possibilities. The way the business responds to these obstacles will demonstrate its adaptability and strategic intelligence. Our ability to invest in leadership development, use performance management strategies influenced by the private sector, and never give up on greatness will determine our ability to succeed going forward. The capacity of PTESU to endure through economic volatility while maintaining to its core values of quality and innovation will determine its destiny in the competitive marketplace (Becker, 2019).

Furthermore, PTESU's reflective study shows how the company has developed from a conventional state-owned business to a cutting-edge, customer-focused, globally competitive giant. To be great, the public sector needs forward-thinking leadership, innovative problem-solving techniques, and a focus on satisfied consumers. Other state-owned businesses can benefit from PTESU's experience leading the sector while negotiating bureaucratic requirements.

ISSUES

- a) **Limited Operational Hours:** The workshop currently operates for only eight hours a day, which may not be sufficient to meet the demand. PTESU suggests implementing three shifts of eight hours each to maximize productivity.
- b) **Insufficient Laboratory Equipment:** There is a lack of necessary equipment and gear in the laboratory, which hinders the workshop's ability to perform experiments and research effectively.
- c) **Low Employee Compensation:** The current employee pay is below the market standard, and there are no allowances provided. This may lead to dissatisfaction and potential talent retention issues.
- d) **Communication Gap:** There seems to be a gap in communication between different departments within the organization. This can result in delays, misunderstandings, and hindered collaboration.
- e) **Collaboration End with Pel:** Pel installed their own setup to repair their own transformer instead of relying on our workshop. As a result, our collaboration with Pel will come to an end on December 31, 2023.

- f) **Lack of Arrangements with Other Sectors:** Although there has been interest from sectors like chemicals and textiles, no formal arrangements have been made yet. This represents a missed opportunity for potential collaborations and diversification.
- g) **Lengthy Decision-Making Processes:** The decision-making process within the organization requires extensive approval processes, leading to delays in implementing necessary changes or improvements.

CONCLUSION

Addressing the issues highlighted in the case study is crucial for PTESU's growth and success. By implementing three shifts to extend operational hours, acquiring necessary laboratory equipment, improving employee compensation, bridging communication gaps, and exploring collaborations with other sectors, PTESU can overcome its challenges and enhance its performance.

Additionally, streamlining decision-making processes will enable PTESU to adapt quickly to the dynamic power infrastructure sector. It is essential for PTESU to have visionary leaders and consistent policies to foster an innovation culture. Despite regional and economic concerns, PTESU has the potential to transform constraints into opportunities and become a shining example of a successful government organization.

However, PTESU must be proactive in the face of the dynamic power infrastructure sector. It needs leaders with consistent policies and worldviews to maintain an innovation culture. Hiring and retaining excellent staff is difficult. Pakistan's development is influenced by regional geopolitical as well as economic concerns. That said, in contrast to other government organizations, PTESU is an outstanding instance of an excellent strategy. Above all, it stands for the countless opportunities that emerge when constraints are transformed into opportunities.

In this case study, the fast growth from a financially struggling state-owned company to being the world leader in transformer testing and repair is described. Overcoming the inherent constraints of the public sector is made feasible by a strong organizational commitment, well-thought-out plans, and impressive leadership vision. This excursion is a wonderful example of it.

There are enough of them to be found. One aspect that set PTESU apart from other government organizations was its unwavering dedication to acquiring cutting-edge technology infrastructure, which enabled it to create capabilities beyond expectations. A collaborative culture that valued partnerships was also necessary to close knowledge gaps and maintain subject expertise. Three, flexible and customer-focused advertisements might provide the personalization required for success in international markets. The fourth aspect is that consultancy possibilities arose as a result of concentrating on quality and getting worldwide certifications. Last but not least, advancements in financial management ensured the organization's sustainability by shielding it from the unpredictability of changing legislative regimes.

Pakistan, now a developing economy, may draw inspiration from similar instances of public-sector change as it seeks to reach world-class ambitions. PTESU has been at the forefront of challenging the notion that state-owned firms are inefficient. Its emphasis on developing people and strengthening institutions teaches us a great deal about successful leadership.

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