



CENTRE for AEROSPACE & SECURITY STUDIES

Potential of Pakistan's IT Industry: A SWOT Analysis

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Research Assistant, Economic Affairs & National Development

Working Paper

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Abstract

In recent years, Pakistan's IT industry has shown significant potential for growth while confronting various challenges. This Working Paper presents a comprehensive SWOT analysis to assess the industry's Strengths, Weaknesses, Opportunities, and Threats in detail. It identifies a young demographic base; large freelancing sector; and financial attractiveness for offshore outsourcing of IT services as the major strengths of Pakistan's IT industry. On the other hand, the study identifies concentration of IT exports to a few destination markets; limited portfolio of IT products and types of domestic startups; supply and demand mismatch of skills; gaps in meaningful access to the internet and the digital divide; bottlenecks in 'ease of doing business'; and inadequate employment of requirement engineering processes as the main weaknesses. The major opportunities for the industry include the presence of an enabling infrastructure; a thriving fintech and e-commerce startup ecosystem; growing inclination of students towards IT-related degree programmes; rising penetration of internet and smartphones; and increasing global demand for IT services. The major threats facing the industry include a competitive global IT marketplace; brain drain; policy inconsistency; and evolving cyber threat landscape. For Pakistan to capitalise fully on the potential of its IT industry, it is important to build on its strengths but, equally important, address and overcome its weaknesses. Additionally, it will be imperative to seize the existing and emerging opportunities and mitigate threats to the country's IT sector to yield sustained positive performance outcomes and augment its strengths over time.

Keywords: IT industry, Software Industry, Startups, Freelancing Industry, Digital Economy.

Introduction

Labelled as the era of knowledge or digital-based economy, the 21st Century has witnessed a tremendous evolution of Information Technology (IT), revolutionising how humans work and connect. IT includes 'creating, managing, storing and exchanging information.' It involves all types of technology that deal with information, such as computer software and hardware technology for storing, creating, or exchanging information, and all these information technology-oriented organisations form part of the broad IT industry.

Today, almost every business and organisation depends on the services provided by the global IT industry in one way or another, making it one of the largest industries in the world.¹ In 2023, its total value stood at USD 8852.41 billion.² The global IT sector is poised to grow further, propelled by factors including but not limited to technological advancements; increased use of Artificial Intelligence (AI) and automation; rise of the gig economy and remote work; digitalisation of traditional industries; growing importance of cybersecurity; and global connectivity. As a result, it is expected to grow to USD 11995.97 billion in 2027.³

Pakistan's digital growth has also rapidly evolved in recent years. In 2018, Pakistan was recognised by the United States technology giant 'Google' for its rapid transformation into a 'digital-first country,' demonstrating Google's realisation of the country's marketing potential.⁴ Today, the IT industry has become one of the fastest-growing sectors of Pakistan's economy.⁵ It has grown at an annual growth rate of 25.6% for the last seven years⁶ and is exporting products and services to some of the

¹ D. Nelson, "What is the Global IT Industry?" *WiseGEEK*, Accessed July 1, 2023, <https://www.wise-geek.com/what-is-the-global-it-industry.htm>.

² Global News Wire, "Information Technology Global Market Report 2023," April 23, 2023, <https://www.globenewswire.com/news-release/2023/04/21/2652000/0/en/Information-Technology-Global-Market-Report-2023.html>.

³ Ibid.

⁴ Khurshid Ahmed, "Pakistan is Rapidly Becoming a 'Digital-First Country', Google," *Arab News*, November 17, 2018, <https://www.arabnews.com/node/1406546/media>.

⁵ Board of Investment, "Sector Profile – Tech (IT and IT enabled Services)," Accessed September 8, 2023, <https://invest.gov.pk/sites/default/files/inline-files/IT.pdf>.

⁶ PricewaterhouseCoopers, *Unlocking Pakistan's IT Potential: A Roadmap for IT/ITeS Export Growth*, report (Islamabad: Ministry of Information Technology and Telecommunication, Government of Pakistan, 2023), <https://moitt.gov.pk/SiteImage/Misc/files/Roadmap%20for%20IT%20ITeS%20Growth.pdf>.

largest entities across 120 countries today.⁷ According to the State Bank of Pakistan (SBP), in the financial year 2023 (FY 22-23), Pakistan exported USD 2.1 billion in computer services,⁸ which includes all IT exports.⁹ Computer services (IT) exports were only superseded by the value of cereal exports, cotton exports, articles of apparel and clothing accessories exports, and exports of textile articles, sets, and worn clothing.¹⁰ In the services sector, computer services exports had the largest share among 23 categories.¹¹

However, notwithstanding the progress in absolute terms over the recent years, Pakistan's relative share in the global IT market remains comparatively low at below 0.5% as it continues to face several challenges.¹² Given this, the *Working Paper* has been written with a view to assess the potential of Pakistan's IT industry and cajole policymakers and other stakeholders, such as industry professionals, in developing and nurturing the industry further within a competitive and dynamically changing global IT market. The research questions guiding this paper are:

- What is the potential of Pakistan's IT industry?
- How can Pakistan increase and sustain the competitiveness of its IT industry within the global IT market?

The study is guided by two complementary theories, including the Resource-Based View (RBV) or the Resource-Based Theory (RBT) and the Dynamic Capability Theory (DCT). Data has been analysed through the SWOT analysis technique. Integrating the theory and findings from the SWOT analysis will lend answers to the research questions. The next section provides an overview of the theoretical framework. This is followed by an overview of the methodology, a brief background of Pakistan's IT industry, presentation of findings and discussion, policy recommendations, and a conclusion.

⁷ Board of Investment, "Sector Profile – Tech (IT and IT enabled Services)."

⁸ State Bank of Pakistan, "Export of Goods by Commodity and Services by Type," Accessed September 8, 2023, <https://www.sbp.org.pk/publications/export/2023/Jun/2.pdf>.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid.

¹² "SBP Experts Highlight IT Sector Growth and Potential," *Pakistan Observer*, Accessed January 22, 2024, <https://pakobserver.net/sbp-experts-highlight-it-sector-growth-and-potential/>.

Theoretical Framework

The study is guided by organisational theories, including the Resource-Based Theory or Resource-Based View (RBV) and the Dynamic Capability Theory (DCT). Although the two theories are used primarily as managerial frameworks, the existing literature has also applied them beyond the level of an organisation or a set of organisations,¹³ pointing to their suitability for the present study. Literature on RBV contends that firms possess capability strengths and weaknesses that shape their performance and competitive position.¹⁴ In other words, firms must maximise the utilisation of strengths and implement measures to address/neutralise weaknesses to achieve higher performance and drive competitive advantage.¹⁵ The theory has been further extended by the DCT, which points to the importance of possessing dynamic capabilities to yield sustained positive performance outcomes and augment strengths over time. Dynamic capability refers to ‘the capacity of an organisation to sense and shape opportunities and threats, to seize opportunities and to maintain competitiveness through enhancing, combining, protecting and when necessary, reconfiguring the business enterprise’s intangible and tangible assets.’¹⁶ According to another definition, it is ‘the ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments.’¹⁷ A conjunction of the two theories suggests that in addition to benefitting from endogenous strengths, firms must also be flexible and responsive to new opportunities and threats to maintain

¹³ Mariana Mazzucato, Rainer Kattel, Giulio Quaggiotto, and Milica Begovic, *COVID-19 and the Need for Dynamic State Capabilities: An International Comparison*, report (New York, NY: United Nations Development Programme, 2021), <https://www.undp.org/library/dfs-covid-19-and-need-dynamic-state-capabilities-international-comparison>.

¹⁴ David G. Sirmon, Michael A. Hitt, Jean-Luc Arregle, and Joanna Tochman Campbell, “The Dynamic Interplay of Capability Strengths and Weaknesses: Investigating the Bases of Temporary Competitive Advantage,” *Strategic Management Journal* 31, no. 13 (2010): 1386-1409, <http://dx.doi.org/10.2307/40961189>.

¹⁵ Om Gupta, “Using the Resource-based View Strategy for a Competitive Advantage,” *SAVIOM*, November 30, 2023, <https://www.saviom.com/blog/using-the-resource-based-view-strategy-for-competitive-advantage/>.

¹⁶ ScienceDirect, “Dynamic Capability,” Accessed January 19, 2024, <https://www.sciencedirect.com/topics/social-sciences/dynamic-capability>.

¹⁷ Ibid.

a sustained competitive position in dynamically changing environments.¹⁸ The present study applies these arguments in the context of Pakistan and its IT industry.

Research Methodology

The study was undertaken employing the SWOT analysis technique. This technique is widely used by academics and practitioners in social sciences as a strategic planning tool to assess a unit's position and help policymakers and planners develop future strategies accordingly.¹⁹ In SWOT, strengths refer to factors that distinguish an entity from its competitors; weaknesses include aspects that prevent an entity from performing at optimum level; opportunities are favourable conditions that can be leveraged for an entity's progress; and threats include the unfavourable conditions or factors that can potentially affect an entity's growth prospects.

Information for the purpose of analysis has been gathered from secondary sources, including government and private sector reports, journal articles, newspaper articles, websites, and conference papers.

Background: Evolution of Pakistan's IT Industry

Some six and a half decades ago, a company called 'Packages Ltd' laid the foundation of the process of computerisation in the country by beginning to use a computer.²⁰ A few companies gradually followed suit in the 1960s and '70s, but it was only in the 1980s and '90s that the employment of computers rapidly grew in the country.²¹ The Government of Pakistan (GoP) significantly reduced restrictions on import of

¹⁸ Piotr Wójcik, "Exploring Links Between Dynamic Capabilities Perspective and Resource-Based View: A Literature Review," *International Journal of Management and Economics* 45, no. 1 (2015): 83-107, <http://www.sgh.waw.pl/ijme/>.

¹⁹ Mostafa Ali Benzaghta, Abdulaziz Elwalda, and Mousa Mohamed Mousa, "SWOT Analysis Applications: An Integrative Literature Review," *Journal of Global Business Insights* 6, no. 1 (2021): 55-73, <https://www.doi.org/10.5038/2640-6489.6.1.1148>.

²⁰ M. Shaukat, "Developments of Information Technology, Telecom, and E-Commerce in Business Environment of Pakistan: An Analysis of Banking and Manufacturing Sectors," *Pakistan Journal of Social Sciences* 29, no. 2 (2009): 259-278, https://www.bzu.edu.pk/PJSS/vol29no2_2009/FinalPJSS8.pdf.

²¹ *Ibid.*, 260.

computers in the mid-1980s to provide impetus to the computer market,²² and supplement the push provided to it by the introduction of personal computers at the global level.²³ These restrictions were completely removed in the 1990s.²⁴ The 1990s is also seen as the period of an IT revolution in Pakistan when satellite communication technology was introduced and Internet Service Providers (ISPs) began providing internet facilities to internet users.²⁵

In March 2000, the government established the Ministry of Information Technology and Telecommunication Division,²⁶ and the first national 'IT Policy' was approved in the same year.²⁷ In 2002, an 'Electronic Transaction Ordinance' was promulgated, followed by the approval of the 'Electronic Crimes Act' by the Cabinet in 2007.²⁸ During these years, the government was actively pursuing an IT development programme,²⁹ and between 2003 and 2005 alone, the country's IT sector trade increased by around 50%.³⁰ The next decade was particularly significant for the progress of the IT industry in Pakistan. 3G and 4G technologies were deployed in the country in 2014,³¹ which provided a boost to the IT sector. Moreover, the government in 2015 introduced the 'Telecommunication Policy',³² followed by the 'Digital Pakistan Policy' in 2018.³³ A 'Digital Pakistan' initiative was also launched in 2019 to promote innovation,

²² Ghulam Muhammad Kundi, Bahadar Shah and Allah Nawaz, "Digital Pakistan: Opportunities and Challenges," *Journal of Information System and Technology Management* 5, no. 2 (2008): <https://doi.org/10.4301/S1807-17752008000200009>.

²³ Shaukat, "Developments of Information Technology, Telecom, and E-Commerce in Business Environment of Pakistan," 260.

²⁴ *Ibid.*, 260.

²⁵ *Ibid.*, 260.

²⁶ Saima Saeed, Muhammad Osama Ahmed, and Umair Malik, "Role of Information Communication Technology (ICT) in 21st Century," *Journal of Business Studies* 13, no. 2 (2017): 124-147, <http://ibtjbs.ilmuniversity.edu.pk/journal/jbs/13.2/10.pdf>.

²⁷ Farzana Shafique and Khalid Mahmood, "Indicators of the Emerging Information Society in Pakistan," *Information Development* 24, no. 1 (2008): 66-78, DOI: 10.1177/0266666907087698.

²⁸ Kundi, Shah, and Nawaz, "Digital Pakistan: Opportunities and Challenges."

²⁹ *Ibid.*

³⁰ Saeed, Ahmed, and Malik, "Role of Information Communication Technology (ICT) in 21st Century," 133.

³¹ Nisha Masroor, "3G and 4G: Generation Gap," *Dawn*, June 20, 2014, <https://www.dawn.com/news/1114047>.

³² Asif Javed, "The Scope of Information and Communication Technology Enabled Services in Promoting Pakistan Economy," *Asian Journal of Economics, Finance, and Management* 2, no. 1 (2020): 165-173, <https://globalpresshub.com/index.php/AJEFM/article/view/860>.

³³ "Govt Approves Country's First Ever "Digital Pakistan" Policy," *Profit*, May 23, 2018, <https://profit.pakistantoday.com.pk/2018/05/23/govt-approves-countrys-first-ever-digital-pakistan-policy/>.

encourage the use of digital services, and help bridge the digital divide.³⁴ As a result, Pakistan's digital growth rapidly evolved, and IT has become one of the fastest-growing sectors of the economy.

SWOT Analysis

This study employs a SWOT analysis to delineate the four critical factors - Strengths, Weaknesses, Opportunities, and Threats - central to the development of Pakistan's IT industry. By methodically evaluating these elements, the analysis highlights the industry's robust capabilities and pinpoints areas of improvement. It also identifies exploitable opportunities and outlines potential risks that must be mitigated to foster growth and sustainability in the sector.

Strengths

Young Demographic Base

The current youth cohort of Pakistani society represents a demographic group of digital natives, comprising individuals who have grown up in the age of the internet and modern technologies. As a result, they exhibit a high degree of comfort and expertise with digital technologies, serving as the human resources for the industry and helping increase the absorptive capacity of IT services in the domestic economy. Pakistan boasts a young and dynamic demographic base, making it one of the youngest countries in the world. Estimates show that the country's youth population grew at an annual rate of 2.7% from 2001-02 to 2020-21, compared to the 2.4% yearly growth rate of the overall population.³⁵ In 2017, individuals below 30 accounted for around 64% of Pakistan's population, and those within the age group of 15 and 29, i.e., the age group defined as the youth, comprised around 29% of the population.³⁶

³⁴ Hasan Ahmad Nizam, Khalid Zaman, Khan Burhan Khan, Rubeena Batool, Muhammad Adnan Khurshid et al., "Achieving Environmental Sustainability through Information Technology: 'Digital Pakistan' Initiative for Green Development," *Environmental Science and Pollution Research* 27, (2020): 10011-10026, <https://doi.org/10.1007/s11356-020-07683-x>.

³⁵ Hafiz A. Pasha, "The Youth Bulge," *Business Recorder*, July 4, 2023, <https://www.brecorder.com/news/40250873>.

³⁶ Shakeel Ahmad, "Unleashing the Potential of a Young Pakistan," *United Nations Development Program*, July 24, 2018, <https://hdr.undp.org/content/unleashing-potential-young-pakistan>.

This percentage could well be higher now, and expectations are that the country's youth population will continue to multiply in the foreseeable future. If fully empowered and provided with a conducive environment, this reservoir of young Pakistanis can be positioned to serve as an invaluable asset for sustaining and furthering the growth of the country's IT industry.

Large Freelancing Industry

Freelancing of IT services advances the IT sector growth by contributing to foreign exchange earnings and allowing local companies to optimise business processes by reducing the cost of permanent employees. Although an increasing number of individuals across the globe have been entering the freelancing industry annually, Pakistan has one of the largest freelancing industries in the world. According to the global payment platform 'Payoneer,' Pakistan's freelancing industry is the fourth-largest globally, preceded only by the United States (US), the United Kingdom (UK), and Brazil, while India stands seventh in the ranking.³⁷ A 2020 World Bank report suggested that almost half of Pakistan's IT industry comprises freelancers.³⁸

Several factors can explain the tremendous size and potential of Pakistan's freelancing industry. First, English is the lingua franca of the freelancing world. A large proportion of Pakistan's population exhibits a reasonable expertise in the English language, and according to some recent estimates, around 58% of Pakistanis are fluent in English.³⁹ According to another estimate, Pakistan is the world's third-largest English-speaking country (lingua franca or primary) after the US and India.⁴⁰ South Asian countries, including Pakistan, India, and Bangladesh, have been popular in the global freelancing market since the emergence of the freelancing trend due to their

³⁷ Richard Clayton, "Payoneer's List of Top Freelancing Countries," *Payoneer*, February 25, 2023, <https://blog.payoneer.com/freelancers/industry-tips-fl/6-countries-capitals-freelancing/>.

³⁸ Syeda Afsheen Sohail and Fouzia Naz, "Growth Opportunities and Impediments in the Digital Freelance Industry of Pakistan," *Journal of Social Sciences and Media Studies* 6, no. 1 (2022): 7-15, <https://doi.org/10.21123/jossams.v6i1.222>.

³⁹ Usman Murtaza, "58% of Pakistanis Speak Fluent English, According to Latest Statistics," *Startup Pakistan*, August 10, 2023, <https://startuppakistan.com.pk/58-of-pakistanis-speak-fluent-english-according-to-latest-statistics/>.

⁴⁰ World Population Review, "English Speaking Countries 2023," Accessed September 8, 2023, <https://worldpopulationreview.com/country-rankings/english-speaking-countries>.

workforce's strong English-language skills.⁴¹ As an added advantage, Pakistan's IT workforce's English pronunciation is also more neutral than competitor countries.⁴² Second, Pakistan has a cost-effective labour force, which makes it ideal for international clients to hire local freelancers.⁴³ According to one study, Pakistani freelancers, despite being highly skilled, charge lower than their counterparts from India and some other South Asian countries.⁴⁴ Third, as discussed earlier, Pakistan has a growing youth population, and most freelance work tends to involve young individuals who are quick learners and are more technologically informed. Fourth, the Pakistani workforce is recognised for adaptability and flexibility – a highly valued quality in the freelancing market. Fifth, recognising the potential of the freelancing industry, the government, in recent years, has also launched enabling initiatives. For instance, the government's DigiSkills Training Programme provides free-of-cost training in a diverse range of fields, such as freelancing, digital marketing, e-commerce management, data analytics and business management, Search Engine Optimisation (SEO), and graphic design.⁴⁵ The Punjab government empowers freelancers through its e-Rozgaar Program,⁴⁶ while the MoITT along with the Punjab Information Technology Board (PITB) has a comprehensive National Freelance Training Program (NFTP) for freelancers.⁴⁷ More recently, the IT Ministry under the interim government formed in 2023 also announced the initiative of establishing 10,000 e-Rozgaar (e-job) centres to be equipped with infrastructure, such as desks, computers, and high-speed

⁴¹ Fabian Stephany, Otto Kässi, Uma Rani, and Vili Lehdonvirta, "Online Labour Index 2020: New Ways to Measure the World's Remote Freelancing Market," *Big Data and Society* 8, no. 2 (2021), <https://doi.org/10.1177/20539517211043240>.

⁴² Government of Pakistan, *Pakistan Export Strategy - Software Development - 2023-2027*, report (Islamabad: Government of Pakistan, 2023), https://tdap.gov.pk/wp-content/uploads/2022/08/Software-Development-Export-Strategy-Pakistan-3_web.pdf.

⁴³ Shamsi and Nasir, "Unleashing the Pakistan Software Industry: Growth Prospects and Challenges," 12.

⁴⁴ Sarfraz Zaman, Faisal Irfan, Jawad Khan Niazi, Fassih Ur Rehman Khan, and Abaid Ullah, "Freelancing is an Opportunity for the Women of Pakistan," *PalArch Journal of Archaeology of Egypt/Egyptology* 19, no. 3 (2022): 1277-1291.

⁴⁵ Finance Division, *Information Technology and Telecommunication*, report (Islamabad: Government of Pakistan), 238, Accessed September 8, 2023, https://www.finance.gov.pk/survey/chapters_23/15_Information_Technology.pdf.

⁴⁶ Punjab Information Technology Board, "What is e-Rozgaar Program," Accessed September 8, 2023, <https://erozgaar.pitb.gov.pk/node/21>.

⁴⁷ Punjab Information Technology Board, "National Freelance Training Program," Accessed September 8, 2023, <https://nftp.pitb.gov.pk/aboutus>.

internet to assist freelancers.⁴⁸ Additionally, it introduced a pilot project to provide freelancers the convenience of receiving funds through PayPal – the international digital payment platform.⁴⁹

However, a highly conducive environment for the freelancing industry to flourish is still lacking (e.g., slow internet speeds, intermittent disruptions in internet services), and its tremendous growth, despite this factor, is a testament to the potential of this sector and its capacity to contribute to the economy.

Financial Attractiveness for Offshore Outsourcing of IT Services

Offshore outsourcing of services constitutes an important component of revenue generation in the IT industry. The Kearney's 2021 Global Services Location Index ranked Pakistan as the second-most financially attractive location for offshore outsourcing of IT and IT-enabled services (ITeS).⁵⁰ Additionally, the International Labour Organisation's (ILO) flagship report of 2021 ranked Pakistan the second-largest supplier of digital labour services, such as software development and technology services, sales and marketing support services, data entry services, translation services, among others.⁵¹ Major contributing factors include the country's cost-effective labour force, which provides it with a competitive edge in the IT market.⁵² For reference, on average, the annual cost of a software engineer in Pakistan is one-fifth of the cost in Europe, and the US.⁵³ This makes Pakistan an ideal platform for offshore IT outsourcing, as most companies worldwide prefer quality services at low labour costs to cut company expenses, conserve capital, and increase profitability.

⁴⁸ Ghulam Abbas, "Interim Govt Announces Plan to open 10,000 E-Job Centres," *Profit*, January 10, 2024, <https://profit.pakistantoday.com.pk/2024/01/10/interim-govt-announces-plan-to-open-10000-e-job-centres>.

⁴⁹ Ibid.

⁵⁰ Finance Division, *Information Technology and Telecommunication*, 237.

⁵¹ Ibid.

⁵² Jawwad A. Shamsi and Zafar Nasir, "Unleashing the Pakistan Software Industry: Growth Prospects and Challenges," *IT Professional* 18, no. 5 (2016), <https://doi.org/10.1109/MITP.2016.91>.

⁵³ Joshua Danish, "Pakistan among the Top Countries in South Asia for Software Outsourcing," *Integrati*, Accessed September 8, 2023, <https://www.integrati.io/post/pakistan-among-the-top-countries-in-south-asia-for-software-outsourcing>.

Weaknesses

Concentration of IT Exports: Limited Destination Markets

Pakistan's IT exports remain highly concentrated towards a few destination markets, with the Information and Communication Technology (ICT) exports, including computer (IT) exports, to the US accounting for more than half of the total ICT exports. According to the State Bank of Pakistan (SBP), in FY23, Pakistan's total ICT exports amounted to USD 2.6 billion.⁵⁴ Exports to the US accounted for around 54.3% of total exports, while exports to the UK, Ireland, Dubai, Singapore, Canada and Germany followed distantly and accounted for another 7.7%, 7%, 6.3%, 4.5%, 2.7%, and 2% of the total exports, respectively.⁵⁵ Others had less than 2% share, and many countries and entities (such as the Asian Development Bank (ADB) or European Economic Community) had no share or negligible shares, with the total outgoing ICT exports from Pakistan to these countries or entities amounting to less than USD 5,000.⁵⁶ The contributory factors of a less diversified export market could include lack of market compatibility; inadequate market exploration and information; language barriers; or hesitancy of the international community to engage with the country's IT sector due to weaknesses in data protection regulations, among others. The concentration of IT exports to a few destination markets restricts Pakistan from enhancing the market visibility of its IT services and expanding customer base.

Limited Portfolio of IT Products and Types of Domestic Startups

Pakistan's domestic startups remain mainly clustered around financial technology (fintech) and e-commerce⁵⁷ at a time when the potential to expand startup domains is vast, as emerging trends suggest a rising demand of startups related to environment-friendly technology, digital health, cloud computing and infrastructure, cybersecurity solutions, quick service restaurants, super apps, metaverse, crypto, fitness, energy,

⁵⁴ State Bank of Pakistan, "Export of Goods by Commodity/Country and Services by Type/Country," Accessed September 8, 2023, <https://www.sbp.org.pk/publications/export/2023/Jun/5.pdf>.

⁵⁵ Ibid., 614-617.

⁵⁶ Ibid., 614-617.

⁵⁷ State Bank of Pakistan, "Special Section: Pakistan's Growing IT Exports and Tech Start-ups: Opportunities and Challenges," 139.

or education, to name a few.⁵⁸ The SBP reports that 71% of the total funding of all publicly reported deals between 2015 and 2022 went to fintech and e-commerce startups.⁵⁹ According to Failory, a content site for startup founders and entrepreneurs, ten of Pakistan's top 13 startups are linked with fintech and e-commerce.⁶⁰

Moreover, most IT projects Pakistani companies take include bespoke software development, involving the creation of customised software systems or applications on existing platforms or software made in other countries, as most companies prioritise taking large contracts with high margins.⁶¹ There still needs to be more focus on products or platforms (e.g., Windows, iOS, Android, Steam, WordPress, Ethereum, etc.) development that could be scaled to different countries or be available for purchase to a broad range of users.⁶² The narrow range of IT products and the scarcity of domestic startups restrict the country's ability to broaden its customer base and maximise revenue capabilities of its IT sector. This limitation also hampers innovation, reduces the attractiveness of the market for foreign investment, and limits job creation in high-tech fields. Consequently, it constrains the country's overall economic growth and its position in the global IT landscape.

Skills Mismatch

In Pakistan, an academia-industry collaboration is lacking, resulting in a disparity between industry needs and skills taught at the university level and contributing to a supply and demand side mismatch of skills.⁶³ According to the Pakistan Software Houses Associated (P@SHA), in terms of technical skills, Java, JavaScript Full Stack (MEAN/MERN), PHP (Laravel/CodeIgniter/Yii/Zend/Drupal/Magento), Python, iOS - Objective C & SWIFT, C# .NET, Flutter Flutter (Hybrid), Android - JAVA, AWS

⁵⁸ Glimpse, "Top AI Startup Trends (August 2023)," Accessed September 8, 2023, <https://meetglimpse.com/ai-startup-trends/>; The Code Work, "Ten Most In-Demand Startup Trends of 2023," January 18, 2023, <https://thecodework.com/blog/10-most-in-demand-startup-trends-of-2023/>.

⁵⁹ State Bank of Pakistan, "Special Section: Pakistan's Growing IT Exports and Tech Start-ups: Opportunities and Challenges," 139.

⁶⁰ Failory, "Top 13 Startups in Pakistan in 2023," August 30, 2023, <https://www.failory.com/startups/pakistan>.

⁶¹ Government of Pakistan, *Pakistan Export Strategy - Software Development - 2023-2027*, 28.

⁶² *Ibid.*, 28.

⁶³ Shakeel Ahmad Jan, "Exploring the Impact of Experiments on Knowledge Workers' Productivity in the Pakistani Software Industry," *International Journal of Politics and Social Sciences Review* 2, no. 1 (2023): 20-30, <https://ojs.ijpssr.org.pk/index.php/ijpssr/article/view/9>.

Developer - Associate, and MICROSOFT SQL, are the top ten skills demanded by the IT industry in Pakistan.⁶⁴ On the other hand, the top ten skills taught at universities nationwide include Java, C/C++, Python, JavaScript Full Stack (MEAN/MERN), MICROSOFT SQL, C#.NET, Oracle Database 12c Administrator, MySQL 5.7 Database Administrator, Oracle Certified Professional, and Project Management Professional.⁶⁵ Of these skills, five, including Java, JavaScript Full Stack (MEAN/MERN), C/C++, Python, and MICROSOFT SQL, align with the top preferences of Pakistan's IT industry.

In terms of non-technical or soft skills, social skills, problem-solving, teamwork, critical thinking, time management, attitude, and communication skills are the top in-demand non-technical skills in the IT industry.⁶⁶ On the other hand, the top non-technical skills taught at the universities include communication and presentation, research and development, analysis and presentation, digital marketing/ social media marketing, content development and content writing, operations and project management, and business development/ B2B & B2C Sales.⁶⁷ Only one of these skills, including communication and presentation, aligns with the industry's needs.⁶⁸ As a result of the skills mismatch, many companies in Pakistan reportedly find it hard to hire skilled employees.⁶⁹

Gaps in Meaningful Access to the Internet and Digital Divide

The number of internet users has been increasing at a modest pace in Pakistan; however, significant gaps still exist in the quality of internet services. According to Ookla's Speedtest Global Index, Pakistan stood 127 out of 145 countries in terms of mobile internet speed and 154 out of 182 countries in terms of broadband speed in August 2023.⁷⁰ Besides slow internet speeds, citizens' meaningful access to the

⁶⁴ Rida Sajjad and Mehreen Hassan Gardezi, *The Industry Academia Skills Gap Report 2022*, report (Islamabad: P@SHA, 2022), <https://www.pasha.org.pk/wp-content/uploads/The-Great-Divide-Industry-Academia-Skills-Gap-Analysis-Report-2022.pdf>.

⁶⁵ Ibid.

⁶⁶ Ibid.

⁶⁷ Ibid.

⁶⁸ Ibid.

⁶⁹ "Focus on IT Skills," *Pakistan Observer*, Accessed January 23, 2024, <https://pakobserver.net/focus-on-it-skills/>.

⁷⁰ Speedtest, "Speedtest Global Index," Accessed September 8, 2023, <https://www.speedtest.net/global-index>.

internet is also undermined due to a lack of consistency in services,⁷¹ for reasons such as technical faults in the optic fibre network, extreme weather events, electricity breakdown, law and order concerns during political rallies, protests, and religious processions, and movement of high-level dignitaries.⁷² The inconsistency in services has a particularly severe impact on the IT sector. For example, the intentional three-day internet outage in May 2023 had a significant effect on Pakistani freelancers.⁷³ On freelancing platforms such as Upwork and Fiverr, notices were posted alongside the profiles of Pakistani users, indicating that these service providers were from a country experiencing internet disruptions, which could lead to project delays.⁷⁴

Relatedly, the digital divide is pervasive in Pakistan. According to the 'Bytes for All Internet Landscape Report 2022,' 15% of the population, especially residents of remote areas, have no access to internet services.⁷⁵ Factors such as harsh weather, rugged terrains, lack of electricity, poor logistics, or reluctance of cellular companies to extend services to regions such as Gilgit-Baltistan (GB) and Azad Jammu and Kashmir (AJK) has resulted in the unavailability of internet services in certain parts of the country.⁷⁶ Additionally, a significant gender digital divide also exists in terms of access to the internet and mobile phones.⁷⁷ A Global System for Mobile Communications Association (GSMA) report published in 2022 showed that only half of the women surveyed owned a mobile phone compared to over 75% of men.⁷⁸

Another dimension of the digital divide pertains to the digital literacy divide. In Pakistan, digital literacy gaps exist between men and women, with the latter exhibiting relatively lesser ability to use ICT.⁷⁹ Among the socioeconomic groups, individuals from the

⁷¹ Jahanzaib Haque, *Pakistan's Internet Landscape 2022*, report (Islamabad: Bytes for All, 2023), 5, <https://bytesforall.pk/sites/default/files/Internet-Landscape-Report-2022.pdf>.

⁷² Arsalan Ashraf and Amjad Qammar, *Pakistan Network Shutdown Report*, report (Islamabad: Bytes for All, 2023), <https://bytesforall.pk/publication/pakistan-network-shutdown-report-2022>.

⁷³ Abdullah Niazi, "Digital Pakistan in a Coma: What is the Cost of the Broadband Shut Down?" *Profit*, May 11, 2023, <https://profit.pakistantoday.com.pk/2023/05/11/digital-pakistan-in-a-coma-what-is-the-cost-of-the-broadband-shut-down/>.

⁷⁴ Ibid.

⁷⁵ Haque, *Pakistan's Internet Landscape 2022*, 21.

⁷⁶ Ibid., 21.

⁷⁷ Ibid., 11.

⁷⁸ Ibid., 12.

⁷⁹ Waqas Shair, Abdul Waheed, Muhammad Mubasher Kamran, and Neelam Kubra, "Digital Divide in Pakistan: Barriers to ICT Usage Among the Individuals of Pakistan," *Journal of Economic Impact* 4, no. 3 (2022): 196-204, <http://dx.doi.org/10.52223/jei4032206>.

higher groups exhibit better ICT skills, while among regions, those in urban areas exhibit higher skills than those in rural areas, and individuals from more developed provinces possess higher ICT usage capabilities compared to their counterparts from other provinces.⁸⁰ The digital divide has kept Pakistan from not only further expanding its domestic market for IT services but also benefiting from the untapped potential of a significant proportion of the country's population.

Bottlenecks in 'Ease of Doing Business'

In recent years, several efforts, such as introducing incentives or establishing Software Technology Parks (STPs) and National Incubation Centres (NICs), have been launched to facilitate business in the IT sector, which are steps in the right direction. Nevertheless, multiple bottlenecks continue to impact the 'ease of doing business'. As a case in point, the process of registering new companies is overly complex in Pakistan, requiring multiple approvals and steps, which deters the establishment of new local companies and expansion of multinational corporations (MNCs).⁸¹ Second, till late 2023, the international payment gateway 'PayPal' did not offer its services in Pakistan due to concerns such as money laundering and fraud. As a result, stakeholders in the IT industry, particularly freelancers and Small and Medium Enterprises (SMEs), have had to go through lengthy and insecure processes to make international transactions.

Additionally, access to finance/credit remains one of the major constraints facing enterprises in Pakistan, as credit to the private sector remains significantly lower compared to some comparator economies such as Bangladesh, Egypt, and Malaysia.⁸² For the IT sector, the problem is particularly difficult as a majority of firms in the industry are young and lack collateral, such as plants or large parcels of land.⁸³ Another example – while a 100% tax credit including minimum, alternate corporate

⁸⁰ Ibid., 202.

⁸¹ P@SHA, "Unleashing the Potential of IT and ITeS Sector," (policy paper, P@SHA, Islamabad, 2023), <https://www.pasha.org.pk/wp-content/uploads/Budget-Recommendations-2023-by-P@SHA.pdf>.

⁸² Namoos Zaheer and Rafay Khan, "Financing Private-Sector Led Growth in Pakistan," *The World Bank*, June 20, 2022, <https://blogs.worldbank.org/endpovertyinsouthasia/financing-private-sector-led-growth-pakistan>.

⁸³ State Bank of Pakistan, "Special Section: Pakistan's Growing IT Exports and Tech Start-ups: Opportunities and Challenges," 152.

tax, and final taxes for three years for Pakistan Software Export Board (PSEB) registered startups is applicable, the procedure for applying for tax credit remains highly cumbersome, creating unnecessary additional expenses for potential beneficiaries.⁸⁴ Such bottlenecks in the 'ease of doing business' affect the simplicity and efficiency with which IT businesses operate within the country.

Inadequate Employment of Requirements Engineering Process

Pakistan's software industry faces challenges and capital losses during software development.⁸⁵ The Requirements Engineering (RE) process is considered one of the most important determinants of the success of software projects in any industry and involves the 'process of determining user needs, requirements, and constraints for a particular product or project.'⁸⁶ In developing countries like Pakistan, however, adequate effort and time are not devoted to RE processes in the software industry.⁸⁷ This is due to a host of factors, including lack of time, lack of budget, inadequate communication among the stakeholders such as project managers and team members, lack of a dedicated team, or a lazy attitude of clients.⁸⁸ An inadequate focus on RE processes leads to the development of relatively low-quality software systems, unnecessary budget increases, dissatisfaction of users and customers, reduced motivation of teams, and worse, often complete failure of projects.⁸⁹

⁸⁴ Hira Zainab and Kashoon Leeza, *Tax Analysis: Mapping Cost of Doing Business for IT and ITeS Companies*, report (Islamabad: P@SHA, 2022), https://www.pasha.org.pk/wp-content/uploads/Tax-Analysis-Report_Mapping-Cost-of-doing-Business-for-IT-and-ITeS-industry-in-Pakistan-2022.pdf.

⁸⁵ Muhammad Hamid, "Intelligent Recommender and Decision Support System for Effective Management of Software Projects," (PhD diss., National College of Business Administration and Economics, Lahore, 2019).

⁸⁶ Iqra Zafar, Aiman Khan Nazir, Asma Shaheen, Bilal Maqbool, and Wasi Haider Butt, "Why Pakistani Software Companies Don't Use Best Practices for Requirement Engineering Processes," Paper Presented at the 2018 IEEE 9th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON), Vancouver, November 1-3, 2018, DOI: 10.1109/IEMCON.2018.8614913.

⁸⁷ Ibid.

⁸⁸ Ibid.

⁸⁹ Amjad Hussan Zahid, Ambreen Liaqat, Muhammad Shoaib Farooq, and Sheraz Naseer, "Requirement Elicitation Issues and Challenges in Pakistan Software Industry," *VFAST Transactions on Software Engineering* 8, no. 1 (2020): 28-36, <https://www.vfast.org/journals/index.php/VTSE/article/viewFile/530/625>; Hamid, "Intelligent Recommender and Decision Support System for Effective Management of Software Projects."

Opportunities

Enabling Infrastructure

Pakistan has developed an enabling infrastructure to support IT startups and companies, with significant developments including the establishment of Software Technology Parks (STPs) and National Incubation Centres (NICs). These technology parks are renowned for providing low-cost infrastructural support and facilitating collaboration and knowledge sharing among firms co-located within the parks. Additionally, they offer firms proximity to universities and research institutes, further enhancing their potential for innovation.⁹⁰ Similarly, incubation centres help support entrepreneurial development by providing capital support, networking services, and training programmes. The Pakistan Software Export Board (PSEB) has developed 32 STPs in private and public buildings in different cities, including major urban centres as well as smaller cities such as Khuzdar, Jamshoro, Bannu, and Swat.⁹¹ These STPs facilitate IT and ITeS companies by providing them with office space at affordable rates with uninterrupted electric power and internet connection. Moreover, IGNITE–National Technology Fund, i.e., a non-profit company owned by the government, has established eight NICs in Peshawar, Karachi, Lahore, Hyderabad, and Quetta, and a special incubator for aerospace in Rawalpindi and agricultural technology in Faisalabad.⁹² These NICs have incubated numerous startups – many of which have successfully graduated, generated more than 100,000 jobs, and received millions of dollars of investment.⁹³ The private sector has also taken some notable initiatives. For instance, private players, including Katalyst Labs, Invest2Innovate, Jazz XLR8, Telenor Velocity, Demo, and Epiphany, have been providing support to startups through their cohort-based accelerator programmes, i.e., mentor-based programmes

⁹⁰ Sami Ullah, Abdul Sami, Tooba Ahmad, and Tariq Mehmood, "Why Choose Technology Parks for Business Locations in Pakistan," *Innovation and Management Review*, <https://doi.org/10.1108/INMR-07-2021-0114>.

⁹¹ Finance Division, *Information Technology and Telecommunication*, 239.

⁹² *Ibid.*, 240.

⁹³ *Ibid.*, 240.

to empower startups.⁹⁴ Some other private players, such as Colabs, Daftarkhwan, The Hive, and Kickstart, offer coworking spaces to freelancers and startup founders.⁹⁵

Fintech and e-Commerce Startup Ecosystem

As discussed earlier, technology-related startups are major drivers of growth in the IT industry. Pakistan's startup ecosystem, predominantly focused on fintech and e-commerce, has flourished in recent years. These domestic startups, particularly in fintech and e-commerce, are rapidly entering the market, gaining widespread popularity, and attracting significant investment. In the 2023 Global Startup Ecosystem Ranking by StartupBlink, which assesses the momentum of startup ecosystems, Pakistan ranked 76th worldwide. It also placed fourth among the Central Asia Regional Economic Cooperation (CAREC) countries and second in South Asia.⁹⁶ The development of an enabling infrastructure, population growth, and the COVID-19 Pandemic primarily underpinned growth of Pakistan's startup ecosystem in recent years.⁹⁷

According to a McKinsey & Company partner, between 2016 and 2018, the Middle Eastern and North African (MENA) startups secured an average of USD 800 million a year in venture capital (VC) funding compared to an average of USD 10 million in Pakistan.⁹⁸ However, since then, Pakistan's startup ecosystem has flourished tremendously, and between 2018 and 2022, the total VC funding to Pakistani startups increased more than twenty-fold, with a majority of the funding received by fintech and e-commerce startups.⁹⁹ In 2022, Pakistani startups were able to attract USD 347

⁹⁴ International Consulting Associated Private Limited and Arthur D. Little, *Study of Assessment of Pakistan's Startup Ecosystem*, report (Islamabad: IGNITE-National Technology Fund, 2023), 23, <https://ignite.org.pk/wp-content/uploads/2018/06/Ignite-Startup-Report.pdf>.

⁹⁵ *Ibid.*, 23.

⁹⁶ Startup Blink, "Startup Ecosystem of Pakistan," Accessed September 8, 2023, <https://www.startupblink.com/startup-ecosystem/pakistan>.

⁹⁷ State Bank of Pakistan, "Special Section: Pakistan's Growing IT Exports and Tech Start-ups: Opportunities and Challenges," 148.

⁹⁸ McKinsey & Company, "What's Fuelling Pakistan's Emerging Startup Ecosystem," May 31, 2022, <https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/whats-fueling-pakistans-emerging-start-up-ecosystem>.

⁹⁹ Alex Irwin-Hunt, "The Rocky Road Ahead of Pakistan's Startup Ecosystem," *fDi Intelligence*, February 22, 2023, <https://www.fdiintelligence.com/content/feature/the-rocky-road-ahead-for-pakistans-startup-ecosystem-81994>.

million in VC funding¹⁰⁰ despite significantly reduced startup funding globally in that year due to the global economic downturn. Of the numerous ventures, three marketplace startups, including Bazaar, Dastgyr, and RetailO, received the largest VC funding, including USD 70 million, USD 37 million, and USD 36 million, respectively.¹⁰¹ Pakistan's thriving startup ecosystem can become one of the primary facilitators of the country's IT industry's growth in the foreseeable future, provided that it is nurtured further and diversified in new domains.

Inclination of Students towards IT-related Degree Programmes

Subjects such as Computer Science and Software Engineering have emerged as two of the most popular study programmes in Pakistan, driven by a rapidly rising demand for IT experts in the job market.¹⁰² As a case in point, a comparison of the five-year closing merit positions for admission in one of Pakistan's top public universities in Engineering and Technology (National University of Sciences and Technology – NUST), shows an increase in the closing merit positions of degree programmes specifically related to IT, which is a testament to rising competition for admission and demand of these degree programmes among prospective students.¹⁰³ In 2018, the closing merit positions for Software Engineering and Computer Engineering at NUST, Rawalpindi, and Computer Science at NUST, Islamabad, stood at 1869, 2342, and 1653, respectively.¹⁰⁴ In 2022, these improved to 963, 1908, and 366, respectively, with the largest jump recorded for Computer Science in absolute terms.¹⁰⁵ In contrast, closing merit positions of many degree programmes that incorporate some IT-focused courses but are not exclusively related to IT, such as Electrical Engineering or

¹⁰⁰ Bilal Hussain, "Pakistan's Startup Funding Recovered in First Quarter of 2023," *Business Recorder*, April 2, 2023, <https://www.brecorder.com/news/40234863>.

¹⁰¹ Zahid Lilani, "List of Pakistani Startups that raised Funding in 2022," *Techshaw*, December 29, 2022, <https://techshaw.com/list-pakistani-startups-funding-2022/>.

¹⁰² Global Village Space, "Software Engineering Emerging as a Popular Field in Pakistan," Accessed September 8, 2023, <https://www.globalvillagespace.com/software-engineering-emerging-as-a-popular-field-in-pakistan/>; UAF Times, "The Scope of Computer Sciences in Pakistan," Accessed September 8, 2023, <https://www.uaftimes.com/the-scope-of-computer-sciences-in-pakistan/>.

¹⁰³ Muhammad Haziq, "NUST Engineering Last Five Year Closing Merit Position," Facebook, July 30, 2023, <https://www.facebook.com/photo/?fbid=236662475989255&set=gm.7231501446865472&id=1688326381183034>.

¹⁰⁴ Ibid.

¹⁰⁵ Ibid.

Mechatronics Engineering, decreased.¹⁰⁶ According to estimates, Pakistan requires an annual supply of 100,000 IT graduates.¹⁰⁷ These graduates, if adequately equipped by universities with in-demand skills and retained within the country, can play a monumental role in fostering the domestic IT industry by providing the required human and intellectual capital.

Penetration of Internet and Smartphones

Internet connectivity and ownership of smartphones are among the major prerequisites determining the scale and pace of supply and demand in the IT industry. Although overall penetration of the internet and smartphones is still not very high in Pakistan, the number of internet users and smartphone owners has been increasing at a modest pace. According to the Pakistan Telecommunication Authority (PTA), the number of overall broadband subscribers in the country reached 194 million in July 2023, compared to 58.7 million between 2017-18, and the number of mobile broadband subscribers reached 126 million, compared to 46.4 million between 2017-18.¹⁰⁸ In parallel, the usage of smartphone handsets has also increased and already surpassed the use of 2G sets in the country.¹⁰⁹ According to the statistics data portal – Statista, Pakistan had the 10th largest number of smartphone users in 2022.¹¹⁰ With the advancement of technology and the ever-increasing need to integrate digital technologies, internet usage and smartphone ownership are projected to keep growing, thus facilitating the country's IT sector growth. However, challenges such as inconsistency of internet services, slow internet speed, and digital divide persist and will have to be decisively tackled to fully capitalise on the opportunity that rising penetration of the internet and smartphones offer. Recently, the IT Ministry under the 2023 interim government took steps in the right direction, including introducing a

¹⁰⁶ Ibid.

¹⁰⁷ Pakistan Software Export Board, *Pakistan's IT Industry Overview*, report (Islamabad: Ministry of Information Technology and Telecommunication, Government of Pakistan, 2020), 25, <https://moitt.gov.pk/SiteImage/Misc/files/Pakistan%27s%20IT%20Industry%20Report-Printer.pdf>.

¹⁰⁸ Pakistan Telecommunication Authority, "Telecom Indicators," Accessed September 8, 2023, <https://www.pta.gov.pk/en/telecom-indicators>.

¹⁰⁹ Pakistan Telecommunication Authority, *Annual Report 2021*, report (Islamabad: Pakistan Telecommunication Authority, 2021), 12, https://www.pta.gov.pk/assets/media/pta_annual_report_2021_01032022.pdf.

¹¹⁰ Statista, "Number of Smartphone Users by Leading Countries in 2022," Accessed September 8, 2023, <https://www.statista.com/statistics/748053/worldwide-top-countries-smartphone-users/>.

national policy for the availability of high-speed internet fibre across Pakistan¹¹¹ and a decision to auction 300MHz of 5G spectrum by mid-2024.¹¹² The policy aims to connect towers via fibre for making data transmission efficient in a 5G environment.¹¹³ Another major initiative is the actualisation of the telecom infrastructure sharing policy that was first outlined in 2015 to improve network coverage.¹¹⁴ It is essential that these initiatives are now carried forward with vigour by the government.

Global Demand for IT Services

One of the lasting legacies of the COVID-19 Pandemic has been realisation of the significance of digital technologies for businesses and the accelerated adoption of digital technologies. At the same time, many individuals and companies continue to rely on hybrid/remote work options and online operations with the productivity-enhancing potential of digital technologies being reported more than ever. As a result, the demand for IT has continued to increase, while IT spending is expected to grow further. The annual State of IT report expects corporate IT spending to grow 6% year-over-year (YoY).¹¹⁵ This growth is also expected to be driven by the ever-increasing security concerns and the need to protect data by adopting emerging cybersecurity technologies.¹¹⁶ Additionally, cloud computing technologies, allowing users to store and share data over the internet, have also been gaining popularity and will help drive demand in the IT industry in the foreseeable future.¹¹⁷ The high demand for IT services serves as an opportunity for countries, including Pakistan, seeking to stimulate or expand their respective IT industries.

¹¹¹ Ghulam Abbas, "Interim Govt Announces Plan to Open 10,000 E-Job Centres," *Profit*, January 10, 2024, <https://profit.pakistantoday.com.pk/2024/01/10/interim-govt-announces-plan-to-open-10000-e-job-centres>.

¹¹² Zafar Bhutta, "5G Services to Begin this August," *Express Tribune*, January 30, 2024, <https://tribune.com.pk/story/2454832/5g-services-to-begin-this-august>.

¹¹³ Abbas, "Interim Govt Announces Plan to Open 10,000 E-Job Centres."

¹¹⁴ Ibid.

¹¹⁵ Spiceworks, "2024 State of IT," Accessed September 8, 2023, <https://www.spiceworks.com/research/state-of-it/>.

¹¹⁶ Ibid.

¹¹⁷ Junaid Hassan, Danish Shehzad, Usman Habib, Muhammad Umar Aftab, Muhammad Ahmad, Ramil Kuleev, and Manuel Mazzara, "The Rise of Cloud Computing: Data Protection, Privacy, and Open Research Challenges – A Systematic Literature Review (SLR)," *Computational Intelligence and Neuroscience*, <https://doi.org/10.1155%2F2022%2F8303504>.

Threats

Competitive Global IT Marketplace

Globally, IT is one of the fastest-growing industries. Its total value stood at USD 8852.41 billion in 2023 and is expected to grow to USD 11995.97 billion in 2027 by recording a CAGR of 7.9%.¹¹⁸ Pakistan will face significant long-term competition in the global IT marketplace like many other countries. The challenge for the country's IT industry is particularly compounded due to multiple intrinsic factors.

First, the drivers of revenue generation in Pakistan's IT industry remain unsustainable to a certain degree (if not completely) due to the concentration of IT exports among a few destination markets, the concentration of IT startups in a few domains, and the disproportionate focus on bespoke software development at the expense of product and platform development that can be scaled to different countries (read section '*Limited portfolio of IT products and types of domestic startups*' and '*Concentration of IT exports among a few destination markets*'). Any significant demand fluctuations and the emergence of a sufficiently large number of competitors can dramatically impact these revenue streams. Second, multiple bottlenecks in the 'ease of doing business' and Pakistan's internal economic instability and security situation threaten the industry's long-term prospects in a competitive global environment. Third, there persists a disparity between the IT industry's needs and the skills taught at the university level in Pakistan, leaving many graduates with inadequate competencies for a rapidly evolving IT sector. Fourth, the IT industry in Pakistan is composed mainly of smaller-sized companies,¹¹⁹ which have a competitive disadvantage over large companies due to their relative lack of capacity, experience, and financial resources, limiting their opportunities to conduct extensive research, such as market and technology research, and invest in new technologies.¹²⁰ Capacity and resource constraints also inhibit smaller-sized companies' ability to obtain big contracts and

¹¹⁸ Global News Wire, "Information Technology Global Market Report 2023."

¹¹⁹ Pakistan Business Council, "Enhancing the Competitiveness of Pakistan's Computer Services Exports," Accessed September 8, 2023, <https://www.pbc.org.pk/research/enhancing-the-competitiveness-of-pakistans-computer-services-exports/>.

¹²⁰ Zahid, Liaqat, Farooq, and Naseer, "Requirement Elicitation Issues and Challenges in Pakistan Software Industry."

handle extensive projects.¹²¹ Without a significant transition towards company mergers or adoption of a collaborative approach for project execution, Pakistan's IT companies may find it challenging to compete internationally in a highly competitive atmosphere.

Brain Drain

The country's IT labour pool has long provided a stable base to support the industry, but recent evidence reveals that the latter has begun to experience human capital constraints.¹²² Although the number of IT graduates is poised to increase with the growing uptake of IT-related subjects in universities (read section '*Growing inclination of students towards IT-related degree programmes*'), the current pace and scale of brain drain, if left unaddressed, can deprive Pakistan of the required pool of human capital. For reference, in 2023, 862,625 Pakistanis left the country¹²³ in search of better economic prospects, of whom 22,760 were highly qualified, 45,687 highly skilled, and 314,932 skilled, according to the Bureau of Emigration and Overseas Employment (BE&OE).¹²⁴ Previously, in 2022, nearly 832,339 individuals migrated out.¹²⁵ This was the third-highest number recorded in Pakistan since 1971 and the highest since 2016.¹²⁶ Of these 832,339 Pakistanis, 17,976 were highly qualified, 20,865 highly skilled, and 347,733 skilled.¹²⁷ The IT sector has also been reported to have received a setback from this fast-paced brain drain.¹²⁸ While the country's uncertain economic conditions primarily drive present migration trends, various other factors have been identified and attributed to the high turnover intention in Pakistan's IT industry,

¹²¹ Pakistan Business Council, "Enhancing the Competitiveness of Pakistan's Computer Services Exports."

¹²² State Bank of Pakistan, "Special Section: Pakistan's Growing IT Exports and Tech Start-ups: Opportunities and Challenges," 150.

¹²³ Bureau of Emigration and Overseas Employment, "Graph Showing the Number of Emigrants over the Years 1971 to 2023 (December)," Accessed January 23, 2024, <https://beoe.gov.pk/reports-and-statistics>.

¹²⁴ Bureau of Emigration and Overseas Employment, "Statement Showing the number of Pakistani Workers Registered for Employment Abroad during the Period 1971-2023," Accessed January 23, 2024, <https://beoe.gov.pk/files/statistics/2024/occupation.pdf>.

¹²⁵ Bureau of Emigration and Overseas Employment, "Graph Showing the Number of Emigrants over the Years 1971 to 2023 (August)."

¹²⁶ Bureau of Emigration and Overseas Employment, "Statement Showing the Number of Pakistani Workers Registered for Employment Abroad during the Period 1971-2023 (up to August)."

¹²⁷ Ibid.

¹²⁸ Shahram Haq, "IT Sector Grappling with Brain Drain," *Express Tribune*, September 23, 2023, <https://tribune.com.pk/story/2437349/it-sector-grappling-with-brain-drain>.

potentially contributing to the emigration of IT professionals from the country. These include, for instance, lack of focus on performance and career management in organisations, lack of team and management support, lack of salary and compensation plans, or lack of proper recognition and reward system.¹²⁹ If left unaddressed, brain drain can adversely affect growth prospects of the IT industry.

Policy Inconsistency

Policy inconsistency is one of the major issues faced by Pakistan's IT industry. A particular example is the inconsistency in tax treatment of the IT sector. The GoP, in FY21-22, as part of negotiations with the International Monetary Fund (IMF), withdrew tax exemptions that had been granted to the IT sector,¹³⁰ which were earlier agreed to be applicable till 30 June 2025.¹³¹ This was replaced by a tax credit regime, under which a 100% tax credit on annual income and withholding tax was made available to the IT and ITeS companies providing export services, provided that they met the eligibility criteria of an IT company.¹³² The new regime is supposed to be applicable until 30 June 2025.¹³³ However, under the 2022-2023 budget, the tax credit regime remained intact for startups, but was replaced by the final tax regime for IT companies, under which a reduced income tax of 0.25% on export proceeds of IT and ITeS was agreed for PSEB registered companies.¹³⁴ These drastic policy changes had a discouraging impact on domestic and international companies.¹³⁵ Previously, in 2016, 40% of IT companies were reported to have moved their businesses to the United Arab Emirates (UAE) after the government announced an 8% additional tax on revenues generated by the IT industry.¹³⁶

¹²⁹ Hassan Farooq, Uzair Iqbal Janjua, Tahir Mustafa Madni, Abdul Waheed, Mahdi Zareei, and Faisal Alanazi, "Identification and Analysis of Factors Influencing Turnover Intention of Pakistani IT Professionals: An Empirical Study," *IEEE Explore* 10, (2022): 64234-64256, <https://ieeexplore.ieee.org/document/9792236/authors#authors>.

¹³⁰ Ali Ahmed, "Withdrawal of Tax Exemptions to Take Toll on Trade & Industry, says Experts," *Business Recorder*, April 5, 2023, <https://www.brecorder.com/news/40080996>.

¹³¹ Zainab and Leeza, *Tax Analysis: Mapping Cost of Doing Business for IT and ITeS Companies*, 28.

¹³² *Ibid.*, 20.

¹³³ *Ibid.*, 28.

¹³⁴ *Ibid.*, 23-25.

¹³⁵ *Ibid.*, 28.

¹³⁶ Shahram Haq, "IT Companies Relocating as Pakistan gets Tax-Hungry," *Express Tribune*, January 16, 2016, <https://tribune.com.pk/story/1028708/it-companies-relocating-as-pakistan-gets-tax-hungry>.

As another case in point, the government in May 2022 announced a ban on the import of non-essential items, also including IT-related accessories, under the 'Emergency Economic Plan'.¹³⁷ Although later withdrawn, the import ban was reported to have affected IT exports and performance of freelancers.¹³⁸ The precedence of a lack of policy continuity creates uncertainty for local and international companies, posing risks to the future growth prospects of Pakistan's IT industry.

Growing Cyber Threat Landscape

The cyber threat landscape has widened as data-driven disruptive technologies proliferate and digitalisation progresses. In Pakistan, the usage of foreign IT products also offers a gateway to hostile forces to interfere in the IT sector.¹³⁹ Although Pakistan's cybersecurity ecosystem has witnessed major advancements, such as approval of the 'National Cyber Security Policy 2021',¹⁴⁰ 'e-safety Bill 2023', or 'Data Protection Bill 2023',¹⁴¹ some essential components of a robust cybersecurity infrastructure remain absent.¹⁴² These missing components include, for instance, a national cybersecurity agency, national cybersecurity standards/guidelines, a cyber threat intelligence agency, or a national cybersecurity coordinator.¹⁴³ Additionally, despite the existence of cybercrime laws, Pakistan's legal system remains ill-equipped to deal with cybercrime-related cases due to the absence of courts or judges exclusively designated to handle cybercrimes. This not only weakens any potential cyber incident response mechanism in the IT sector or elsewhere but also undermines Pakistan's image as a conducive IT business locale.

¹³⁷ Sohail Sarfraz, "Import Ban to Hit IT Sector: Smuggling, Use of Informal Channels to get a Boost: PCA," *Business Recorder*, May 24, 2022, <https://www.brecorder.com/news/40175196>.

¹³⁸ Kaibe Ali, "Rising Costs, Connectivity Outages - A Tough Year for the IT Sector," *Dawn*, January 1, 2023, <https://www.dawn.com/news/1729313>.

¹³⁹ Rana Ghulam Qadir, "Govt Warns Against Use of Indian IT, AI Products," *News International*, September 20, 2023, <https://www.thenews.com.pk/print/1111534-govt-warns-against-use-of-indian-it-ai-products>.

¹⁴⁰ Shahrukh Khan, "Cyber Security Challenges in Pakistan: An Assessment," *Science Diplomacy Perspectives*, Inaugural Issue (2022): 78-89, https://www.researchgate.net/publication/360256123_Cyber_Security_Challenges_in_Pakistan_An_Assessment.

¹⁴¹ "Cabinet Approves Personal Data Protection Bills 2023," *Dawn*, July 27, 2023, <https://www.nation.com.pk/27-Jul-2023/cabinet-approves-personal-data-protection-bills-2023>.

¹⁴² Khan, "Cyber Security Challenges in Pakistan: An Assessment," 79.

¹⁴³ *Ibid.*, 79.

Discussion

The SWOT analysis has identified a young demographic base, financial attractiveness for offshore outsourcing of IT services, and a sizable freelancing industry due to factors such as population's strong English-language skills or a flexible workforce as major strengths of Pakistan's IT industry. The concentration of IT exports to a few destination markets, a limited portfolio of IT products and types of domestic startups, supply and demand mismatch of skills, gaps in meaningful access to the internet and the digital divide, bottlenecks in 'ease of doing business,' and inadequate employment of requirement engineering process in the software industry have been identified as the major weaknesses of Pakistan's IT industry. The literature on Resource-Based View (RBV) of strategy or the Resource-Based Theory implies that the performance of an entity depends on exploiting strengths and neutralising weaknesses.¹⁴⁴ According to some scholars, a robust advantage occurs when the set of strengths is vastly superior to the set of weaknesses.¹⁴⁵ Drawing on this perspective, for Pakistan to capitalise fully on the potential of its IT industry, it will be imperative to build on the strengths but, equally important, to address and overcome the weaknesses. The present analysis has shown that while certain factors provide the country's IT sector with a market edge, there are also a substantial number of gaps and shortcomings, potentially undermining optimal contribution to valuable assets and positive competencies. For instance, Pakistan's reservoir of youth is an invaluable asset for its IT industry. However, the potential of this youth may remain underutilised until the gaps in meaningful access to the internet and the digital divide are addressed, and the students pursuing IT-related degree programmes are provided with skills that align with the industry's demands.

Additionally, the analysis has identified multiple opportunities for Pakistan's IT industry, including establishment of an enabling infrastructure for the IT sector, a thriving fintech and e-commerce startup ecosystem, growing inclination of students towards IT-related degree programmes due to rising demand for IT experts in the job

¹⁴⁴ Bartleby Research, "Strengths and Weaknesses of Resource Based Model," Accessed January 25, 2024, <https://www.bartleby.com/essay/Strengths-And-Weaknesses-Of-Resource-Based-Model-FCQ6S27NR>.

¹⁴⁵ Sirmon, Hitt, Arregle, and Campbell, "The Dynamic Interplay of Capability Strengths and Weaknesses: Investigating the Bases of Temporary Competitive Advantage," 1393.

market, rising penetration of internet and smartphones, and increasing global demand for IT services. A competitive global IT marketplace, brain drain, policy inconsistency, and an ever-evolving cyber threat landscape have been identified as the major threats facing the industry. The theory of dynamic capability suggests that it will be imperative to seize these opportunities and mitigate these threats for the country's IT sector to yield sustained positive performance outcomes and augment strengths over time. It is worth noting that in the context of Pakistan's IT industry, leveraging opportunities is contingent on addressing weaknesses. For instance, the rising popularity of study programmes, such as Computer Science and Software Engineering, is an opportunity for Pakistan's IT sector to be leveraged by increasing academia-industry collaboration to address the supply and demand side mismatch of skills. Likewise, increasing penetration of the internet and smartphones is an opportunity for the industry to be leveraged by addressing gaps in meaningful access to the internet and reducing the digital divide.

However, besides the identified set of opportunities and challenges, new challenges and opportunities will continue to emerge for the IT industry in a world characterised by constant change and innovation. Pakistan will require a continuous and proactive commitment to identifying and leveraging opportunities as well as predicting and mitigating the threats. Sustained competitiveness will depend on the ability to build and reconfigure competencies to tackle the evolving environments.

Policy Recommendations

The section below (Figure 1) provides policy recommendations to address the weaknesses and mitigate threats to foster growth prospects of Pakistan's IT industry. Recommendations have been outlined along with the relevant weaknesses/threats:

Figure 1: Policy Focus Overview

Weaknesses/ Threats	Recommendations
<p><i>Concentration of IT exports to a few destination markets</i></p>	<ul style="list-style-type: none"> • The PSEB, Pakistan's IT industry association, and relevant ministries and divisions (Ministry of Information Technology and Telecommunication (MoITT), Commerce/ Division) should collaborate and engage the diaspora community, commercial counsellors, or global expansion consultants/market research firms to conduct comprehensive market research to develop strategies for expanding into new territories. • The diaspora community, commercial counsellors, media, or public relations firms should be taken on board to expand the marketing reach of Pakistani IT products, technologies, and systems in untapped high-potential markets, while sustained investment should be made to develop a competitive edge and increase the attractiveness of Pakistani IT products and technologies in the global market. • Academia/research institutes and startup businesses should be encouraged and incentivised (e.g., through multiplier grant schemes) to collaborate for research and development (R&D) for startup innovations in new trending domains.
<p><i>Limited types of domestic IT startups</i></p>	<ul style="list-style-type: none"> • Additional incentives and government or private sector support mechanisms (e.g., facilitating collaboration with international startup ecosystems, providing mentorship, etc.) should be offered to entrepreneurs and startup businesses that innovate/intend to innovate in new startup domains that are in high demand but have not been explored enough. In a welcome development, the IT Ministry, under the interim government, recently introduced a Pakistan startup fund (a USD two billion initiative) that is to be managed by Ignite. It should focus on supporting such startups. • Like-minded startup businesses and entrepreneurs should be encouraged and incentivised (e.g., through grants/reimbursable grants, regulatory support, etc.) to collaborate for successful startup innovations in new trending domains.

Weaknesses/ Threats	Recommendations
<p>Limited portfolio of IT products</p>	<ul style="list-style-type: none"> • Along with the bespoke software development projects, individual IT companies should also be encouraged to increase the development of products and platforms that can be scaled to different countries and can be offered capacity-building programmes by the private sector or government bodies/organisations (e.g., MoITT, PSEB) to pursue this path. • The PSEB, Pakistan's IT industry association and relevant ministries should collaborate and engage market research firms to explore market opportunities for increasing the development of products and platforms that can be scaled to different countries/made available to a wide range of users.
<p>Skills mismatch</p>	<ul style="list-style-type: none"> • A detailed survey of the IT industry's skills requirements should be conducted periodically by the relevant government or private sector bodies and disseminated among universities. Alternatively, universities can take the lead in organising periodic skills surveys by engaging the IT industry and disseminating the results among concerned stakeholders. • Universities can engage IT industry leaders while developing/updating curricula and maximise students' exposure to the IT industry during study years, while prioritising practical learning. • For upskilling/reskilling the large pool of existing human capital, the scale of the current skill development programmes by the PSEB, such as the IT industry readiness bootcamp programme, the IT industry-academia bridge programme, or the ICT internship programme, should be expanded. At the same time, regular trainings should be organised for lecturers.
<p>Gaps in meaningful access to the internet and the digital divide</p>	<ul style="list-style-type: none"> • The MoITT, Pakistan Telecommunication Authority (PTA), and cellular/broadband companies should collaborate and make determined efforts to increase investment in telecom infrastructure, make arrangements for infrastructure sharing, install more submarine cables for meeting increasing demand, add more spectrums for internet use, and invest in optic fibre to increase fibre connectivity. • The option of intentional internet blockage should only be considered during situations of extreme necessity, particularly for national security reasons. • The MoITT should engage local bodies/organisations to address the digital illiteracy divide in their respective areas by developing tailored strategies according to the needs of their respective communities.

Weaknesses/ Threats	Recommendations
<p><i>Bottlenecks in ease of doing business</i></p>	<ul style="list-style-type: none"> • Regulatory bodies should be digitalised to fast-track regulatory approvals, and the regulatory/administrative processes for licences, permits, trade, and custom approvals should be simplified and minimised. • The procedures for availing tax incentives should be simplified and fast-tracked. • Special mechanisms/strategies should be developed by the Finance Division to increase access of IT businesses/startups to non-collateralised loans. • Continuous efforts should be made to bring companies like PayPal to Pakistan and address loopholes in the system that have deterred the extension of their services to the country.
<p><i>Inadequate employment of Requirements Engineering (RE) processes</i></p>	<ul style="list-style-type: none"> • Industries should be encouraged to collaborate and share best RE practices with one another.
<p><i>Competitive global IT marketplace</i></p>	<ul style="list-style-type: none"> • Like-minded smaller-sized IT companies should be encouraged and incentivised (e.g., electricity subsidies, regulatory support, export assistance, etc.) to adopt a collaborative approach (or opt for mergers) to create more opportunities and target more substantial projects in a competitive global IT marketplace. • The IT industry should invest in diversifying startup domains, destination markets for exports, and developing products and platforms that can be scaled to different countries to make the revenue stream more sustainable. • The diaspora community, commercial counsellors, media, or public relations firms should be taken on board to expand the marketing reach of Pakistani IT products, technologies, and systems in the global market, while sustained investment should be made to develop a competitive edge and increase the attractiveness of Pakistani IT products and technologies in the global market.
<p><i>Brain drain</i></p>	<ul style="list-style-type: none"> • The supply and demand side mismatch of skills should be addressed to increase employability of IT graduates in the domestic IT industry. • Individual IT companies should investigate (on a regular basis) the organisation-specific factors contributing to employee turnover and address them accordingly.

Weaknesses/ Threats	Recommendations
<i>Policy inconsistency</i>	<ul style="list-style-type: none">• Policy continuity should be ensured for the IT sector (except for meaningful changes required to incentivise Pakistan's IT industry or the extremely unavoidable policy changes). The industry stakeholders should be taken on board while planning policy changes.• The government should regularly engage with the IT industry to address the trust deficit due to the precedence of a lack of policy consistency, especially regarding tax treatment of the sector.
<i>Evolving cyber threat landscape</i>	<ul style="list-style-type: none">• The IT businesses should be strongly discouraged to utilise foreign IT products from states that pose the biggest cyber threats.• Determined efforts should be made to strengthen Pakistan's cybersecurity ecosystem.• Specialised courts to deal with cyber crime related matters should be established.

Conclusion

Globally, the IT industry has been recording impressive growth, making it one of the largest industries in the world. Likewise, in Pakistan, the IT sector has emerged as one of the promising economic sectors, playing an essential role in the country's economic growth and development. Notwithstanding this, Pakistan's IT industry is still in its infancy, as it faces myriad challenges that have kept the country from optimising this industry's potential and increasing its competitiveness within the global IT market. This study was, therefore, undertaken to assess the strengths of Pakistan's IT industry and explore shortcomings that must be addressed, opportunities that can be leveraged, and threats that ought to be mitigated to develop and nurture it further. The study has concluded that factors such as Pakistan's large freelancing industry and financial attractiveness for offshore outsourcing of IT services provide the sector with a market edge. However, the government needs to improve meaningful access to the internet and reduce the digital divide, and leverage opportunities, such as increased global demand for IT services, and mitigate the threats facing the IT sector, such as the rapid surge in brain drain.

Multiple stakeholders will have to collaborate and decisively act to strengthen Pakistan's IT industry further, catch up in economic development, and become a knowledge economy. Relevant stakeholders, for instance, include the PSEB, Pakistan's IT industry association, IT industry leaders, IT companies, relevant ministries, and divisions, such as the Ministry of Information Technology and Telecommunication (MoITT) and Commerce/Finance Division, media, or public relations firms, commercial counsellors, market research firms, Pakistan Telecommunication Authority (PTA), academia/research institutes, and cellular/broadband companies. Practical measures should range from developing strategies for expanding into new territories and exploring new market opportunities to ensuring policy continuity for the IT sector and strengthening the country's cybersecurity ecosystem. As a prerequisite, a detailed and practical strategy must be formulated for materialising a successful collaboration among multiple stakeholders to achieve the desired goals.

Appendix

Findings of the SWOT analysis have been summarised in Table 1:

SWOT Analysis of Pakistan's IT Industry

Strengths (S)	Weaknesses (W)
<ul style="list-style-type: none"> • Young demographic base • Large freelancing industry <ul style="list-style-type: none"> ○ Population's strong English-language skills ○ Cost-effective labour force ○ Adaptable and flexible workforce ○ Growing youth population • Financial attractiveness for offshore outsourcing of IT services <ul style="list-style-type: none"> ○ Cost-effective labour force 	<ul style="list-style-type: none"> • Concentration of IT exports among a few destination markets • Limited portfolio of IT products and types of domestic startups • Skills mismatch • Gaps in meaningful access to the internet and the digital divide <ul style="list-style-type: none"> ○ Slow internet speeds ○ Lack of consistency in internet services ○ Unavailability of internet services in remote areas ○ Gender digital divide in smartphone ownership and internet access ○ Digital literacy divide • Bottlenecks in 'ease of doing business' <ul style="list-style-type: none"> ○ Burdensome regulatory procedures ○ Unavailability of more services like PayPal ○ Inadequate access to credit/finance ○ Procedural challenges in acquiring tax exemption certificates • Inadequate employment of Requirements Engineering process

Opportunities (O)	Threats (T)
<ul style="list-style-type: none">• Enabling infrastructure<ul style="list-style-type: none">○ Establishment of Software Technology Parks and Incubation Centres• Thriving fintech and e-commerce startup ecosystem• Growing inclination of students towards IT-related degree programmes<ul style="list-style-type: none">○ Rising demand for IT experts in the domestic job market• Rising penetration of internet and smartphones• Increasing global demand for IT services	<ul style="list-style-type: none">• Competitive global IT marketplace<ul style="list-style-type: none">○ Limited portfolio of Pakistani IT products and types of domestic startups, concentration of IT exports among a few destination markets○ Inadequate number of large companies• Brain drain• Policy inconsistency• Evolving cyber threat landscape

Source: Author's compilation.

ABOUT THE AUTHOR



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