

MARKET ASSESSMENT REPORT

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Executive Summary

The Government of Balochistan (GoB) plans to transform a 34,000 sq ft facility in Quetta into the Mountain View Tech Park (MVTP), a dedicated Science and Technology Park (STP). This executive summary highlights key insights from global STP trends, Pakistan's technology sector, and the science and technology environment in Balochistan. The analysis aims to provide a value-adding approach for the MVTP business model and strategic direction, considering practical factors that contribute to the success of similar projects.

Approach and Methodology

The market assessment comprises both desk research and field research, using a combination of key informant interviews and secondary data sources to gather information. Key informant interviews were conducted with a range of stakeholders, including government support organizations, academia, software houses and technology companies, National Incubation Center (NIC) Operators and relevant professionals.

Desk research encompassed a review of current practices, strategies, and reports to contextualize the findings within Pakistan and Balochistan's broader technology and innovation ecosystem.

Global Trends: Critical Factors for STP Success

Globally, Science and Technology Parks (STPs) have evolved into major innovation hubs that drive regional economic growth. A few critical success factors that MVTP can learn from include:

Strategic Location: Successful STPs are typically located in urban areas with easy access to transportation, educational institutions, and business networks. Although the Mountain View Tech Park (MVTP) is located in Quetta, it does face challenges related to security and regional polarization.

Prestige and Visibility: STPs with a high level of prestige and visibility tend to attract top-tier businesses and talent. The MVTP should aim to create a strong brand image through partnerships with leading technology companies, universities, and research institutions.

Diverse Business Models: STPs can operate under various business models, from government-funded to public-private partnerships (PPPs) or fully private ventures. For MVTP, the mixed ownership structure with a focus on PPPs can provide flexibility and attract a wider range of investors and stakeholders.

Comprehensive Service Offering: A successful STP provides a variety of services, from basic infrastructure to advanced business support and value-added services. MVTP should consider offering a mix of internal and external services to cater to startups, SMEs, and established tech companies.

Emerging Trends in Pakistan's Technology Sector

Pakistan's technology sector contributes around 1% to the national GDP and stood at approximately PKR 647 billion in FY22 (FY21: PKR 485 billion).

The domestic market size for technology products and services is estimated to be PKR 273 billion in FY22 (FY21: PKR 218 billion).

Meanwhile, during FY22, exports of the total technology industry increased to PKR 374 billion (FY21: PKR 267 billion).

Recently in March 2024, the IT sector achieved a noteworthy achievement in the shape of its greatest monthly IT exports to date. According to the statistics, the monthly IT exports in March 2024 increased by 37% YoY and 19% MoM, reaching a total of USD 306 million. This surpasses the previous high of exports, which was set in December 2023 at US USD 303 million.

Pakistan's technology sector is evolving, with key sub-segments emerging as potential growth drivers for MVTP:

Information Technology Enabled Services (ITES): With a growing emphasis on software development, ITES is a significant sector for Pakistan's technology industry. MVTP can focus on attracting companies specializing in software development, IT consulting, and business process outsourcing (BPO).

Smart Technology: Innovations in artificial intelligence (AI), machine learning, and the Internet of Things (IoT) are gaining momentum. On later stages, MVTP can position itself as a hub for these technologies by providing state-of-the-art facilities and resources for tech companies.

FinTech and PropTech: Financial technology and property technology are emerging areas with significant growth potential. MVTP can leverage partnerships with financial institutions and real estate developers to attract companies specializing in digital payments, blockchain, and smart real estate solutions.

Opportunities and Challenges in Balochistan

Balochistan's science and technology environment presents both opportunities and challenges for MVTP:

Opportunities: The region untapped market provide an excellent opportunity to develop a thriving STP. The presence of universities and a growing pool of tech talent can contribute to MVTP's success.

Challenges: Balochistan faces infrastructure limitations, high unemployment rates, and a skills gap. MVTP must address these challenges by fostering local employment opportunities, investing in workforce development, and providing training programs to bridge the skills gap.

Recommendations for MVTP's Business Model

To maximize the success of MVTP, the following recommendations are made:

Develop a Strong Brand and Identity: Build a recognizable brand that reflects MVTP's commitment to innovation, sustainability, and regional development.

Offer Comprehensive Services and Support: Provide a wide range of services, including business support, networking opportunities, and advanced technology resources.

Foster Collaboration with Academia and Industry: Establish partnerships with local universities and research institutions to drive innovation and create a talent pipeline.

Focus on Emerging Technologies and Sub-Segments: Target high-growth areas such as ITES, Smart Technology, FinTech, and PropTech to attract a diverse range of tenants and investors.

Key Insights

This sub-section offers a SWOT analysis alongside practical insights for developing the project, reaching out to potential investors, and fostering sustainable socio-economic growth.

Strengths	Weaknesses
<ol style="list-style-type: none"> High Demand: Balochistan has a significant need for an STP to support existing companies (over 70 as identified by field visits) and foster startup growth. This initial pool of tenants can jumpstart the park's activity. First Mover Advantage: The proposed STP would be the first of its kind in the province, eliminating competition for tenants within Balochistan. This allows the STP to establish itself as the premier destination for IT and tech ventures. Existing Infrastructure: The Government-owned 34,000 sq ft facility reduces initial setup costs and provides a foundation for development. This existing infrastructure can be adapted to meet the needs of the STP. Government Support: Government backing demonstrates a commitment to the project's success and can attract potential tenants through incentives or streamlined processes. Government support can also facilitate access to resources and infrastructure. Economic Potential: The STP has the potential to create jobs, stimulate economic activity in the region, and contribute to Balochistan's overall development. Growth in the IT sector can attract further investment and diversify the provincial economy. University Collaboration: Collaboration with universities like BUIEMS (with NIC) and the University of Balochistan (with its innovation lab) can foster collaboration between academia and industry. This strengthens the talent pool, provides a pipeline for innovation, and facilitates student internships or placements. Local Talent Pool: The local community of Mariabad's high literacy rate can be a significant strength. By engaging with this community, the STP can attract a pool of qualified tenants and contribute to the overall development of the local IT sector. 	<ol style="list-style-type: none"> Security Concerns: The location can be designated as "high risk" due to potential religious unrest and activities which could deter companies, especially larger ones, from setting up operations. This perception can hinder tenant recruitment efforts. Community Sensitivity: The presence of a nearby graveyard and major religious processions might be seen as insensitive by the local community. Careful planning and open communication with community leaders are crucial to address these concerns and ensure the project's social license to operate. Utility and Connectivity Challenges: Ensuring uninterrupted access to utilities (including electricity) and high-speed internet connectivity might be difficult due to the area's high-risk designation. Reliable infrastructure is essential for the smooth functioning of IT businesses, and these challenges require mitigation strategies. Seasonal Disruptions: The one-month Ashura period with its processions could lead to complete shutdowns or reduced activity, impacting business continuity. The STP's operations plan may need to account for these seasonal variations. Limited Expertise: Balochistan's nascent IT sector might have a limited pool of experienced professionals to fill specialized roles within the STP's management or tenant companies. Strategies to attract talent from outside the province or bridge the skills gap through training programs may be needed.
Opportunities	Threats
<ol style="list-style-type: none"> Youth Bulge: Balochistan's demographics present a significant opportunity. With nearly 65% of its population under 30, there's a large, young talent pool that can be trained and employed in the IT sector. The STP can act as a catalyst for skilling and job creation for this demographic. 	<ol style="list-style-type: none"> Social Integration Challenges: If the STP fails to effectively engage the local community, it could face resistance due to the area's history of unrest and potentially low tolerance for outsiders. Proactive measures to ensure inclusivity and address community concerns are crucial for the project's success.

<p>2. IT Market Growth: Pakistan's IT and ITes export market is expanding rapidly. The STP can position itself to capture a share of this market by providing a supportive environment for companies to develop export-oriented solutions.</p> <p>3. Cost Advantage: Balochistan might offer lower operational costs compared to established IT hubs, attracting companies seeking to optimize their expenses. The STP can leverage this advantage to attract cost-conscious businesses.</p> <p>4. Networking and Mentorship: The STP can facilitate connections between startups, universities, investors, and mentors. This ecosystem can provide valuable support and guidance to young entrepreneurs, accelerating their growth and innovation.</p>	<p>2. Competition and Pricing: While the proposed STP would be the first large-scale facility, existing competition exists. The PSEB-operated STP offers co-working and dedicated office spaces with IT infrastructure at PKR 45 per square foot plus maintenance fees. Additionally, the University of Balochistan's Center of Excellence for Result Based Management (CERBM) and Innovation Lab offer rental space at PKR 100-120 per square foot. These existing options, particularly the PSEB STP with potentially lower costs, might pose some competition for tenants, especially price-sensitive startups. However, these are still small scale STPs and do not still provide sufficient space to completely meet existing demand. Additionally, the MoIT's planned STP presents a significant future threat.</p> <p>The proposed STP will need to establish a clear value proposition beyond just space to attract tenants. This could involve additional amenities, specialized services, or a strong focus on fostering innovation and collaboration.</p> <p>3. Security Perception: The perception of Balochistan as a high-risk area can dissuade established companies and organizations from setting up operations in the STP. Overcoming this perception requires effective security measures and a positive narrative about the region's potential.</p> <p>4. Government Incentives: The STP's success is strongly contingent on government support through incentives. This could include tax breaks, designation as a Special Technology Zone (STZ) under the STZA Act, or even applying for special exemptions if the area doesn't meet STZ requirements. Additionally, government allocation of funds through PSDP might be necessary to incentivize local companies and operators to set up within the STP.</p>
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Science and Technology Parks

This opening section establishes a foundational knowledge base for the subsequent analysis of Mountain View Tech Park's role within the broader landscape of Science and Technology Parks (STPs).

A comprehensive overview of STPs is presented, encompassing their core concept, historical evolution, and global presence. The section explores into the driving forces behind the rise of STPs, examining the various strategic approaches and operational models they employ.

Understanding these aspects is crucial for effectively evaluating Mountain View Tech Park. By establishing a benchmark through the characteristics and best practices of successful STPs around the world, this section provides a framework for assessing Mountain View Tech Park's strengths and potential for future development.

Definition

According to the International Association of Science Parks and Areas of Innovation, a Science and Technology Park can be described as:

“An organization managed by specialized professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions.

To enable these goals to be met, a Science and Technology Park stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets; it facilitates the creation and growth of innovation-based companies through incubation and spin-off processes; and provides other value-added services together with high quality space and facilities”.

By analyzing various definitions, it becomes evident that certain overarching themes are consistently present in nearly all of them:

- Supporting local or regional economic development
- Providing space and other support services
- Promoting innovation and competitiveness of clients
- Working with the knowledge base
- Facilitating investments of knowledge-based businesses
- Showcasing cluster developments
- Incubating start-up activities
- Providing an environment that encourages networking and exchanging of ideas



The expression “Technology Park” and “Science Park” encompass a broad concept and are interchangeable within this definition. The acronym **STP** (Science and Technology Park) is used to refer to all of these expressions.

Mainly, technology parks represent a supply-side approach aimed at furnishing businesses with resources for networking and collaboration.

Evolutionary Development of STPs

STPs have been evolving since their first establishment. The first technology park was founded in California in 1951, at the University of Stanford. Although STPs were initially often developed to support the commercialisation of universities' research results, they have increasingly been recognised as a policy tool for regional and national development (OECD, 2011).

The following further explains this evolutionary growth:



1. **First generation STPs:** STPs that started during and before the 1980s fit within the first generation. Their characteristics include:
 - A site with attractive landscaping and high-quality buildings.
 - Association with one or more Higher Education Institutions (HEIs), establishing connections between STPs and universities.
 - Dynamic connections with the affiliated HEIs to facilitate technology transfer that bolsters innovation among STP tenants.
2. **Second generation STPs:** During the 1990s, many STPs began to realize that the smaller technology firms they were supporting were not growing as fast as expected. This was largely because the management teams of young technology start-ups were relatively inexperienced. Hence, STPs began to expand the support they offered their tenants to include access to finance, business trainings, mentoring and coaching programs, etc. These programs were either delivered internally by the STPs or through their external networks. Simultaneously, STPs began to see themselves as an important pillar of the regional innovation ecosystem. On the basis of their experience of helping companies and the access to their own HEIs, these STPs started creating more complex networks to enable their tenants to access and utilize needed resources. Second generation STPs can be characterized as having all the features of a first generation STP in addition to:
 - Business support infrastructures for start-up and early-stage technology businesses. Most frequently this takes the form of a business incubator together with its value-added services.
 - Proactive networks in support of innovation. The networks are founded by the STP, yet are driven by the needs of their tenants; being universities, research and technology organizations, and technology businesses. Most well managed STPs created in the first-generation era have evolved to become second generation STPs.
3. **Third generation STPs:** The third generation of STPs was defined around 2006. They have all the features of second generation STPs, but would be physically constructed to create spaces and environments that are conducive to high levels of creativity and innovation. These collaboration spaces, available to the tenants, are also open to external companies and suppliers; hence creating a rich mix of possible networks.

Growth Drivers

The European Commission identified three key drivers behind the rise of Science and Technology Parks (STPs):

1. **Demand for High-Tech Infrastructure:** The rapid growth of the ICT sector, followed by biotechnology and life sciences, created a need for specialized workspaces with access to skilled talent. STPs provided the ideal environment with high-quality facilities and proximity to universities.

2. **Venture Capital Investment:** The expanding venture capital market, particularly interested in life sciences, found STPs to be a suitable launchpad for early-stage and growing companies.
3. **Economic Development:** Public policymakers recognized that STPs fostered job creation, particularly in high-value sectors. This realization led to increased public support for their development.

Global Overview

According to sources such as UNESCO (2017), there are over 400 STPs worldwide and their numbers are still growing.

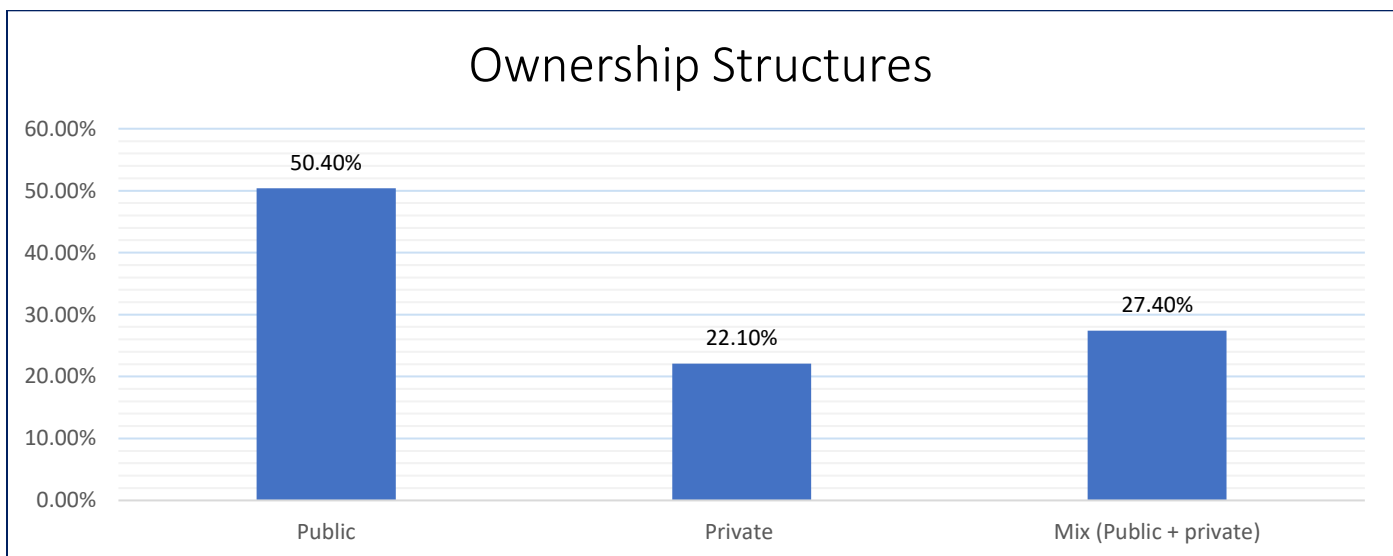
1. At the top of the list comes the **USA**, which is reported to have **more than 150 STPs**.
2. **Japan** comes next with **111 STPs**.
3. **China** began developing STPs in the mid-1980s and now has **around 100**.

Legal Structure, Ownership and Management

STPs typically have legally established management organizations, employing various juridical constructs with well-defined governance bodies and bylaws. Moreover, they commonly feature an on-site, full-time management team (Ng et al., 2019).

Regarding ownership, the majority of STPs worldwide are **initiated and owned by the public sector**, particularly regional and municipal governments. However, there is a **growing trend toward mixed ownership structures**, including Public-Private Partnerships (PPPs), and to a lesser extent, fully private STPs.

For example, approximately 30% of STPs in the EU operate under mixed public-private ownership. Additionally, universities occasionally own their own STPs or participate as co-owners in mixed-ownership arrangements.



Source: IASP

Full-Time Management Team: STPs require a dedicated and permanent team of professionals to handle all aspects of the park's operation. This contrasts with other innovation spaces that might have less intensive management structures.

Legal Entity: The management body of an STP typically operates as a legal entity, separate from the park's owner (land or facilities owner). This allows for independent decision-making and facilitates efficient park operations.

Scope of STP Management Authority

STPs confer significant authority and decision-making power to their management organizations. This extensive scope encompasses several key areas:

- **Tenant Selection:** Management has the discretion to select companies or activities that best align with the park's goals and contribute to its overall success.
- **Operations and Services:** The management team determines the common activities permitted within the park, the services offered to tenants, and the overall operational framework.
- **Infrastructure Development:** Decisions regarding building new facilities, refurbishing existing ones, and maintaining the park's infrastructure may fall under the purview of the management team.
- **Commercial Strategy:** The management team sets the commercial direction for the park, including the type of tenancy options offered and the pricing structure.

STP management can therefore be described as:

- Intensive, as it entails a permanent and full-time management team;
- Comprehensive, i.e., it covers a very wide range of aspect, such as infrastructures, maintenance, commercial, services, networking, institutional relations etc.

Scale and Location

Recent data show that **75%** of STPs have an area from **100,000 to 1,000,000 m²**, although a significant **18%** of STPs present an **area over 1,000,000 m²**.

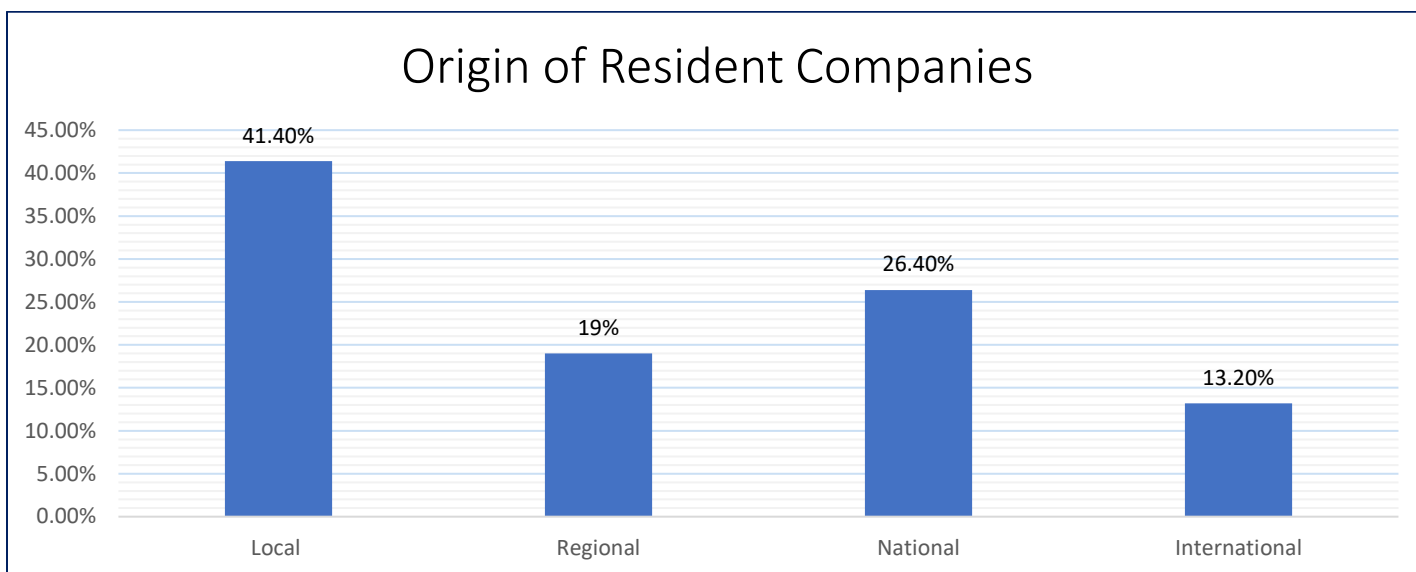
Location wise, STPs are markedly of an urban character, being mainly in cities or in areas adjacent to cities. Regardless, they always have a clearly delimited area.

Target Users and Services

STPs cater to a specific user base that fosters innovation and collaboration:

- **Technology and Innovation Firms:** Companies across all stages of development, from startups to established multinationals, can benefit from the STP environment. However, statistics show a higher concentration of startups and SMEs (Small and Medium Enterprises).
- **Knowledge Institutions:** University labs, research institutes, and other knowledge-based organizations play a crucial role within STPs.

The strong connections of STPs to their local areas is highlighted by the fact that **41.4%** of companies based in the areas/parks are of **local origin**. This also shows their importance as local innovation actors. However, STPs also attract regional and national companies, and a smaller but significant percentage (13.2%) of international companies.



Source: IASP

One of the key differentiators of STPs is the extensive array of services offered to resident businesses and organizations. These services can be categorized using a **two-dimensional matrix**:

1. Service Type:

- Ancillary Services (low value-added): These services provide basic support for daily operations, such as security, parking, and maintenance of common areas.
- Value-Added Services: These services directly contribute to a company's growth and success. Examples include business consulting, access to networks, patenting and licensing guidance, high-quality IT infrastructure, and internationalization support.

2. Service Provider:

- Internal Services (provided by STP management): The STP team directly manages the delivery of some services, such as meeting rooms, conference facilities, and basic lab equipment.
- Externalized Services (facilitated by STP): For other services like training, specialized consulting, restaurants, and fitness facilities, the STP acts as a facilitator, ensuring their availability to residents but not necessarily providing them directly.

The above is demonstrated in the matrix below:

	Ancillary services	Mid high value-added services
Provided by the STP	<ul style="list-style-type: none"> • Security and surveillance • Parking space • Maintenance of common areas • Meeting rooms • Conference rooms 	<ul style="list-style-type: none"> • Equipped lab facilities • Entrepreneur assistance (consulting, monitoring, etc.) • Access to networks • Patenting and licensing guidance • Quality IT connectivity • Internationalization support
Externalized	<ul style="list-style-type: none"> • Restaurants • Cafeterias • Gym • Sports centers 	<ul style="list-style-type: none"> • Training • Consulting • Patenting & licensing consulting

Strategic Approaches of STPs

STPs can adopt various strategies regarding the types of companies and technologies they focus on:

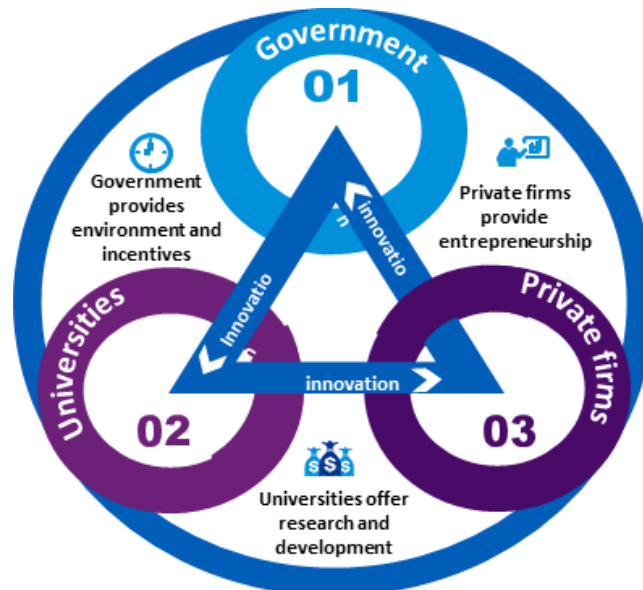
1. **Generalist:** These STPs welcome innovative companies from any sector, prioritizing a general commitment to innovation. They require their residents to be innovation driven/focused, regardless of the sector they operate in.
2. **Semi-specialist:** These STPs accept innovative companies across sectors, but may favor certain areas that could eventually become their dominant focus. IASP recent statistics show that more and more STPs seem to favour a certain degree of semi-specialisation.
3. **Specialist:** These STPs cater exclusively to companies and institutions within a very specific niche, such as life sciences, biotechnology, agriculture, or aerospace. This specialization results in dedicated parks like Bioparks, Aerospace Parks and Agroparks.

While earlier generations of STPs followed a linear model of innovation, focusing on either academia to business or demand-pull to academia, later generations tend to embrace a multidirectional approach. They involve **triple helix actors**—academia, industry, and government—and serve as ecosystem orchestrators, catalyzing regional development and growth (European Commission, 2014; Romano et al., 2014).

Triple helix model

It is used as a policy making tool to enhance innovation and economic development. It advocates the strengthening of the collaborative relationships between:

1. **Government** can provide land at a subsidized cost. Such benefits could be embedded in the policy documents so that it can provide protection to create an environment where universities and private firms are willing to invest their time and resources over a longer time horizon.
2. **Private firms** can bring their technical knowledge and market awareness. They may bring in agility to respond to new challenges because they are receptive to changes in the fast-changing consumer requirements.
3. **Universities** can bring their cutting-edge research and the experience of seasoned professors. Universities can carry out new research with resources provided either by the government or the private firms and may also help startups with technical hiccups.



Governance Dimensions

The following dimensions constitute the governance dimensions according to the model established by the World Technopolis Association:

1. **Legal status** – e.g. What is the legal structure of the STP? Will there be a separate science park company or will the park be a division of one of the partner organizations?
2. **Ownership** – e.g. Who owns the land, sites, infrastructures and buildings that constitute the park? Who owns the assets in the early stages of the development? does ownership change over time?

As physical realities, STPs include land, infrastructure and real estate facilities available for their residents/users. A distinguishing feature is the existence of clear and well-defined boundaries, which can, however, delimit one or multiple sites.

Nowadays, the most common model observed is, by far, **space rental** in premises mostly owned by the STP, while sale/lease of plots of land was more common in the first generation of STPs, in the 80s, and is now quite rare.

3. **Capital** – e.g., what is the capital, in the form of money or other assets, that is required during development and operations? Who provides that funding? Seed capital can be acquired from grants, loans, leasing etc., whereas, working capital can be generated against offered services or incentives at a science park.
4. **Decision making and control** – e.g. Who makes strategic decisions? To what extent do each partner want to keep some level of control over the development of the park and how far are they prepared to relinquish this control? Will there be an external board with membership of wider partners and stakeholders or will the science park be run basically by the main sponsoring organization?
5. **Management** – e.g., who makes operational decisions? What are the reporting arrangements? What is the level of autonomy?

Management of a science park refers to the team of individuals that governs planning, development, administration, and operation of a science park. A successful management team has a clear vision and mission that helps in fulfillment of the objectives that aid in STP development and growth. Moreover, they are responsible for planning and formulating science park policies, undertaking risk analysis, drawing subsequent mitigation plans, and devising cost structure and revenue models.

Finally, in order to achieve the full potential, STP needs to be developed and managed in an entrepreneurial way and this will be facilitated by having a fair amount of autonomy vested in the park management, allowing it to make strategic decisions that predominantly serve the interests of the STP.

6. **Stakeholders** – e.g., who are the key stakeholders of the STP? A stakeholder is an entity or an individual that has an investment, share, or interest in the STP. Besides the management team of a science park, tenant companies, R&D organizations, regional and national development authorities, and private sector are key stakeholders in planning of a STPs.
7. **Key performance measures** – e.g. What are the key performance measures for the STP? What is the balance between financial and wider economic development objectives and targets?
8. **Technology Focus** - STPs face a number of crucial strategic choices, both at their planning stage and later on as they develop. One of them is to choose whether to have a strong technology focus or have a more generalist approach. The choice of being either specific or general mainly depends upon the economy sectors that are to be provisioned at the STP.

9. **Target Group** - A target group is defined as a group of customers towards whom the STP decides to aim its services. This group may comprise startups, spin-offs, small and medium enterprises, privately or publicly owned R&D centers, business support agencies, venture capital companies, etc. Clearly defining target groups at planning stage can help a science park to make appropriate arrangements for the target group.
10. **Eco-settings** – e.g. Does the STP have eco-friendly policies? Does the management prioritize environment-friendly arrangements? Does it take proactive initiatives for improving the environment?

Best Practices

While STPs can vary significantly in their goals, facilities, and management, some key best practices contribute to their success:

1. **Champions:** Committed champions who have matching visions and can provide sustained, high-level attention to ensure the growth and development of the STP.
2. **Leadership:** Effective and professional management that can facilitate service provision in addition to networking among entrepreneurs, researchers, investors, and others within the ecosystem.
3. **Funding:** Designated and sustained funding (public or private), combined with effective public policies to support companies that seek to convert ideas into innovations and innovations into commercialization.
4. **Soft infrastructure:** This includes the inventory of human capital resulting from investments in education and training, public policies that encourage entrepreneurial culture, and the presence of networks among professionals.
5. **Metrics:** Effective metrics to help management set clear goals and measure the effectiveness of the STP.

Stakeholders in Developing Economies

The successful establishment of STPs in developed countries had been attributed to the strength and diversity of their economies. However, for developing countries with economies in transition, some factors must be considered for successful implementation and operational capabilities of STPs such as:

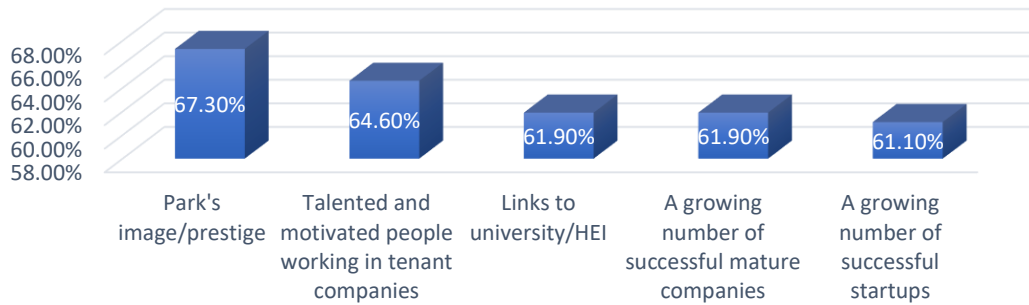


Success Factors

Looking at the success factors of respondents shows that image/prestige (67.3%) and talented workers (64.6%) are those that are most valued by STPs.

Links to universities/HEIs and a growing number of successful mature companies are also viewed as “very important” by more than 6 in 10 respondents, whilst a growing number of successful start-ups follows just behind.

Success Factors



Source: IASP

As STPs focus turned from bricks to brains, developing clear success factors became important.

Hence, STPs:

1. **Cannot be stand-alone entities.** They are connected to and involved in the implementation of national and regional economic development policies.
2. Should have the **right ownership and governance architecture**, where all the right actors are onboard with a clear division of responsibilities and competences.
3. Should have a **professional and full-time management** of the project.
4. Should have a **comprehensive and adaptable strategy** relevant to the area they are operating, in. The strategic axes include:
 - (i) location
 - (ii) position in the technology pathway
 - (iii) target companies
 - (iv) technological/sectorial specialization
 - (v) target markets (balance between the local, national and international visions)
 - (vi) networking strategy
 - (vii) management and organization.
5. Should have a **sustainable business model** for the STP.
6. Should have **accurate control over the activities of the tenants**, without directly interfering in their work.
7. Should have **accurate designs** of buildings and infrastructure.
8. Should **secure visibility and proactive position** in international networks.
9. Should participate in the **academic research center's works**.
10. Should provide a **list of supporting and value-added services**.
11. Should have **incubators and innovation spaces**.
12. Should attract **innovating and dynamic companies** that bring along other firms.
13. Should be **connected with networks** at all levels.

Success stories in Technology Park Arena

Case study 1: The Indian Silicon Valley	
Location	Bangalore, India
Area of Specialization	Electronics, IT industries / ITES, manufacturing, Hi-Tech and Bio-tech industries
Year	Electronic City in 1978, Software Tech Park in 1991, International tech Park in 1998
Insight into economics	<ul style="list-style-type: none"> Bangalore, the IT city has made a significant contribution to India's technology space. The Information technology industry in India consists of two components IT Services and Business Process Outsourcing [BPO]. As of the year 2021, the sector's contribution to India's GDP aggregated at 7.7 % from revenues of over USD 180 billion in 2019. While it is projected to grow to USD 350 billion by 2025. The sector employs more than 4.36 million employees in the country and is a major foreign exchange generator. Bangalore takes a big chunk of the IT pie by contributing to over 38% of all IT exports that is USD 45 billion.
Key Takeaways	<ul style="list-style-type: none"> IT Parks in Bangalore contributes to job creation at 17.6 percent, thus decreasing unemployment. BPO helps in creating economies of scale, business risk mitigation, cost advantage which has led to the growth in trade balance. Contributes to an increase in capital investments. <p>Source: https://www.thehindubusinessline.com/info-tech/%E2%80%98Bangalore-will-become-the-world%E2%80%99s-largest-IT-cluster-by-2020%E2%80%99/article20909098.ece (Source: https://shathayuretrear.com/blog/bangalore-it-city-the-silicon-valley-of-india/)</p>
Case study 2: Monterrey technology park, PIIT	
Location	Nuevo Leon, Mexico
Area of Specialization	Scientific research, technological development, innovation and digital transformation
Year	2004
Insight into economics	<ul style="list-style-type: none"> This technology park was set up with a cost of USD 450 million. The park is now home to ten of the twenty most important Mexican corporations: namely, Alfa, Cemex, Deacero, Femsa, Gimsa, Proeza, Quimmco, Villacero, Vitro, and Xignux. Home to Nuevo Leon Autonomous University (UANL) and Monterrey Institute of Technology (ITESM). By 2013, the park housed 35 research facilities, had created more than 1,500 high-skilled jobs and an investment in Infrastructure of USD 100 M.
Key Takeaways	<ul style="list-style-type: none"> Created an economy away from low-skilled manufacturing jobs and towards high-value, specialized industries. Launched campaign for public investment, such investments helped reduce the risks of private investors and universities. <p>(Source: Princeton university paper, fostering an innovation economy: Launching a technology park) (Source: IASP.WS; PIIT Parque de investigacion innovacion tecnologica)</p>
Case study 3: UA tech park	
Location	Arizona, USA
Area of Specialization	IT industries / ITES, Hi-Tech
Year	1994

Insight into economics	<ul style="list-style-type: none"> The University of Arizona purchased the UA Tech Park from IBM in 1994. It is one of the region's largest employment hub. It generates an economic impact of USD 2 billion statewide through direct, indirect and induced economic activity, home to approximately 75+ tenant companies representing 15 different industries, employing over 6,000 knowledgeable workers. It generated an estimated USD 52.8 million in tax revenues for the state, county, and city governments.
Key Takeaways	<ul style="list-style-type: none"> Primary impact is helping to advance new technology that expands and diversifies the local and state economies. Provides a platform for clients to test, validate and demonstrate their technologies and products to the marketplace. e.g. projects like Solar Zone. The profitability of tech park is also lucrative to the government collecting millions of dollars in terms of taxes. Many industries flourish simultaneously as a result of Tech Parks being established like UA tech Park. Offers employment opportunities to the graduates of University of Arizona (UA). <p>(Source: Official website of university of Arizona, techparks.arizona.edu)</p>
Case study 4: Purdue research park	
Location	Indiana, USA
Area of Specialization	Mechanical, Software, and auto parts manufacturing
Year	2000
Insight into economics	<ul style="list-style-type: none"> The Park welcomes high-tech companies to join their growing technology conduit, which includes locations in West Lafayette, Indianapolis, Merrillville and New Albany It has almost 150 acres of already developed with approximately 1 million square feet owned or leased by 260 companies employing 4500 people. Has an economic impact of USD 1.3 Bn USD to the State of Indiana, contributed USD 48 million to the state and local taxes. High-tech, high-quality jobs paying an average annual salary of USD 63,000 - 65 percent higher than the Indiana average. Combined, the park network is a top-20 private employer in Indiana.
Key Takeaways	<ul style="list-style-type: none"> Purdue University tech parks have been a driver of an effective “domestic insourcing” movement, that has created marketable products. Due to university sponsored research park the faculty work in close liaison with the graduates hence create value in terms of intellectual breakthroughs. <p>(Source: Official Website of Purdue Research Park)</p>
Case study 5: Saigon Hi-Tech park	
Location	Ho Chi Minh City, Vietnam
Area of Specialization	Microelectronics, IT and Telecommunication, Engineering and automation, Biotechnology, new materials
Year	2002
Insight into economics	<ul style="list-style-type: none"> Saigon Hi-Tech Park [SHTP], there have been 49 foreign-invested enterprises with the total investment of USD 5.67 trillion. The park attracted USD 742.4 million of foreign direct investment in 2019.

	<ul style="list-style-type: none"> SHTP has successfully attracted renowned, large corporations in the world and in the country with total investment capital of more than USD 6.5 billion. More than 100 projects in SHTP have contributed significantly to the export turnover of High-Tech items of HCMC. Hi-Tech product export turnover of the city, attracting approximately 25,000 experts, scientists, senior management personnel, engineers and skilled labors come here to study and work.
Key Takeaways	<ul style="list-style-type: none"> Exporting Hi-Tech products attracts further investments and more and more qualified individuals are willing to become part of projects sponsored by SHTP. Global corporations are encouraged to setup their offices. Profitable tech parks attracts foreign direct investments. (Source: http://www.saigonsiliconcity.com.vn/about-us/saigon-hi-tech-park)
Case study 6: TIDEL park	
Location	Chennai, India
Area of Specialization	Information technology, electronics, communication tech
Year	2000
Insight into economics	<ul style="list-style-type: none"> TIDEL is the first IT facility in India Promoted by Tamil Nadu Industrial Development Corporation (TIDCO and Electronics Corporation of Tamil Nadu Limited (ELCOT), both fully owned organization of Government of Tamil Nadu Commissioned on July 4, 2000 on record time of 15 months from the date of start. The park was set up at a cost of INR 3380 Million. It has provided employment to 11,500 people.
Key Takeaways	<ul style="list-style-type: none"> Generated employment for the tech graduates present in the IT universities of Chennai. Incubates IT and commercial startup environment in Tamil Nadu. (Source: http://crn.co.in/portfolio_details.asp?id=23&pid=1&hnam=Software%20Campus&xVal=0) (Source: Economic Times Chennai) (Source: http://www.saigonsiliconcity.com.vn/about-us/saigon-hi-tech-park)
Case study 7: Zhongguancun science and technology	
Location	Haidan District Beijing, China
Area of Specialization	Microelectronics, IT and Telecommunication, Engineering and electronics, Education, Biomedicine, Energy and environmental protection, Advanced manufacturing
Year	1988
Insight into economics	<ul style="list-style-type: none"> Also known as Z-Park has 16 member Parks covering an area of 488 square kilometers, and is home to over 90 education institutions, and 22000 high-tech companies that employ 2.7 million people. The total number of organizations is 25,471 with 90 starting every day. The entrepreneurship center has incubated over 2000 new enterprises 200 Branches of the world's top 500 companies.
Key Takeaways	<ul style="list-style-type: none"> Formation of new startups operating in different industries. Recruitment of tech graduates from the educational institutes present in the close proximity. Presence of global companies that generates employment. (Source https://www.iasp.ws/our-members/directory/@6113/zhongguancun-science-park--z-park-)

Case study 8: Bangabandhu Hi-Tech city	
Location	Kaliakhor, Ghaziapur District , Bangladesh
Area of Specialization	Information technology and manufacturing
Year	2016
Insight into economics	<ul style="list-style-type: none"> Bangabandhu Hi-Tech City (BHTC) is a business park established on 355 acres of land, initially 37 companies have got land allocation in BHTC, with various start-ups in the process of manufacturing, as of March 2022, there was an additional investment of around Tk 3.27 Bn, it has been confirmed that 44 companies have their stakes in BHTC with an investment of USD 130m so far. However, this investment is expected to increase in 2025 to USD 1,300m. The revenue from the parks has been around Tk 24.15 crore till 2020 As of November 2020, five companies are manufacturing in the park employing 13,000 workers, however expected employment by 2025 is 50,000 workers.
Key Takeaways	<ul style="list-style-type: none"> Investments into the IT Parks yields revenues helping companies to flourish and also benefits the government to collect revenues. (Sources: https://www.thedailystar.net/news/bangladesh/news/big-leap-tech-industry-2991826)

Case study 9: Technology park Malaysia	
Location	Buktil Jalil, Kuala Lumpur, Malaysia
Area of Specialization	Engineering and bio-tech, Telecommunication and content, and support services.
Year	1988
Insight into economics	<ul style="list-style-type: none"> Operates under the auspices of the Minister of Science, Technology and Innovation (MOSTI), with its Modern infrastructure and state-of-the-art-facilities, it boasts as the only 4th generation incubator service provider in the country offering a comprehensive range of services. Technology Park has bought in more than RM 1 billion total investment by providing infrastructure and ecosystems for innovators. The Technology business Incubation, Commercialization and Technology Development (TechBIC) aspires to accelerate the growth of technopreneurs in renewable energy, ICT, biotech and engineering industries to grow from ideation to commercialization
Key Takeaways	<ul style="list-style-type: none"> Providing infrastructure and a highly developed ecosystem encourages investors to invest into the IT Parks which results in uplifting of the sector. (Source: TPM Official website)

Case study 10: Singapore science park	
Location	Queenstown, Singapore
Area of Specialization	IT & ITES, bio-informatics, software development, telecommunications, and electronics
Year	2016
Insight into economics	<ul style="list-style-type: none"> The Singapore Science Park is home to more than 350 multinationals, local companies and national institutions, its landscaped grounds create an ideal working environment for modern hi-tech businesses involved in R&D and innovation employing over 10,000 people.

	<ul style="list-style-type: none"> Leveraging on the proximity to the National University of Singapore (NUS), the park is developing a Deep Technology Hub to focus on catalyzing industry-academia collaborations in the fields of Connected Devices.
Key Takeaways	<ul style="list-style-type: none"> Singapore Science Park provides a prime example of collaboration of industry and academia, which is an application of triple helix model that contributed to the success of this particular IT Park. (Source: Singapore Science park Official website) (Source: IASP.com)
Case study 11: Chungbuk techno park	
Location	North Chungcheong province in South Korea.
Area of Specialization	Biotechnology and assist business incubation
Year	2003
Insight into economics	<ul style="list-style-type: none"> Chungbuk Technopark is a non-profit government organization, is playing a leading role in achieving 4% of the Chungbuk economy by establishing strategies for responding to the 4th industrial revolution. At present, a variety of actors such as the national government, 6 local governments including Chungcheongbuk-do, 11 universities, 1 research institute and 8 companies participate in Chungbuk Technopark. Chungbuk techno park is also striving to maximize the performance of local industries by upgrading the smart IT parts industry, bio-health industry, transportation machinery parts industry, energy new industry and premium consumer goods.
Key Takeaways	<ul style="list-style-type: none"> Application of triple helix model led to the success of Chungbuk Technopark. Technological upgradation of the local industries leads to a more stabilized economy. (Source: IASP.com/ Chungbuk Technopark)
Case study 12: Pardis technology park	
Location	Pardis Town, Tehran Province, Iran
Area of Specialization	ICT Services, training & education, consulting, investing and marketing
Year	2001
Insight into economics	<ul style="list-style-type: none"> Pardis Technology Park hosts more than 400 high-tech companies employing more than 6000 specialists as direct and established members, and more than 2000 companies and startups as sub members, PTP members take advantage of different incentives, such as business development services, 20 years tax exemption and financial supports, enjoys USD 20 million investment from government and USD 300 million from Private sector companies Operates in 3 kinds of establishment: (1) Start-ups Incubators, (2) small and medium enterprises [SMEs] type 1 Multitenant Building, (3) SME's type 2 Independent Research Center.
Key Takeaways	<ul style="list-style-type: none"> Providing 3-tiered infrastructure to startups encourages entrepreneurs to come up with new ideas, that can be put to life. Government incentives and financial supports encourages corporates operating within IT Parks to invest in new startups representing different industries. (Source: Pardis Technology Park Official website)

Technology Parks in Pakistan

Overview

PSEB established the first STP in Islamabad in 1999 and since then, total **28 STPs** have been established.

These STPs have been set up by converting public /private owned office buildings/ factories/ warehouses to provide tech-enabled office space to the IT & ITeS companies at affordable rates along with quality IT infrastructure and backup power arrangements.

More than 80 public and commercial IT/ITeS companies are active in software development and export services and approximately **1,343,893 square feet** of IT enabled office space has been given in approved STPs.

Software Parks in Pakistan are somewhat similar to innovation centers, information technology, and software technology parks developed by Korea, Taiwan, and China.

Software Technology Parks (STPs) have mainly been established in major cities, **(Islamabad, Rawalpindi, Lahore & Karachi)** to augment the rapid development of the IT industry. These cities account for **around 90%** of all IT companies based in Pakistan. This trend is also in line with concentration of both infrastructure and human resources in these areas. The Pakistani government plans to establish Software Technology Parks in secondary and tertiary cities of Pakistan to duplicate the success of Pakistan's tech centers in this regard.

In addition, the Government has also established a National Incubation Centre to develop and cultivate startups in the country. Moreover, there are several private incubators operating in the country as well with many having a focus on tech related products and services.

Objectives

Objectives of STPs in Pakistan

To provide a stable and reliable IT infrastructure and other allied services to IT and ITes companies

To promote the development and export of software services

To provide high speed data communication services including value added services to IT/ITeS companies

To arrange backup power supply in case of power failure

To promote entrepreneurship

Creating work conducive environment

Increase IT-enabled office space by establishing new STP's

Provision of reliable and redundant data communication services

Technology Sector

The technology sector, with its focus on research, development, and distribution of tech-based goods and services, has an incredibly broad scope. It encompasses a wide range of activities, from electronics manufacturing to consumer goods like smartphones and appliances.

This vast industry caters to all facets of business – Business-to-Business (B2B) and Business-to-Consumer (B2C). On the B2B side, we see the development of software solutions and automation systems that streamline operations for businesses of all sizes. On the B2C side, the focus is on creating ever-more advanced consumer electronics and appliances, with manufacturers constantly innovating to attract customers with cutting-edge features.

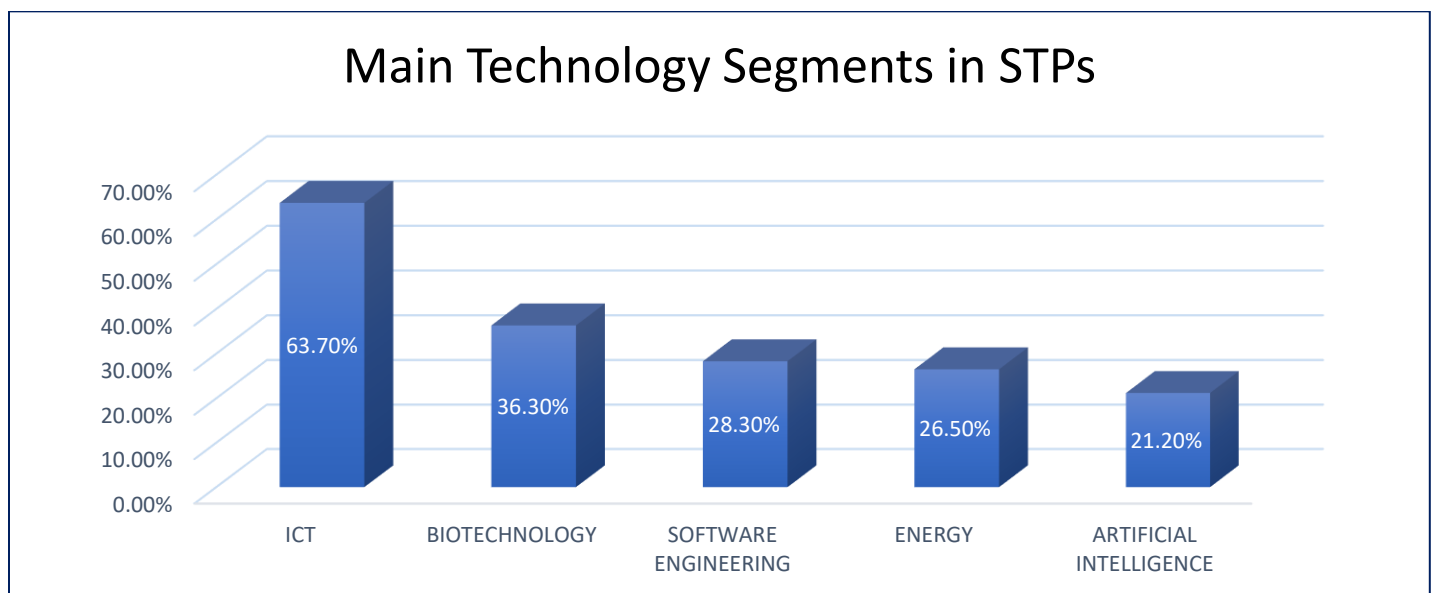
Global landscape

Market Size

The market size of the global tech industry, which encompasses hardware, software, services and telecommunication, in terms of spending, was estimated to stand at **USD 5.3 trillion** in **CY22** as compared to USD 5 trillion in CY21.

Composition for STPs

As per IASP 2022 Global Survey conducting for STPs, when asked to name the four main technology sectors found in their area/park, 63.7% of respondents named the ICT sector, again affirming the importance of ICT to the industry. Other sectors that are of significant importance to many respondents include biotechnology (36.3%), software engineering (28.3%) and energy (26.5%).



Growth Rate

The industry had been expected to return to its former annual growth rate of **~5%- 6%** and its market size is expected around **USD 5.6 trillion** for **CY23**.

Top Countries

1. The technology industry is led by the **USA** with a market share of around **33%**, approximately **USD 1.8 trillion** in value terms.

2. **Europe** is also a major contributor to the technology sector, representing **around 20%** of total technology spending.
3. **China** has also established itself as a major player in the technology sector as it is closing the gap in traditional technologies (i.e., Software, Services and IT Infrastructure) while taking the lead in emerging technologies (i.e., robotics and 5G).
4. The overall **Asia Pacific** region represents approximately **14%** share in the global IT industry.

Top Tech Players

Largest Tech Companies by Market Cap (April, 2024)	
Name	Market Cap (USD bln)
Microsoft	3,105
Apple	2,606
Nvidia	2,114
Alphabet (Google)	1,879
Amazon	1,869

National landscape

Market Size

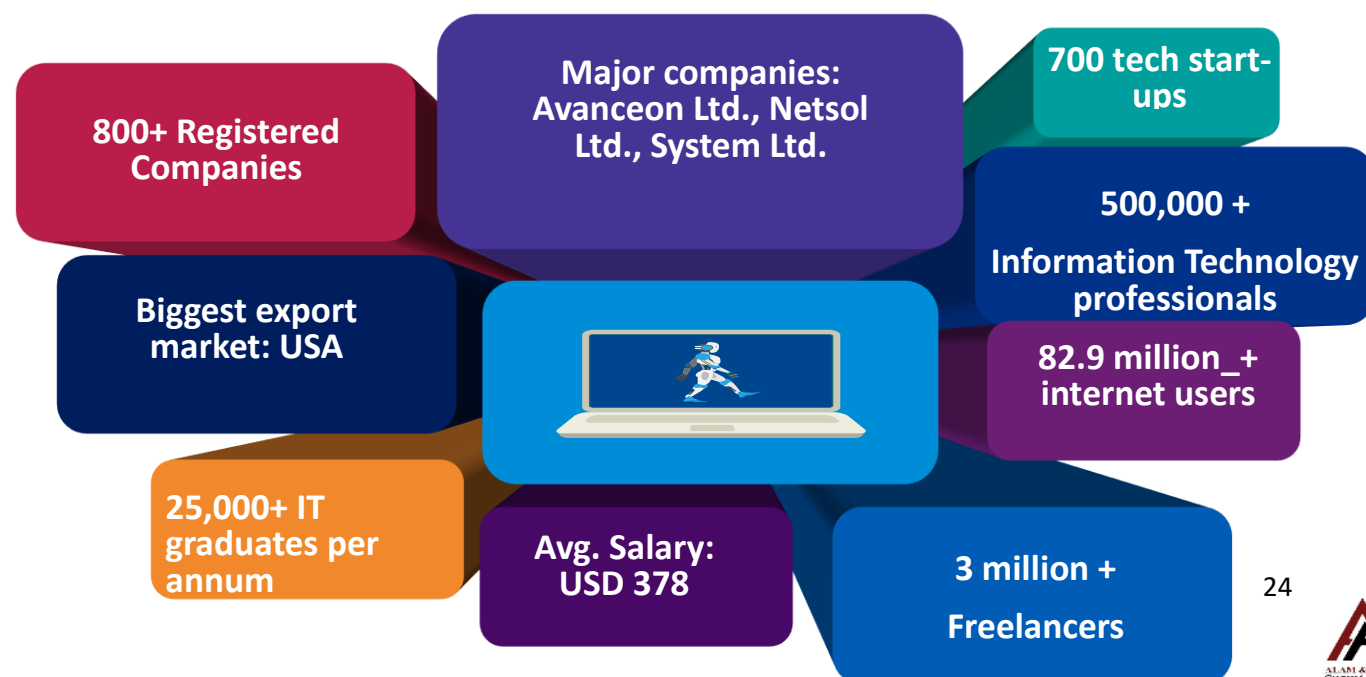
Pakistan's technology sector contributes around **1% to the national GDP** and stood at approximately **PKR 647 billion** in **FY22 (FY21: PKR 485 billion)**.

The domestic market size for technology products and services is estimated to be **PKR 273 billion** in **FY22 (FY21: PKR 218 billion)**.

Meanwhile, during FY22, exports of the total technology industry increased to **PKR 374 billion (FY21: PKR 267 billion)**. During first five months of FY 2024 alone, Pakistan earned more than USD 892 million from IT exports.

In recent years, the Government has enhanced its focus on the tech industry and recognized the potential for growth and investment that exists. The Ministry of Information Technology & Telecommunication (MoITT), through bodies such as the Pakistan Software Export Board (PSEB), has taken various steps such as the establishment of IT Parks and incubators to promote the industry and provide an enabling ecosystem for businesses and startups.

Snapshot



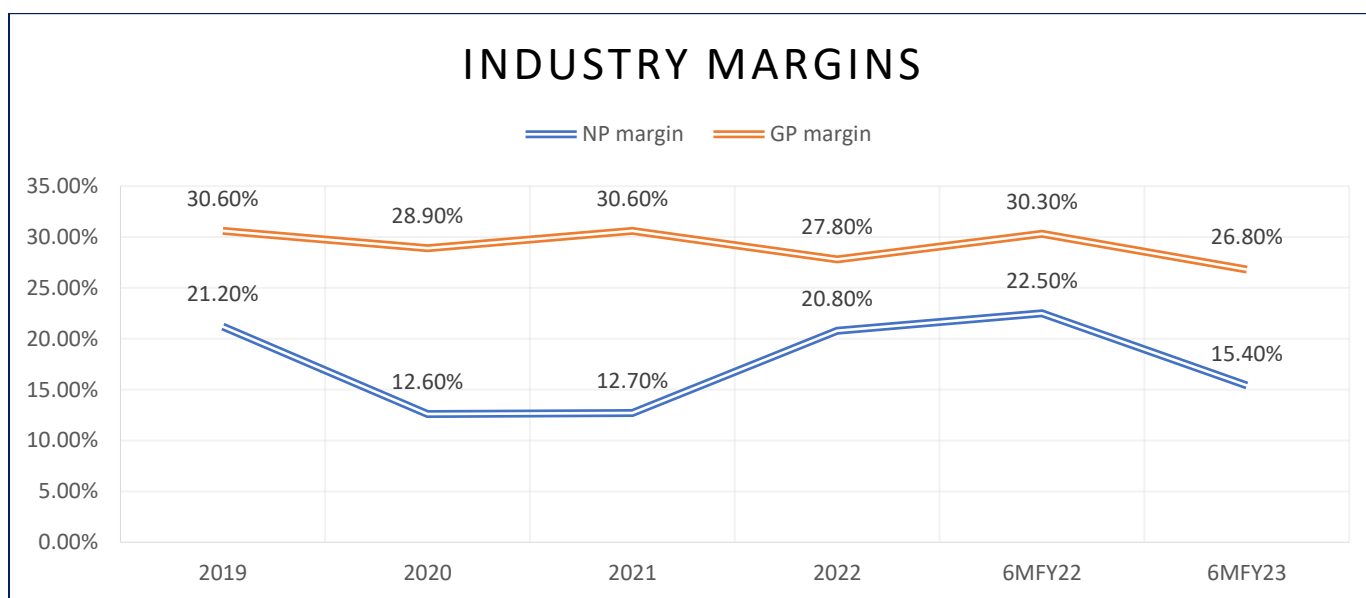
The industry comprises of over 800 registered companies with this number expanding each year. These companies operate in a wide array of areas such as customized software development and Business Process Outsourcing (BPO) services.

The industry employs over 500,000 professionals, many of whom have expertise in latest and emerging IT products and technologies; in addition, around 25,000 IT graduates and engineers are being produced in the country each year.

Profitability

In the past, the sector typically sustained **gross margins of approximately 30%**, attributed to the provision of high-quality services allowing for international competitiveness.

However, due to macroeconomic vulnerabilities in FY23, gross margins **declined to around 27%** in the first six months of FY23, compared to approximately 30% in the same period of FY22. Elevated inflation, increased interest rates, and reductions in tax credits in favor of the final tax regime further pressured net margins in the first six months of FY23 to approximately **15%**, down **from around 23%** in the corresponding period of FY22.



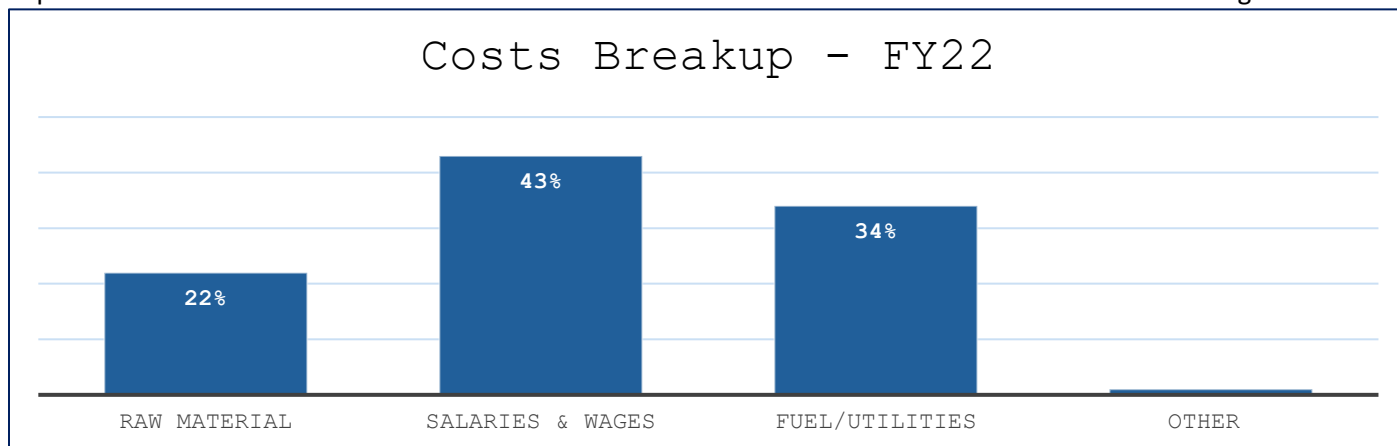
Source: PACRA database

Outlook: High inflation (29.2% in FY23), policy rate (22%) and a low GDP growth rate (0.3% in FY23) are likely to constrain profit margins for STP companies in the medium term. However, the devaluation of the Pakistani Rupee (PKR) offers some relief, as it could potentially boost exports from the sector.

Cost Breakdown

The primary component of direct costs within the industry is **Salaries & Wages**, accounting for an average of 43% of total direct costs. This high percentage reflects the industry's need for a technically proficient and skilled labor force. Meanwhile, the second largest component, **Raw Material**, represents approximately 22% of direct costs, encompassing

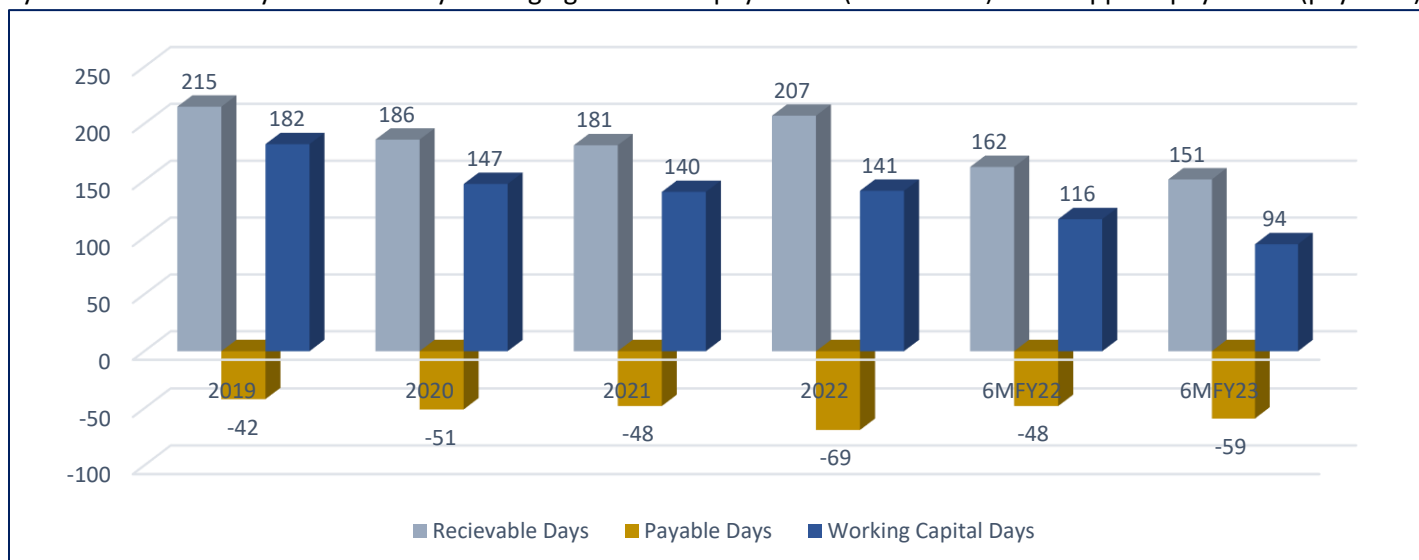
expenses related to software and hardware during FY22.



Source: PACRA database

Working Capital Management

As the industry primarily deals in services, most companies have minimal to no inventory, impacting their working capital cycle which is mainly influenced by managing customer payments (receivables) and supplier payments (payables).

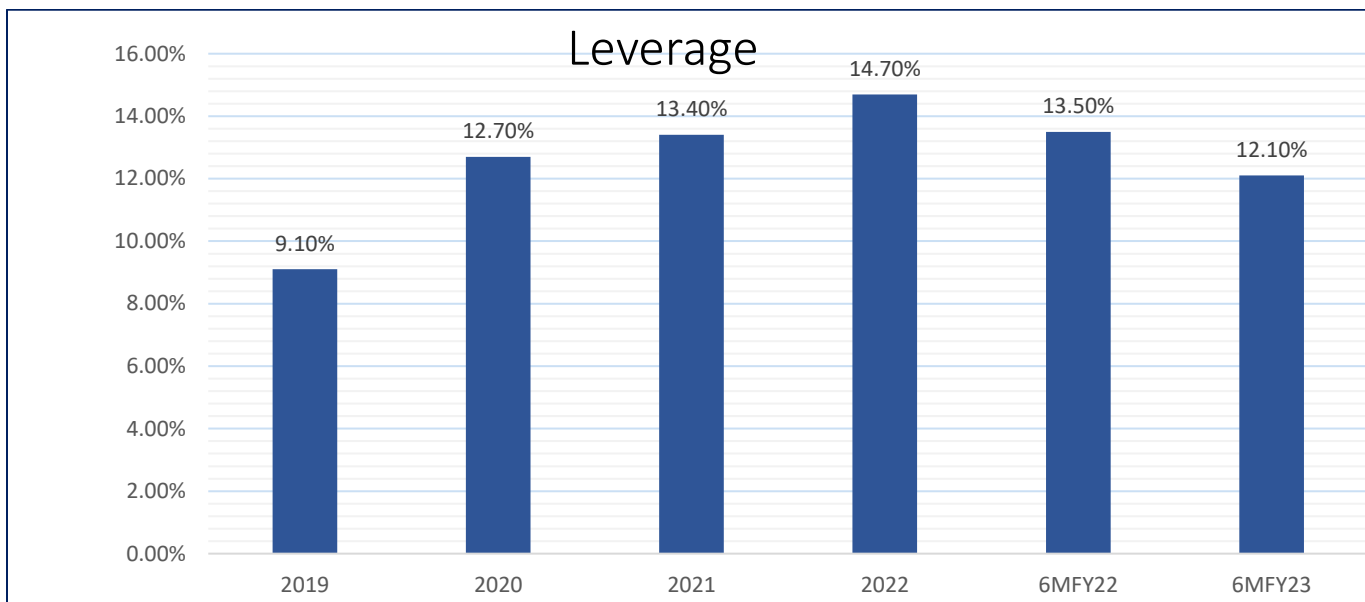


Source: PACRA database

The industry relies heavily on contracts for revenue generation. Longer contracts can lead to higher outstanding customer payments (trade receivables). On average, the industry operates with a net working capital cycle of around **150 days**. This figure remained relatively stable in FY22 (~141 days) compared to the previous year (~140 days). However, a more recent analysis for the first half of FY23 (6MFY23) reveals some fluctuations. While customer payment terms improved, with receivable days decreasing from ~162 in 6MFY22 to ~151 in 6MFY23, supplier payment terms deteriorated (payable days rose from ~48 in 6MFY22 to ~59 in 6MFY23). This combination resulted in a shorter net working capital cycle of **~94 days in 6MFY23** compared to **~116 days** in the first half of the previous year (6MFY21).

Leverage & Borrowing Mix

The sector has shown a positive trend in reducing its reliance on debt financing. As of the first half of **FY23 (6MFY23)**, the sector's leverage ratio has decreased to around **12%**, compared to **15%** at the **end of FY22**.



Source: PACRA database

This improvement is attributed to two main factors:

Higher Earnings Retention: Companies within the STP sector are retaining a larger portion of their profits, reducing the need for external borrowing.

Reduced Borrowings: Overall borrowings in the sector have **declined by 10%** year-over-year (YoY) to PKR 10,012 million in April 2023 (down from PKR 11,012 million in April 2022).

- **Long-Term Borrowings:** These have seen a significant drop of 49% YoY, reaching PKR 1,592 million in April 2023 (compared to PKR 2,128 million in April 2022) and representing only 16% of the total borrowing mix.
- **Short-Term Financing:** Short-term debt has also decreased slightly by 4% YoY, standing at PKR 3,514 million in April 2023 (down from PKR 3,650 million in April 2022) and constituting roughly 35% of the borrowing mix.
- **Long-Term and Export Finance Facilities (LTFF & TERF):** These facilities saw a decrease of 45% YoY, with a current value of PKR 470 million in April 2023 (compared to PKR 859 million in April 2022) and making up only 5% of the total borrowings.
- **Export Finance Scheme (EFS):** Notably, borrowing through the Export Finance Scheme (EFS) by the SBP (State Bank of Pakistan) has grown by 28% YoY, reaching PKR 4,435 million in April 2023 (up from PKR 3,465 million in April 2022). This currently represents the largest share of the borrowings mix at approximately 44%.

Regulatory Framework and Support

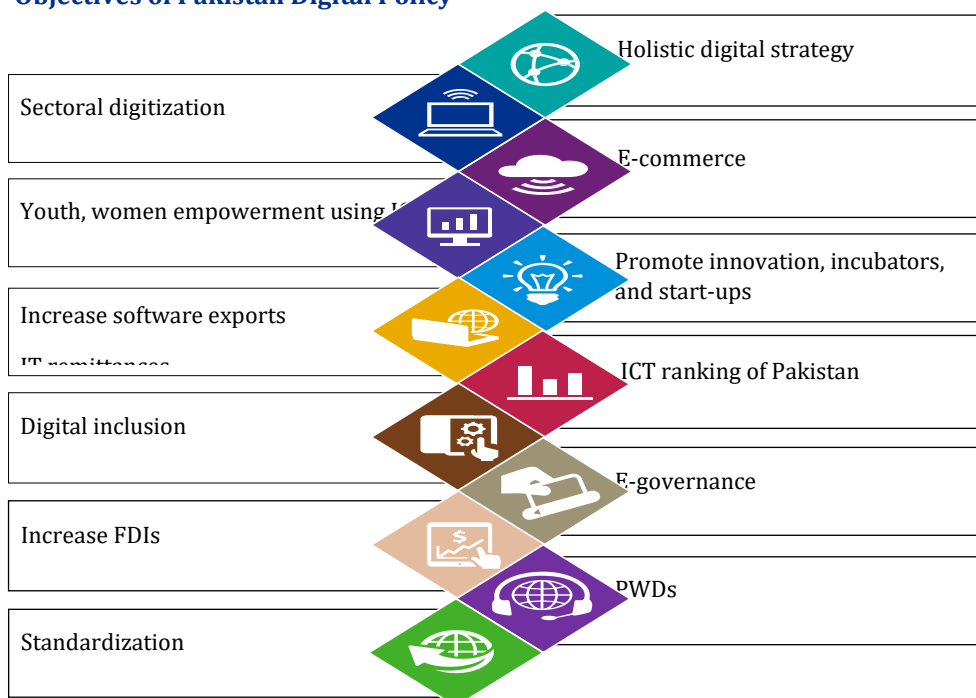
Regulator: Oversight of the technology industry falls under the purview of the Ministry of Information Technology and Telecommunications (MoITT).

Association: The Pakistan Software Houses Association for IT and ITES (PASHA) serves as the representative body for the industry. It engages in advocacy with the government and offers insights on industry-related policies and legislation.

Key initiatives taken by GoP:

- In CY18, the ministry implemented a Digital Pakistan Policy aimed at expediting digitization efforts and fostering the growth of a knowledge-based economy. Some of the key objectives highlighted in the policy are:

Objectives of Pakistan Digital Policy



The five key areas for digital Pakistan are described below:

Key areas for Digital Pakistan

- Provide access to the internet and the knowledge that comes with it as a fundamental right for all Pakistanis.
- Build a “Pakistan Stack” that allows government, businesses and startups to utilize a digital infrastructure to solve Pakistan’s problem towards presence-less, paperless & cashless service delivery.
- Digitize intragovernmental processes to move towards a paperless environment. Digitize Pakistani citizen and business interaction with government services.
- Transition to a knowledge economy by augmenting our existing talent and preparing the future generation. Moving up the value chain by rapidly imparting specialist/emerging tech skills.
- Make it easy for investors to come in and for startups to operate and grow to fuel the economy’s growth and make Pakistan a force to be reckoned with on the global playing field.

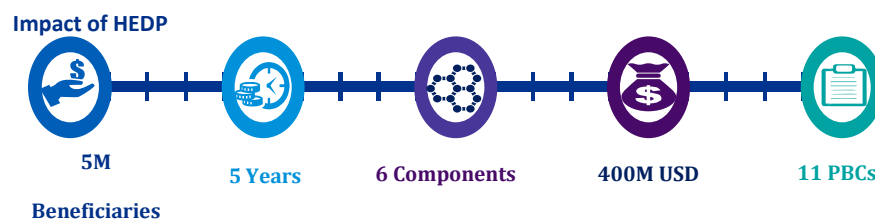
- Special Technology Zone Authority is established in 2022 providing a One Window Facility with a purpose to facilitate zone developers and zone enterprises. These STZs shall feature partnerships between global-local tech companies promoting technology transfer and boost in high-tech exports from Pakistan.
- Establishment of largest IT Park in Karachi as a result of an agreement signed between Economic Affairs Division and EXIM Bank of Korea worth USD 158 million.
- PITB developed 21 online digital applications to digitize government services, that are easily accessible e.g., “Pakistan Citizen Portal”.
- National Telecommunication Corporation (NTC) partnered with VMware to modernize public sector by building government cloud-based storage.
- MoITT launched Pakistan’s first investment platform “Pak impact Invest” to bridge gap between entrepreneurs and investors.

- The GoP launched flagship programme to provide computer labs to 114 Women Empowerment Centers.
- The government was reported to support growth of 1,000 start-ups, 24 incubators and accelerators and 80 co-working spaces by 2019' end.
- PITB established physical “e-Rozgaar” centers in 36 districts of Punjab.
- PITB have introduced incubators and Platforms like Digital Youth Summit.
- TDAP signed an MOU with Alibaba, a global giant in e-commerce, to provide online and offline training programmes to Micro, Small and Medium Enterprises (MSMEs).
- IGNITE under the auspices of MOITT has successfully established 5 National Incubation Centers (NIC).
- The National Grassroots IT Research Initiative (NGIRI) aimed to promote R&D by providing financial support to selected Final Year Projects of undergraduate students.
- Through finance act 2022-23, the government implemented a Normal Tax Regime on the industry and rescinded tax exemptions and tax credits.
- Now 0.25% tax on export receipts is applicable on companies register with the PSEB and 1% on companies not register with it. While super tax is also applicable on companies who meet certain benchmarks. While tax exemptions to companies operating in the SEZ are still applicable.

HEC Initiatives

HEC provides a number of programs to support university students and researchers some of which are mentioned below:

1. **Innovators Seed Fund (ISF) Program:** The Higher Education Commission under Higher Education Development Program launched ISF Program in 2021, in order to support the development of startups through provision of Innovator Seed Fund Grants to students, recent graduates, and faculty members from the universities. The program offers grants in various sectors including AgriTech, FinTech, EdTech, E-commerce, Smart Retail and Emerging Technologies. Budgets for ISF awards will be up to USD 35,000 with a project duration of 1 year.
2. **Business Incubation Centers (BIC):** The HEC has also established BIC at several universities including Abdul Wali Khan University, Bahria University, Institute of Management Sciences, UET Peshawar, NUST etc. These BICs are established to provide basic infrastructure and allied facilities for researchers and young entrepreneurs who are interested in developing early-stage business ventures.
3. **The Higher Education Development Project (HEDP):** HEDP is a World Bank supported project (USD. 400 Million) assisting HEC in key strategic areas of research and development, improving the quality of higher education and support to affiliated colleges, leveraging technological resources and capacity building of faculty/ staff through the National Academy of Higher Education (NAHE).



IT Segment in Pakistan

Overview

Despite an impressive **25.6% annual** growth rate over the **past seven years**, the IT sector remains relatively young. Its FY21 contribution to GDP stood at **USD 3.9 billion (1.5% of total GDP and 2.9% of services sector GDP)**.

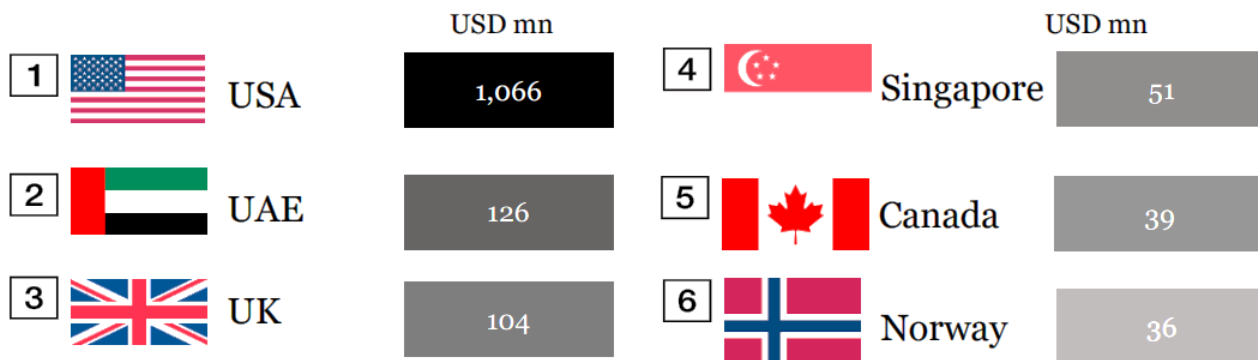
In contrast, India's IT industry boasts a **USD 194 billion share (>51% share of services** while services sector contributes over 50% to GDP). This highlighting the significant potential, and challenges, Pakistan faces in further developing its IT sector.

Recently in March 2024, the IT sector achieved a noteworthy achievement in the shape of its greatest monthly IT exports to date. According to the statistics, the monthly IT exports in March 2024 increased by 37% YoY and 19% MoM, reaching a total of USD 306 million. This surpasses the previous high of exports, which was set in December 2023 at US USD 303 million.

The significant year-over-year increase in IT exports can be attributed to two policy changes. First, the State Bank of Pakistan (SBP) relaxed the permissible retention limit for Exporters' Specialised Foreign Currency Accounts, allowing IT companies to keep more of their earnings in foreign currency (from 35% to 50%). Second, the stability of the Pakistani rupee incentivized IT companies to bring their foreign income back into Pakistan and deposit it in local accounts.

The Information Technology (IT) segment in Pakistan has not only exhibited consistent year-on-year growth but has also emerged as **one of the top five net exporters** in the country.

Top Export Destination (FY2021)



Source: SBP Economic Data

Growth Potential

1. **Ambitious Export Targets:** The Ministry of Information Technology and Telecommunication (MoITT) estimates significant potential for IT/ITeS export revenue growth. They aim to reach **USD 10-18 billion by 2028**, positioning Pakistan as a global IT hub. This growth would be accompanied by a strong domestic IT industry **exceeding USD 6 billion** annually.
2. **Key Growth Drivers:** Software Development and IT-Enabled Services (ITeS) are at the forefront of this expansion, contributing a substantial **75% of total IT industry** revenues.

3. **Identifying Niche Markets:** MoITT has pinpointed five priority IT/ITeS market segments along with twelve sub-segments ripe for exploitation. These segments combine high global market growth rates, significant market size, and the potential for capturing a larger share due to limited established competitors.

Strategic inputs for export growth

Pakistan's IT/ITeS export potential is driven by the overall global growth in IT markets. However, to capitalize on this opportunity and achieve ambitious export targets, MoITT has identified a two-pronged approach:

1. **Upskilling the Workforce:** Bridging the skills gap is crucial. MoITT estimates the need to train **up to 1 million people** in technical and managerial areas. This initiative should be coupled with investments in higher education programs specifically tailored to the IT/ITeS field.
2. **Infrastructure Development:** Equally important is upgrading and expanding the supporting infrastructure required by the industry. This includes reliable high-speed internet connectivity, readily available cloud services, and the development of modern Science and Technology Parks (STPs).

Market Segmentation

Drawing on data from the Ministry of Information Technology and Telecommunication's (MoITT) Global IT Market and Industry Data Gathering Report, focus was drawn on high-growth areas within Pakistan's IT/ITeS industry. The MoITT report identified a broad spectrum of the industry, encompassing 7 major IT/ITeS segments further divided into 150 sub-segments.

Further analysis shortlisted 30 particularly promising market sub-segments/product offerings, revealing 5 IT/ITeS market segments that stood out due to superior levels of growth, significant market size, and a high level of market opportunity. Within these 5 segments, 13 specific sub-segments have been identified for further exploration, as detailed below

Segment	Sub segment & product offering	Growth rate (2023%)	USD B (2023)	Market opportunity (%)	Market* opportunity (USD B)
	Blockchain	83	23	43	10
	AI	39	71	58	41
	Cloud computing	18	622	30	187
	CRM	12	82	28	23
	ERP	8	51	53	27
	LPO	32	21	72	15
	BPO	6	344	70	241
	Digital Twin	55	12	40	5
	Cyber Security	10	160	35	56
	E-learning	15	393	31	122
	E-health	14	173	65	112
	E-agriculture	11	7	65	5
SMART Technology	AR, VR & MR	112	124	45	56

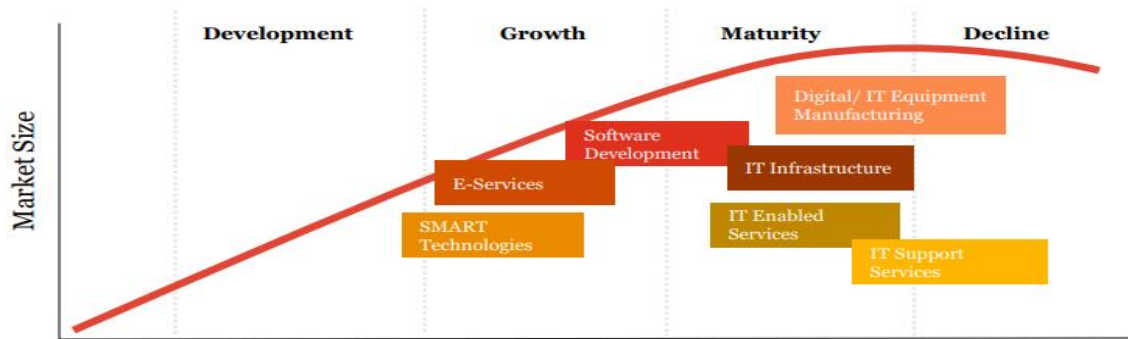
Source: MoITT

*Market opportunity is the amount of the global market in USD that is not taken by the biggest three players in that sub-segment/product offering

Potential for IT segments / sub-segments in Pakistan



















Lifecycle curve of IT sector (segmental level)

The identified IT/ITeS segments primarily fall within the "**growth**" or "**maturity**" stages of their lifecycle. **SMART** technologies, being in the **early "growth"** stage, present the most significant opportunities due to their high market growth potential. In contrast, **IT manufacturing and equipment** house the most **mature** sub-segments within the industry.



Source: MoITT

List of prioritized IT/ITeS segments and sub-segments for Pakistan

		<div><div></div><div>Growth</div></div> <div><div></div><div>Low</div></div> <div><div></div><div>Safe bet</div></div> <div><div></div><div>Medium</div></div> <div><div></div><div>Maturity</div></div> <div><div></div><div>High</div></div> <div><div></div><div>Emerging</div></div> <div><div></div><div>Market</div></div> <div><div></div><div>High</div></div>				
SOFTWARE DEVELOPMENT	 AI	 LIFE CYCLE	 Technical Complexity	 Industry Type Model	 Global Industry Attractiveness Ranking	
	 Block Chain	Growth	High	Safe Bet	Med/High	
	 ERP/CRM Integrations & Implementations	Growth	High	Safe Bet	Med/High	
	 Cloud Computing	Maturity	Medium	Industrial Approach	Med/High	
	 Cloud Computing	Growth	High	Safe Bet	Med/High	
ITES	 LPO	 BPO		Niche/Emerging Market	Med/High	
	Dev/Growth		Medium	Industrial Approach	Medium	
	 BPO	Maturity	Low			
ITSS	 Cyber Security	Growth	High	Safe Bet	Med/High	
	 Digital Twin	Growth	Medium	Niche/Emerging Market	Med/High	
E-Services	 E-HealthCare	Growth	Medium	Safe Bet	Med/High	
	 E-Learning	Growth	Low	Safe Bet	High	
	 E-Agriculture	Dev/Growth	Medium	Niche/Emerging Market	Medium	
Smart Tech	 AR,VR & MR	Dev/Growth	Medium	Niche/Emerging Market	Med/High	

Source: MolTT

EdTech

Educational technology is “the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources.” Educational technology is the use of both physical hardware and educational theoretics.

Since the outbreak of Covid-19, students of all ages have been confined to their homes for months on end. Lower-income schools, in particular, are having a difficult time keeping their students engaged, and most if not all, do not even have a Learning Management System in place for basic remote information sharing with students and/or parents.

Several Edtech startups in Pakistan are using this opportunity to either offer independent learning solutions or are partnering with other players such as government institutions, telcos, and NGOs. The current circumstances created by the pandemic have put further emphasis on the role of such startups in grappling with a massive need for learning solutions as education institutions remain closed and many have shifted to remote learning. Startups that have already been leveraging technology to build distance learning solutions. Some of the successful EdTech startups in Pakistan are:

1. **Maqсад:** Provider of online learning solutions for students. The platform allows students to complete courses at their own pace. Additionally, it provides doubt clearing solutions.
2. **Edkasa:** Mobile & SaaS-based platform providing board exam preparation solutions. The platform offers online courses, video lectures, tutors, and practice test questions. The platform offers learning solutions for students of classes 9 and 10. Its mobile app is available for Android devices.
3. **Daakhla:** Daakhla is an online portal for students to apply to any educational institution in Pakistan. Students can apply to institutes and institutes can also follow up. They also provide career counseling services.
4. **Desk:** Digital Education Streaming Kiosk (DESK) is a tool for transforming educational curriculum delivery system into digital content streaming by using Information and Communication Technologies (ICTs). The DESK content delivery system toolbox consists of various modules which include video lessons, notes, quizzes, and past examination papers.
5. **Orbit:** Orbit offers an AR-based educational app for schools. Offers an in-depth explanation of concepts taught in books using 3D visualizations. Allows students to master the concepts through a rich database of 3D models and also assists teachers in delivering complex topics through visual, interactive and deep learning experiences. Resources cover science, technology, engineering, and mathematics (STEM) subjects. Available for iOS platform.

Understanding this importance, Ed Tech at proposed science and tech park can focus on Educational and Instructional Theories, Cognitive Tools for Learning, Computer-Based Language Learning, Assessment Systems, Trainings, Distance Education, Technology-Enhanced Classrooms and Informal Learning.

SmartTech

The technologies capable to adapt automatically and modify behavior to fit environment, senses things with technology sensors, thus providing data to analyze and infer from, drawing conclusions from rules and use experience to improve performance about what to do next with the ability to self-generate and self-sustain.

Smart Tech at proposed science and technology park will focus on Artificial Intelligence & Machine Learning, Data Management, Image, Video & Signal Processing, IoT, Modelling & Simulation, Networks & Network Security, Software and ICT.

FinTech

Fin Tech is the industry that uses technology to improve activities in Finance by applying high-tech devices in financial sectors such as mobile payments, money transfers, loans, fundraising and asset management.

Globally, FinTech market is continuously evolving and expanding with an increasing diversity of funding sources, scope of business and geographic spread. The role of Fintechs has become more important during the pandemic that resulted in lockdowns and social distancing. Fintechs have supported governments in delivering relief measures, specifically tax relief schemes, delivering government-based stimulus funding to Micro, Small and Medium Enterprises (MSMEs) and households amongst other aspects. There are 13 distinct verticals that Fintechs traditionally focus on. These include the following:

1. Digital Lending
2. Digital Capital Raising
3. Digital Banking
4. Digital Savings
5. Digital Payments
6. Digital Asset Exchange
7. Digital Custody
8. InsurTech
9. WealthTech
10. RegTech
11. Alternative Credit and Data Analytics
12. Digital Identity
13. Enterprise Technology Provisioning

Pakistan; being the world's sixth most populated country, is still a cash-based economy with more than 50% of its population being financially excluded. At present, only a few FinTechs operate in the country, and those are primarily in the developed cities of Lahore, Karachi, and Islamabad. However, Pakistan possesses the potential to be an attractive market for FinTechs growth, owing to the increasing youth population, disruptive internet and smartphone penetration, consumer preference for mobile phones and social media, a booming e-commerce market facilitating digital payments and an overall financial system having the absorption capacity for innovation.

Acknowledging this importance, Fin Tech theme at proposed science and tech park can focus on:

1. Peer-To-Peer Payment Technology
2. Peer-To-Peer Lending
3. Mobile Banking
4. Digital Wallets
5. Insurtech
6. Blockchain

7. Smart Contracts
8. Consensus Protocols
9. Investing Services
10. Cryptocurrency
11. Cryptography
12. Cyber Security.

PropTech

It is defined as the usage of technology and software to assist in today's real estate needs of relevant stakeholders i.e; buyers, sellers, financial institutions and brokers. This has been made possible through introduction of Property technology or simply PropTech. It is a technology that comes into direct contact with real estate operations by performing tasks or shifting duties, by mediating between buyers and sellers, transforming physical products and knowledge into data and services, and supporting the organization of people.

With influx of money from One Belt, One Road and CPEC, PropTech in Pakistan is set to thrive as a sector. There are a host of supply chain and logistical challenges that PropTech entrepreneurs from Pakistan can solve. With very smart talent pool and pent up demand for technology, PropTech in Pakistan can be a game changer.

Today, with the increased availability of smartphones, reliable 3G, and 4G services in Pakistan and the increased use of online portals, the PropTech in Pakistan is growing. As more house hunters are logging in to find homes, traditional agents and developers have had to buck up and change their outreach channels from traditional to digital. While there is still a widespread use of traditional methods, one can observe a steady shift in processes towards digital. The technologies that are being used in PropTech in Pakistan vary across many domains and are in the fields of:

1. Smart online listing portals
2. Drones
3. Mobile-friendly websites and apps
4. Augmented reality (AR) as well as virtual reality (VR) tours.

HealthTech

Pakistan's digital health market is poised for significant growth. Telemedicine services are experiencing a surge, bridging gaps in healthcare accessibility, especially in remote areas. Teleconsultations, remote diagnostics, and e-prescriptions are becoming more commonplace. The diverse range of market segments, coupled with substantial revenue potential, makes digital health an attractive sector for investment. Further integration of artificial intelligence (AI), expansion of telemedicine, and continued investment in digital infrastructure are likely to drive significant improvements in Pakistan's healthcare sector

Innovations in personalized health, wearable devices, and data-driven solutions are on the horizon. Startups and established players alike are exploring ways to enhance patient care, streamline processes, and improve health outcomes.

Survey findings

As per MoITT, a comprehensive survey was conducted of Pakistan's IT ecosystem, encompassing IT graduates, Higher Education Institutions (HEIs), freelancers, and the IT industry itself. Key findings are as follows:

1. Interest in pursuing opportunities abroad is expressed by **almost half** of the IT graduates surveyed. **Only 9%** of the IT graduates were able to get an overseas job, as reported by HEIs.
2. Employability rate of IT graduates within a year of pass out is **about 63%**, indicating job prospects for IT graduates.
3. IT graduates reported their skills to be **relevant (54%) or somewhat relevant (38%)** to their jobs, indicating a positive correlation between education and job requirements.
4. A majority of IT graduates **(78%)** are working for IT businesses.
5. **48%** of respondents working in development and programming roles
6. HEIs are planning to gear themselves predominantly towards introducing Artificial Intelligence **(42%)** and Cyber Security **(38%)** in research and teaching.
7. Sourcing suitable faculty is a reported challenge in maintaining quality education for HEIs which they have rated **2.75** on a scale of 1-5
8. HEIs reported a lack of international exposure (**~23%**) followed by lack of areas of expertise (**~15%**), lack of partnerships with international institutions (**13%**) and lack of linkage with industry (**11%**) as major stumbling blocks.
9. There's a lack of adequate IT research programs in HEIs, **55%** do not have research programmes which result in fewer publications and limited exposure for Pakistan in international journals
10. The lack of experienced staff to deal with international clients for the export of IT services is reported as a major reason for not achieving desired growth by **66%** of IT businesses.
11. **82.3 %** of the IT businesses surveyed in respect of debt financing, remarked their experience of raising debt finance as "very difficult" to "somewhat difficult".
12. A mismatch between the skills required by IT businesses and the skills available in the market is reported by **75%** of businesses surveyed, highlighting a potential skills gap.
13. The average experience of **85%** of freelancers is **less than 3 years**.
14. **59%** of freelancers reported inconsistency in finding clients and lack of payment gateways (**41%**) as major stumbling blocks.
15. **65%** of the freelancers cited flexibility in working hours as the primary reason for freelancing, while **43%** cited better pay as another reason.
16. **26.5%** IT graduates (87/328) reported affordability as their major challenge to education.

Overview of Science and Tech industry in Balochistan

The GoB owns a 34,000 sq ft purpose-built facility in Mariabad, Quetta which it intends to outsource to a private party with adequate capability and capacity to convert the infrastructure to a Science & Technology Park. The facility has been built initially in outlay of an orphanage having 64 rooms with average size of 300 sq ft with possibility to augment to 80 rooms.

The following section outlines the science and technology landscape in Balochistan, providing a basis for evaluating the potential of the proposed Science and Technology Park (STP).

Provincial Landscape Overview

Balochistan is the largest province of Pakistan by area (347,190 square km) and a population of 14,894,402 people (2023 estimates). Balochistan's geographical positioning, coupled with years of negligence, long distances, infrastructure, and an uncertain security situation, has impeded the socio-economic growth of the province.

Educational Landscape

Limited Starting Point:

Following independence, Balochistan inherited minimal educational infrastructure (only nine high schools and no colleges), with only a handful of high schools and no colleges. While the situation has improved since establishment of HEC in 2002, the province still faces challenges in expanding higher education institutions (HEIs) and student enrollment.

Reasons for Low Enrollment:

High Out-of-School Rates: A significant portion of children (60-70% according to UNICEF, 2022) remain out of school, hindering the pipeline feeding into higher education.

Low Primary Enrollment: Weak primary school enrollment further weakens the foundation for higher education participation.

University Growth and Funding:

Early Development: The University of Balochistan (established 1970) was the first HEI in the province, followed by Khuzdar Engineering University in 1994.

Impact of Higher Education Commission (HEC): Established in 2002 (Sofia, 2019), the HEC has provided funding and promoted research culture, leading to an increase in the number of public and private universities (**currently 11**, 10 public sector universities and 1 private).

Enrollment and Faculty Growth: Enrollments have witnessed a significant rise, from **3,700 students in 2002** to **over 47,000 in 2021**, alongside a faculty increase exceeding **5,000**. However, the growth is still sluggish.

Funding Constraints: Despite annual government allocations of approximately **Rs 3 billion**, higher education institutes struggle financially. Revenue generated falls short of meeting their needs.

Barriers to Access:

Socioeconomic Factors: Poverty and socioeconomic backwardness limit student ability to afford university fees.

Geographical Challenges: The sparse and scattered population across small villages creates difficulties in implementing economies of scale for educational institutions.

Admission Criteria: As per experts, existing admission criteria does not fully address the needs of the population, leading students towards programs with state funding options.

Curriculum and Quality Assurance:

Standardized Curriculum: The National Curriculum Review Committees (NCRCs) develop and update curricula (every four years) across various academic fields, ensuring a consistent educational foundation.

Quality Assurance Mechanisms: Annual reviews are conducted for each program through self-assessment reports and external audits. Additionally, universities undergo annual Institutional Performance Evaluations involving internal and external experts.

Budget Allocation:

The 2023-24 government budget allocated Rs. 83.2 billion for education projects, with a breakdown favoring primary and secondary education. University allocation has historically been the recipient of a smaller share (**4.6% in 2018-19**).

Science and Tech degrees

A deep dive into the related degree programs offered by the universities in Balochistan is tabulated below:

Name	Location	Programs offered	Ranking by HEC	No. of students enrolled annually
Balochistan University of Engineering & Technology, Khuzdar	Khuzdar, Balochistan	MS of Computer Engineering MS of Computer Science Bachelors in IT	143	50
Al-Hamd Islamic University	Quetta	IT related programs	109	91
Balochistan University of Information Technology, Engineering and Management Sciences	Quetta	Bachelors in IT BS Computer Science Master of Computer Engineering MS/Phd Computer Science MS Information Technology MS/Phd Environmental Science	74	1598 (50 students each semester for IT and CS)

		MS/Phd Management Science		
Lasbela University of Agriculture, Water and Marine Sciences	Lasbela	BS Computer Science	141	145
Sardar Bahadur Khan Women University	Quetta	MS in Management Science	136	306
University of Balochistan	Quetta	MS in Computer Science and others	41	959
University of Loralai	Loralai	BS in Computer Science	171	64
University of Turbat	Turbat	BS in Computer Science BS in Information Technology	149sZ	288

Source: <https://www.hec.gov.pk/english/services/students/PCD/Pages/University-Wise-Enrolment.aspx>
<https://edurank.org/>

Employment Landscape

High Unemployment Rate:

According to the 2014 Pakistan Labour Force Survey, Balochistan has the highest unemployment rate in the country.

A more recent survey (2020-21) suggests a lower rate (**4.3%**), but the issue persists.

Despite educational efforts, graduates face limited relevant opportunities in Balochistan's IT sector. Field visits and insights from experts indicate many graduates settle for jobs in banking, leave the province altogether, or move to larger cities for relevant IT work.

Skill Gap and Market Incompatibility:

A significant disconnect exists between the skills graduates possess and the demands of the job market due to lack of practical exposure. This "market incompatibility challenge" prevents graduates from finding employment despite a large working-age population (**71%**).

Positive Efforts - One University Example:

Despite the challenges, some universities are taking proactive steps. The Alumni Relation Office (ARO) in one university demonstrates a commitment to graduate employability.

Initiatives like the Alumni Mentoring Program (BAMP) offer support, guidance, and resources to graduates in their career pursuits.

The university boasts over **8,000** successful alumni working globally, highlighting the potential for graduate success.

Specific data showcases their efforts over the past three years:

- Job placements through campus job fairs have increased significantly (24 in 2019 to 220 in 2021).
- Internship placements have also seen a rise.
- The university organizes job fairs every other year, attracting a large number of companies and attendees (3,500 in 2021).

Major Science and Tech Projects in the Public Sector

Following is a list of completed and ongoing PSD projects in Balochistan in the IT industry:

Initiative 1: Technical Training Center for Precision Mechanics and Instrument Technology	
Location	Gwader, Balochistan
Area of Specialization	Instrument Technology, Mechatronics, Industrial Robotics, Telecommunications Equipment Maintenance
Timeline	2020
Objective	<ul style="list-style-type: none"> • To lay the foundation for the development and generation of technical know-how in the field of Precision Mechanics & instrument Technology, Die and mold technology. • To organize and conduct a three-year diploma of Associate Engineering in Precision Mechanics & instrument Technology, Dies and Mold Technology taking 180 students per year.
Cost	PKR 164,267,074
Policy applied	Accepted as per PPRA Rules
Insight into economics	<ul style="list-style-type: none"> • Provided consultancy services to the local industry on designing mechanical products, and fixtures. • Skilled the local community, increased exports, and created employment opportunities.
Sources	https://www.ppra.org.pk/elv/5/pcsir285.pdf , https://www.pakistantoday.com.pk/2023/01/17/center-helping-balochistan-youth-to-acquire-skilled-based-education-under-cpec/
Initiative 2: Quetta safe city project	
Location	Quetta Pakistan
Area of Specialization	Cutting-edge Internet Protocol (IP) cameras, high security, Smart verification and alert system
Timeline	2017-Ongoing
Objective	<ul style="list-style-type: none"> • The project features a state-of-the-art command and control centre. • To establish centre equipped with cutting-edge technology, houses a team of skilled human resources. the entire system has been designed locally, underscoring the province's commitment to technological self-reliance. • Maintain the capacity building of our security forces via advanced information technology
Cost	PKR 2.28 billion (estimated)

Insight into economics	<ul style="list-style-type: none"> Safe city coordinated with various law enforcement agencies. This collaborative effort aims to establish a customized response and immediate action mechanism, thereby enhancing the city's overall security infrastructure. Police Surveillance Department
Sources	https://www.nation.com.pk/28-Jan-2024/balochistan-cm-inaugurates-quetta-safe-city-project https://www.zameen.com/news/quetta-safe-city-project-nears-completion.html
Initiative 3 : Inclusion of Women in the Digital Economy	
Location	Balochistan
Area of Specialization	Information Technology, Computer literacy, financial services
Timeline	2023
Objective	<ul style="list-style-type: none"> To teach digital skills to women, which will help in women's access to digitalization and will reduce the gender-based gap in the IT sec-tor to provide women in Balochistan with Computer literacy to promote financial independence and economic empowerment
Cost	NA
Sources	https://www.nation.com.pk/09-Mar-2023/inclusion-of-women-in-digital-economy-project-on-the-card-says-dr-rubaba https://tribune.com.pk/story/2405170/balochistan-to-launch-it-project-for-women
Initiative 4 : University of Turbat (UoT)	
Location	Mekran region, Balochistan
Area of Specialization	Education and research, Natural science, Information technology, Social sciences, management, and Humanities.
Timeline	2012
Objective	<ul style="list-style-type: none"> Improve the quality of education in higher education institutions and promote research activities. Creating harmony with modern science and technology
Cost	PKR 86.81 million
Insight into economics	<ul style="list-style-type: none"> UoT is connected to PERN 2 (Pakistan Education & Research Network) which provides organizations with access to Internet services, an intranet, a National Digital Library, VoIP, and local content hosting in the cloud. Serving as liaison between the academia and the industry nationally and internationally for socio-economic development.
Sources	https://www.datacenterdynamics.com/en/news/pakistans-university-of-turbat-gets-new-data-center/ https://uot.edu.pk/about/vision
Initiative 5 : Establishment Of Geomatic Centre At Pak-EPA	
Location	Quetta Balochistan
Area of Specialization	Application of SRS, GIS and Global Positioning System (GPS) technologies, Mapping of hazards prone areas
Timeline	
Objective	<ul style="list-style-type: none"> Promote the application of GIS, SRS, and GPS technologies in assessing the existing situation of the forest, desertification, soil, climate, environmental pollution, marine life, coastal areas, snow and glacier, disasters, hazards, biodiversity, water resources, ecological zones. Facilitate better environmental planning in the country, particularly for rational and scientific decision-making through assessment of the environmental impact

	<p>of different human activities, making them compatible with the objectives of sustainable development!</p> <ul style="list-style-type: none"> Enhance and upgrade the institutional capacity of Pak-EPA, Ministry of Climate Change in the use of SRS, GIS, and GPS for environmental monitoring and management. Facilitate Federal and provincial governments in disaster risk reduction through vulnerability mapping, information clearing house mechanism, and training to use the latest available technologies for risk assessment from various forms of hazards.
Cost	404.940
Sources	https://environment.gov.pk/Detail/NTAyYzgwNTUtZjc4Yy00MzZkLTg2OWItNjkyZGE1NzE0ZDRi
Initiative 6: Freelancing & Entrepreneurship- DIGI Bizz	
Location	Science and IT Department, IT Training Institute, Old Pishin Stop, Near TCS Office, Model Town, Quetta.
Revenue	Female earned : USD 21,918 Male earned: USD 93,207.3
Area of Specialization	Freelance, Science & IT
Timeline	N/A
Objective	<ul style="list-style-type: none"> This program will help in improving the technical and professional skills of youth by providing them with state-of-the-art Information Communication Technology training, Freelancing training and e-Business opportunities
Cost	PKR 200 million
Insight into economics	DIGI BIZZ has successfully started courses relating to; Amazon E-Commerce , Digital marketing & advertising , creative designing
Sources	https://digibizz.gob.pk/
Initiative 7: Quetta Safe City Phase II	
Location	DHA Quetta
Area of Specialization	Embracing technology, promoting progressive urban living, developing eco-spaces, implementing a smart water management system ,modern amenities, a vibrant social fabric, and eco-friendly spaces, fostering a peaceful environment and responsible water use.
Timeline	April 2019
Objective	<ul style="list-style-type: none"> Goal is to elevate the city of Quetta and contribute to local prosperity. Creating a vibrant community that fulfills the aspirations of our residents. We aim to establish a thriving neighborhood equipped with world-class amenities, ensuring safety, and excelling in healthcare, education, and entertainment
Cost	PKR 100 million
Sources	https://www.dhaquetta.org/announcements

Other projects include:

1. E-Filling System Civil Secretariat Quetta
2. Promoting Use Of Artificial Intelligence In Improving Service Delivery In Balochistan
3. Virtual Education System Project
4. Establishment of e-rozgar Labs

Science and Tech Companies

Currently, Balochistan lacks existence of too many prominent software houses like other bigger provinces. Several factors contribute to this, including lower population density, limited infrastructure, and an emerging IT sector in the region. However, there are a few small-scale software companies operating in Balochistan, some of these are listed below:

1. **UltraSoft:** Incepted in 2004 and located in Quetta, it is the leading local IT company in Balochistan with experience in Web Designing, Graphic design, Software development, IT Consultancy, General IT support, Networking, Trouble shooting, General IT Supplies, Solar, maintenance and installations.
2. **JahaSoft:** Founded in 2018, JahaSoft is a software house in Balochistan that has been offering services for a long time throughout the region and other significant parts of Pakistan. They also cater to clients living in different countries. Their expertise covers various digital services, and they have a physical location in Quetta.
3. **Pak IT Services:** Although not exclusively based in Balochistan, Pak IT Services operates in Quetta. They offer a range of IT services, including software development.
4. **THOSE (The House Of Software Engineers):** Located in Hazara Town, Quetta, THOSE specializes in web designing, web development, web hosting, and software on demand. They are open for business.
5. **IconsPro Solutions:** Regional software company serving New York, Toronto, Quetta and Sydney offering services in web development, UI/UX, web apps, cloud and security services, etc.

Our field visits revealed a promising landscape. Since 2021, over 70 formal IT companies have emerged, primarily concentrated in Quetta. These companies offer services ranging from web development and e-commerce to ERP and software consultancy, with team sizes varying from a handful to over 70 employees. Notably, an estimated 5-10 companies are operated by the Hazara community. Additionally, a thriving freelance community exists in the region.

Beyond established companies, Balochistan boasts valuable resources for nurturing new ventures. Incubation centers like the NIC at BUIEMS and the University of Balochistan's innovation lab provide support and infrastructure for early-stage businesses and startups seeking dedicated workspaces. These resources can serve as a pipeline for future tenants in the proposed STP.