



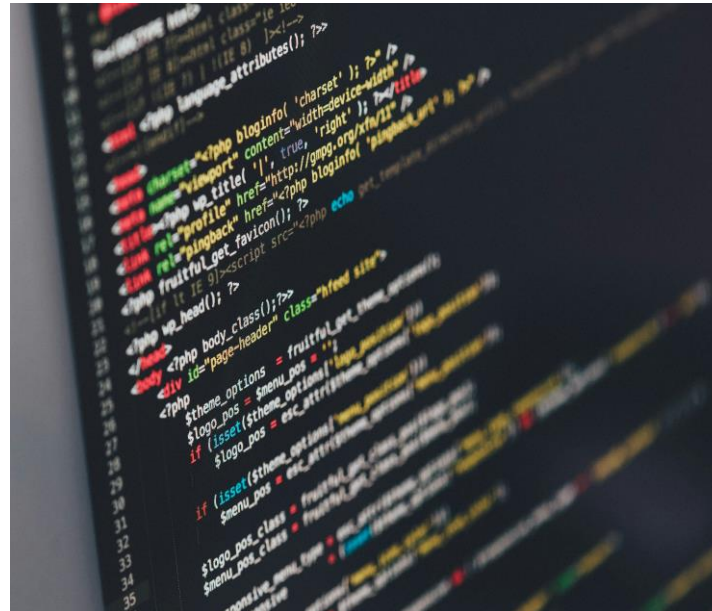
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# Technology

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## Introduction

- Technology is defined as the application of scientific knowledge for practical purposes. The world has progressed at a rapid pace in terms of technological advancements in various fields such as engineering, medicine, communication and manufacturing.
- The technology sector encompasses category of businesses involved in research, development, or distribution of technologically based goods and services. Some examples include manufacturing of electronics, development of software, computers, or other products and services related to information technology and industrial automation.
- The sector caters needs of all businesses (B2B and B2C) including both consumer-centric and technology services. Producers of consumer goods such as computers, mobile devices, home appliances and televisions etc. are continuously aiming to develop new and more technologically advanced features in order to attract customers.
- For businesses (mainly industrial manufacturing), advancements in technology enables them to achieve better quality and higher efficiency. This encompasses industrial and systems automation, software development and communication systems etc. A key aspect of this technology is that it often provides critical information and services that enable businesses to make key strategic decisions. It is also vital for businesses to maintain up to date technology in comparison to their competitors or they may find themselves at a disadvantage or even becoming non-competitive.
- This sector study will particularly focus on systems automation and software segments of the technology sector.

## Automation & Process Control

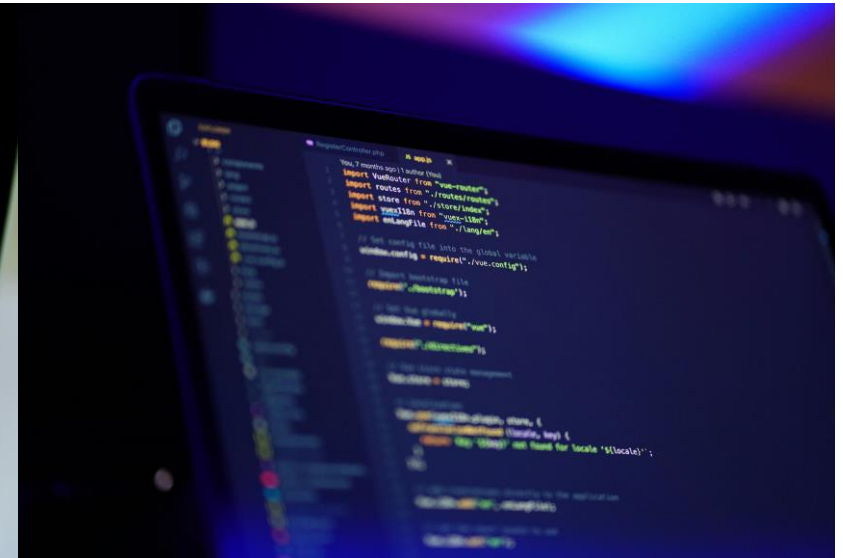
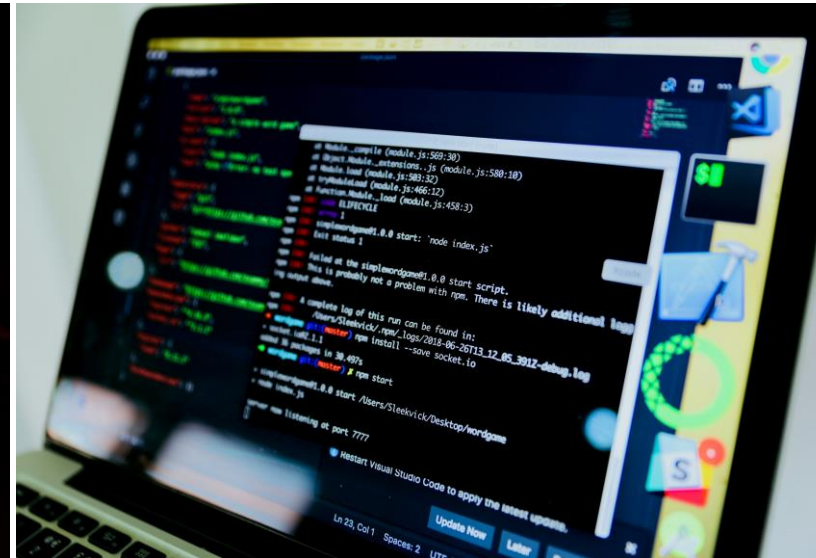
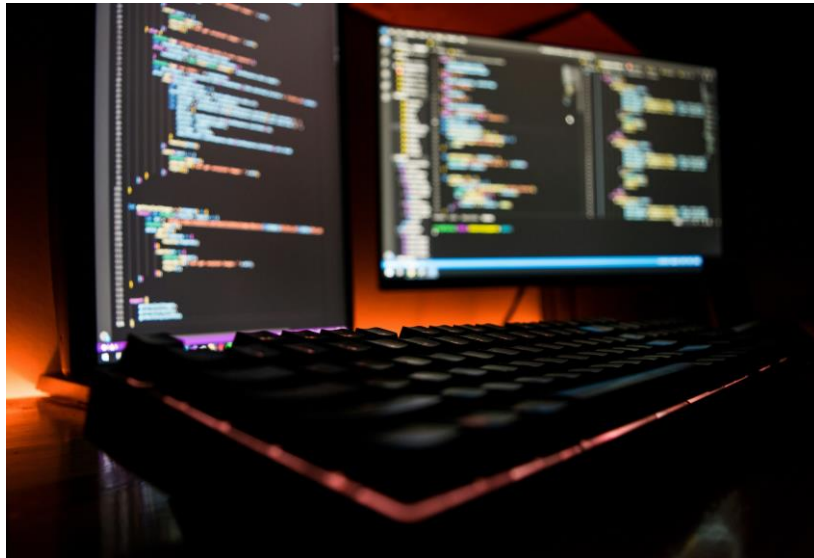
- Automation and process control is used in industrial settings to control the conditions in which a product is made through technology. The use of automation and process control in industrial setting allows the advanced systems to make required adjustments within established parameters. It relies on specialized control systems that manage the flow, output and other aspects of an industrial process based on feedback obtained from sensors and data monitoring systems.
- The main advantage of implementing automation and process control is increased efficiency and better quality. Automation and process control minimizes human intervention beyond the monitoring of each system. As a result, steps that would otherwise be time-consuming can be carried out swiftly by the automated system while reducing chances of human error, thus reducing wastages or redundancies. In addition, it also enables repetitive tasks or operations to be carried out efficiently while ensuring compliance with required standards is strictly observed.
- Process control is typically implemented in industries where continuous production occurs. Some examples are:
  - **Pharmaceuticals:** Extreme precision is required when producing medicines as there is no room for even minor errors. Therefore, automation and process control is used to minimize human error and guarantee the safety of medicines produced.
  - **Petrochemicals:** Process control can be used to closely monitor the refining and production process to ensure consistent quality and uninterrupted production.
  - **Food & Beverage:** The food and beverage industry must comply with specific health standards and process control can be used to monitor and adjust the ingredients or required temperature to ensure a high quality output.
  - **Energy:** These systems are used to control power production ensuring adequate supply while monitoring fuel levels, temperature etc. In addition, they are also used to control pressure in oil and gas pipelines to ensure safety and continuous supply.

# Technology

## Software

Software can be defined as a set of instructions or programs that enable a computer to execute specific tasks. It is a generic term used to describe programs that run on PCs, mobile devices and other smart devices. It includes operating systems, diagnostic tools and a variety of applications. There are three basic categories of software:

- i. **Programming Software:** A set of tools to aid developers in writing programs. The various tools available are compilers, linkers, debuggers, interpreters and text editors.
- ii. **System Software:** Serves as a base for application software. System software includes device drivers, operating systems (OSs), compilers, disk formatters, text editors and utilities helping the computer to operate more efficiently.
- iii. **Application Software:** Intended to perform certain tasks. Examples of application software include office suites, gaming applications, database systems and educational software.

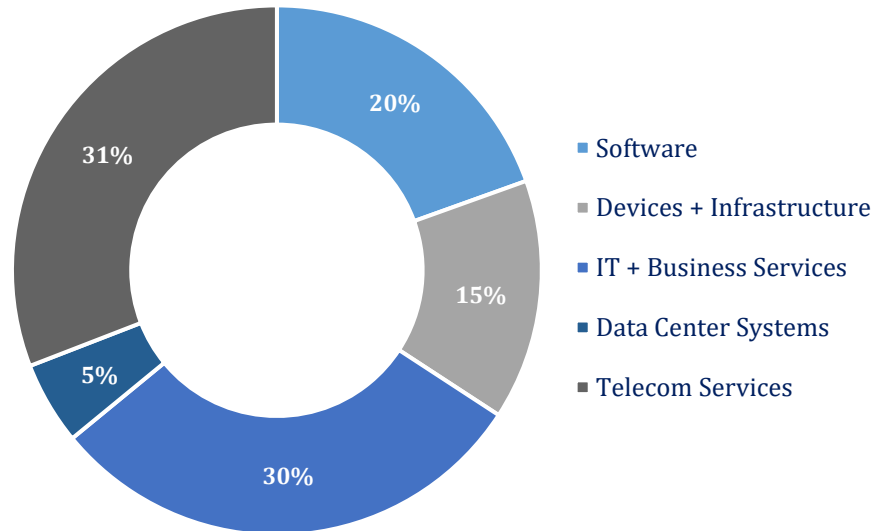


# Technology

## Global | Overview

- The global market size of technology sector (encompassing hardware, software, services and telecommunication), in terms of research and development spending, stood at USD~4.7tln in CY23, growing ~3.5% YoY. The sector is forecast to reach annual growth rate of ~8.0%, with market size reaching USD~5.1tln in CY24. Due to easing inflation, technology companies are expected to invest more in automation to increase operational efficiency as inflation effect on both consumer and business plagued the computer devices market throughout CY22 and CY23, computer related devices spending is expected to rebound modestly in CY24.
- Globally, the sector is led by the USA with a market share of ~36% (USD~1.7tln, in terms of total technology spending). 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) represents ~11% share in the global technology spending.

**R&D Spending-wise Key Segments | Technology (CY23)**



**Top 5 Global Companies | By Market Capitalization**

Company Name	Market Cap (May'23)	Market Cap (May'24)
Microsoft	2,370	3,123
Apple	2,996	2,911
NVIDIA	760	2,274
Alphabet (Google)	1,570	2,181
Amazon	1,193	1,922
<b>Total</b>	<b>8,889</b>	<b>12,411</b>

# Technology

## Local | Overview

- Pakistan's technology sector contributed ~1.7% to country's GDP in FY23 (SPLY: ~1.9%), with market size recording at PKR~1,320bln in FY23, an uptick of ~7.3% YoY. In 9MFY24, sector's market size recorded growth of ~10.5% YoY.
- During FY23, exports of overall computer services remained stable at USD~2.1bln (FY22: USD~2.1bln). Software exports and Automation & Process exports registered YoY growth rates of ~-0.2% and ~0.6% during the year. In 9MFY24, these recorded growth rates of ~6.0% and ~46.0% YoY, while overall computer services exports registered ~19.9% YoY growth.
- As of FY23, the sector comprises over ~12,000 companies, with these companies operating in a wide array of areas such as customized software development and Business Process Outsourcing (BPO) services. Moreover, the number of Information Technology (IT) professionals and graduates per year recorded at ~600,000 and ~25,000, respectively, during the same period.
- The MoITT, through bodies such as the PSEB, has taken various steps such as the establishment of Information Technology (IT) Parks and incubators to provide an enabling ecosystem for technology-related businesses.
- Further, PSEB-registered companies are allowed to pay only ~0.25% tax on exports proceeds of IT sector. In Oct'23, the SBP increased the permissible retention limit of IT exporters from ~35% to ~50% of their export proceeds in Exporters' Specialized Foreign Currency Accounts (ESFCAs).

Particulars	FY22	FY23	9MFY24
<b>Est. Market Size   PKR bln</b>	1,230	1,320	1,083
<b>Contribution to GDP (%)</b>	1.9%	1.7%	1.5%
<b>Automation &amp; Process Control Exports (USD mln)</b>	747	752	802
<b>Software Exports (USD mln)</b>	1,361	1,358	1,078
<b>Automation &amp; Process Exports   Growth (YoY)</b>	7.5%	0.6%	46.0%
<b>Software Exports   Growth (YoY)</b>	40.1%	-0.2%	6.0%
<b>Average Exchange Rate (USD/PKR)</b>	177.9	244.6	284.7
<b>Registered Technology Companies (No.)</b>	2,338	2,507	
<b>Regulator</b>	Ministry of Information Technology & Telecommunication (MoITT), Pakistan Software Export Board (PSEB)		
<b>Association</b>	Pakistan Software Houses Association		

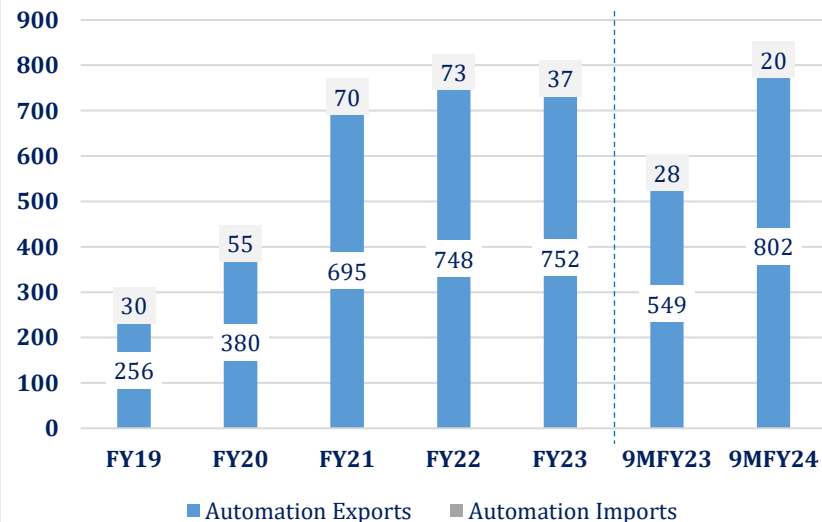
*Note: Market Size pertains to Information and Communication sector as classified under Services segment of the economy. No. of registered companies in 9MFY24 is assumed to be the same as of FY23, due to data limitation.*

# Technology

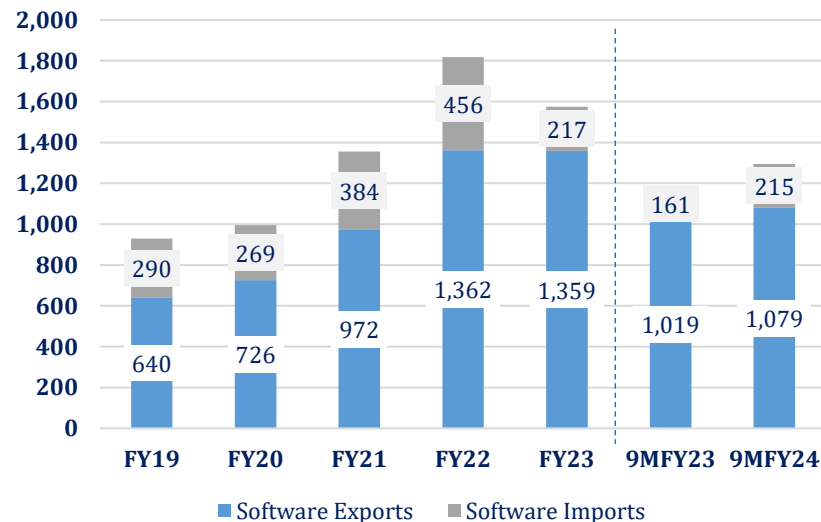
## Local | Automation, Process and Software Trade

- The country's computer services exports comprise automation & process as well as software services. Overall computer services exports exhibited a CAGR of ~19.0% (FY19-23), recording at USD~2,111mln during FY23, a marginal uptick of ~0.1% YoY. Over the same period, software services comprised ~63.0% of total computer services exports, on average, while the rest included automation and process services.
- During FY23, software exports comprised ~57.0%, while automation & process made up the rest (SPLY: ~64.0% and ~36.0%, respectively). During the year, software services exports were down ~0.2% YoY, while those for automation and process services were up ~0.6% YoY. During 9MFY24, software exports were up ~6.0% YoY while those for automation & process recorded ~46.1% growth YoY.
- Meanwhile, imports of computer services have exhibited CAGR of ~-4.5% during FY19-23 and were registered at USD~254bln in FY23, registering YoY downtick of ~52.0%. In 9MFY24, these recorded growth of ~24.4% YoY. Segment-wise, imports for automation & process services were down ~26.5% YoY, while those for software services grew ~33% YoY.

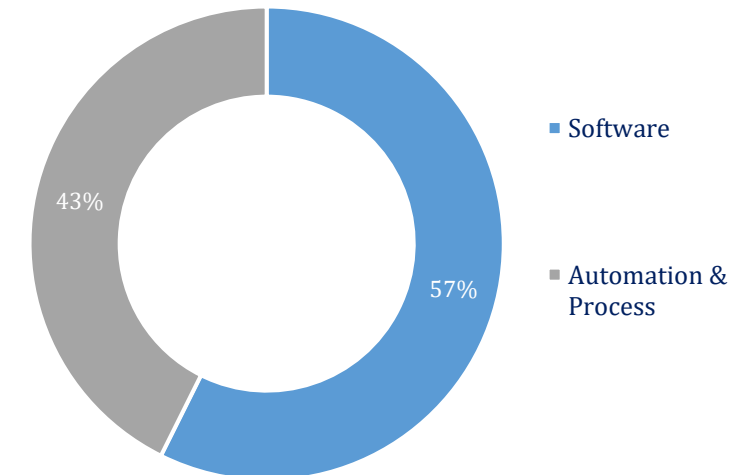
**Automation & Process Services (USD bln)**



**Software Services (USD bln)**



**Computer Services Exports | Breakdown (9MFY24)**

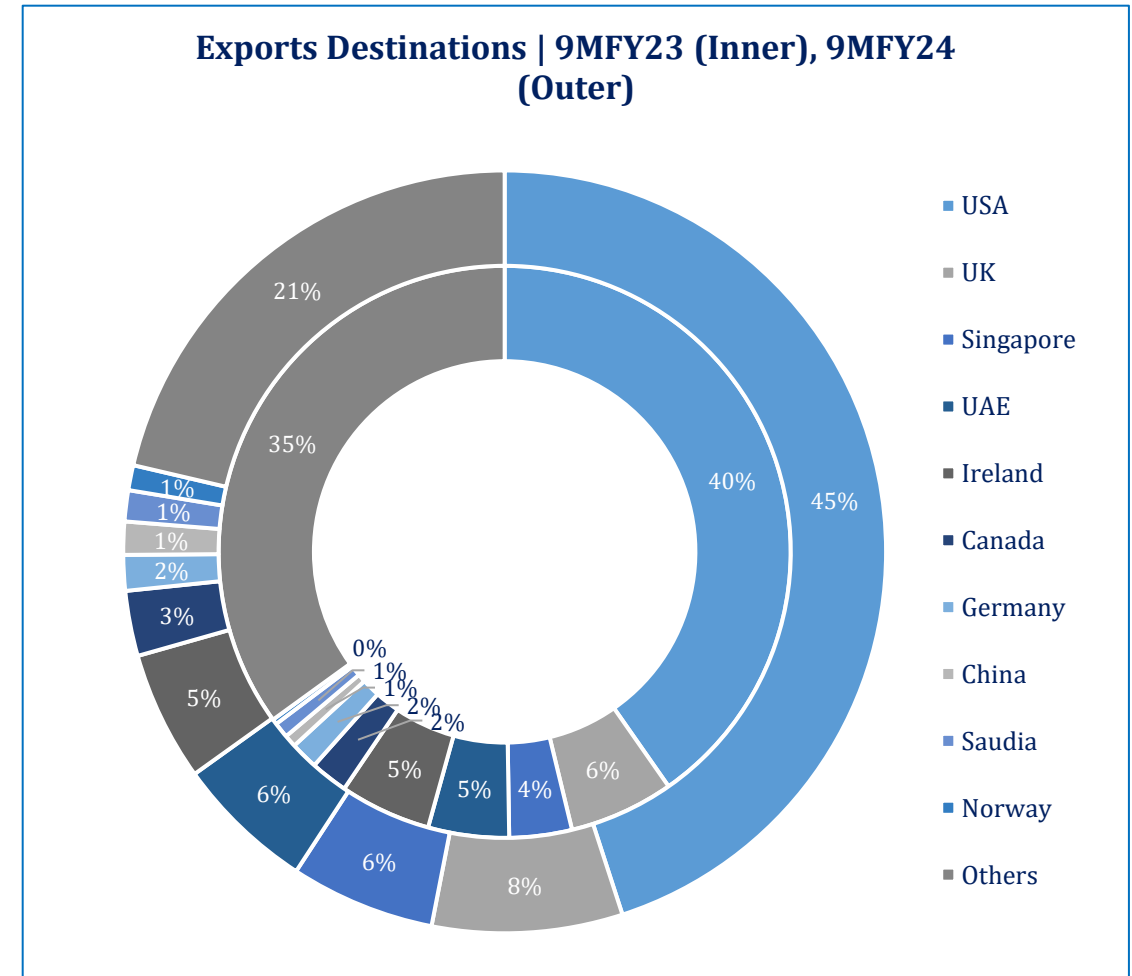




# Technology

## Local | Export Destinations

- During FY23, country's overall computer services exports clocked in at USD~2,605bln (SPLY: USD~2,619bln), recording ~0.5% YoY decline due to economic slowdown in major export countries demand for Pakistan technology sector remained low. These constituted ~35.0% of country's total services exports in USD terms during FY23 (SPLY: 33%).
- The USA was the top destination for computer services exports, with export value amounting to USD~1,416bln during FY23 (FY22 USD~1,493bln), ~5.1% decline YoY. Export value in the case of UK clocked in at USD~200bln during FY23, recording ~7.4% decline YoY.
- In 9MFY24, the USA remained the top destination for exports (same as FY23) with exports value recording at USD~1,172bln, an uptick of ~11.0% YoY, followed by the UK, where exports value amounted to USD~210bln during the period, ~35.5% YoY increase.



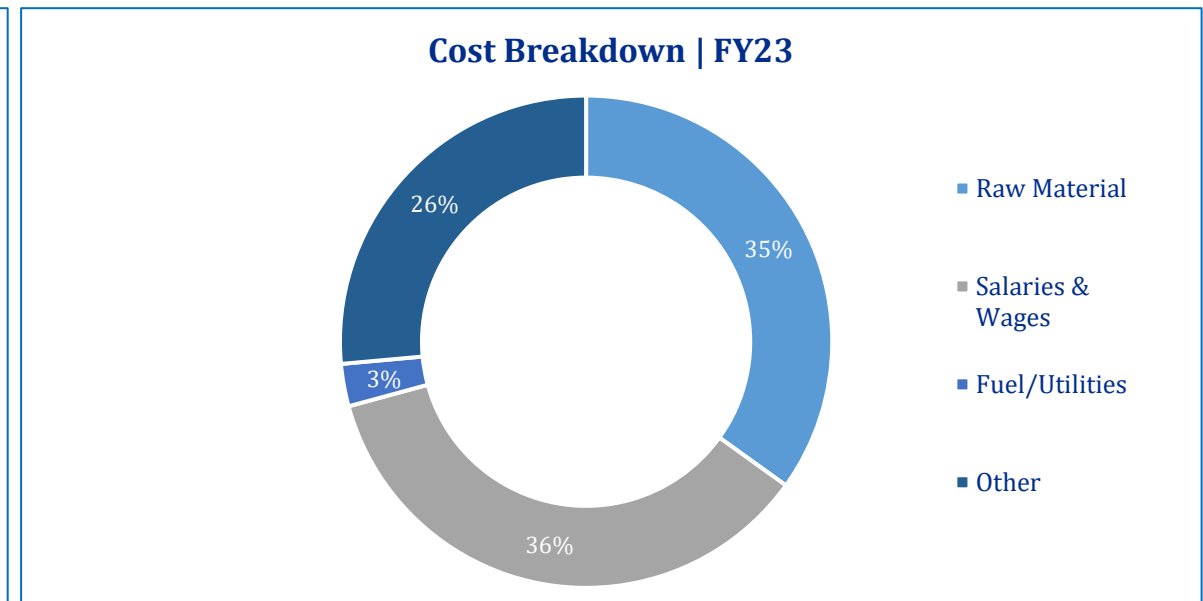
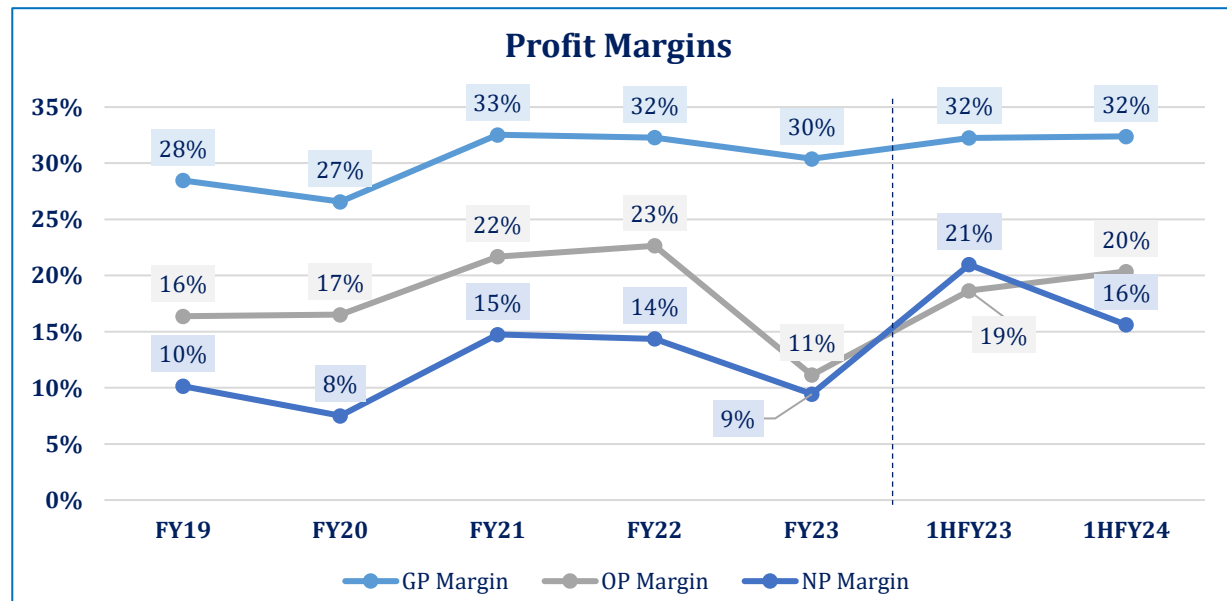
## Business Risk

- **Fast-paced Growth:** The technology sector is among the fastest-growing industries worldwide and new developments and technologies are continuously being introduced. Local players must keep up pace with new and relevant upgradations in technology or they may lose competitive advantage/ risk becoming obsolete in the long run.
- **B2B Model:** Since many players within the technology sector are involved in providing services to other businesses, their demand depends on conditions in these client industries. If the overall economy, or any client industry or sector is not doing well, it would hamper the creation of new demand for technology players providing services.
- **Digital Literacy:** Mobile phone usage in Pakistan has increased exponentially in recent years and has resulted in increased digital literacy among the population. During FY19-22, the number of mobile subscribers recorded an increasing trend, however, the number of mobile subscribers was down ~1.9% in FY23 and stood at ~190.9mln (FY22: ~194.6). During 10MFY24, the number of mobile subscribers picked up pace and stood at ~191.5mln though still ~1.2% lower than SPLY.
- **Labor Dynamics:** Over the years (FY19-22), the uptake of 3G/4G devices increased while the opposite can be observed in the uptake of 2G devices over the same period. As of Sep'23, uptake of 3G/4G and 2G stood at ~57.0% and ~43.0%, respectively. On the other hand, the ratio of Information Technology graduates formed ~0.01% of total population during FY23, reflecting thereby that the sector's potential remains untapped. Furthermore, with per capita income recording at USD~1,551 in FY23, record-high inflation levels (FY22: ~21.3%; FY23: ~29.4%), have resulted in significant brain drain
- **Infrastructure:** Software companies face the risk of cyber-attacks and data breaches, which can result in the loss of sensitive information and damage to their reputation. Moreover, sudden internet shutdowns also directly dent sector players' performance and erodes their competitiveness in the global market.

# Technology

## Business Risk | Margins and Cost Breakdown

- Historically (FY19-23), sector players maintained ~30.0% average gross margins as they provide high-quality services and compete internationally. In FY23, these dipped marginally to ~30.0% owing to ~24.7% YoY higher average cost of goods. However, players were able to sustain gross margins owing to ~39% YoY currency depreciation and minimal ~0.2% YoY dip in computer services exports. Meanwhile, owing to ~23.7% YoY higher average finance costs, sector's average net margins dipped to ~9.0% in FY23, nearing COVID-level.
- In 1HFY24, average gross margins of the sector remained stable at ~32.0%, when compared with SPLY, however, these were up ~2.0% when compared with FY23. Owing to persistently high interest rates, average net margins squeezed to ~16% (SPLY: ~21%). During SPLY, these were greater than average operating margins on account of "other income" (largely comprising exchange gains) outpacing the growth in average finance costs.
- In terms of overall cost of goods, Salaries & Wages comprised ~36% in FY23 (SPLY: ~34%) as the sector relies on technically-proficient and skilled labor force, while the second largest component, raw material, contributed ~35% of direct costs, comprising software and hardware costs during FY23 (SPLY: ~22%). Raw material comprises imported hardware as well as software licenses procured from international technology companies.

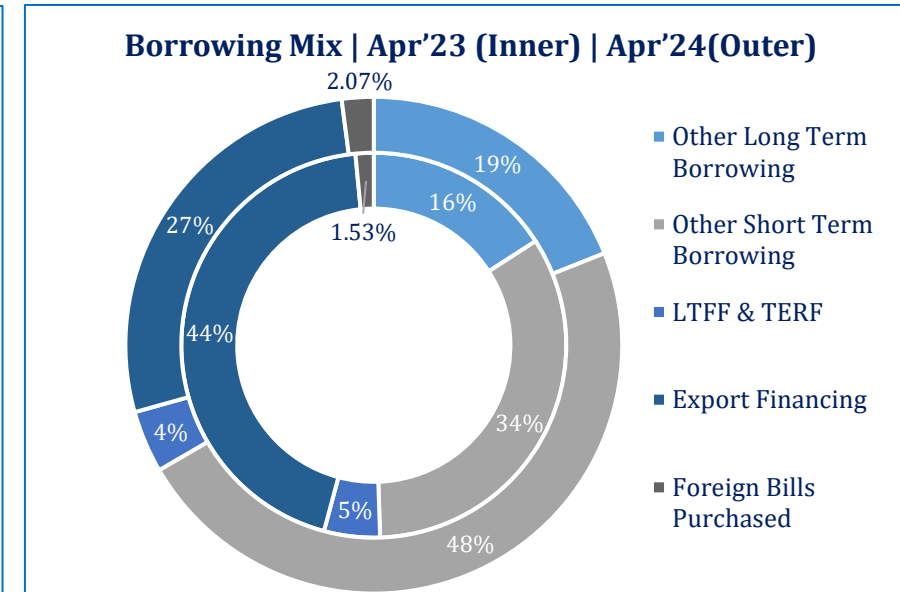
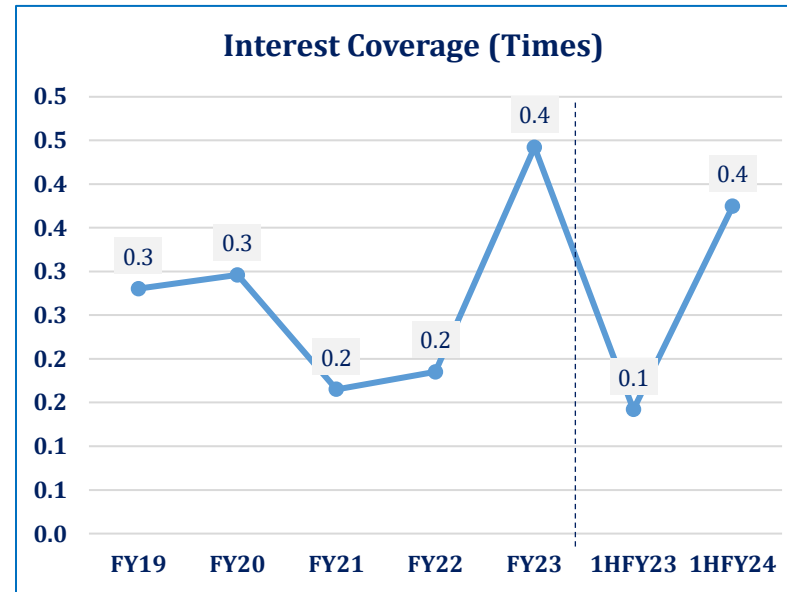
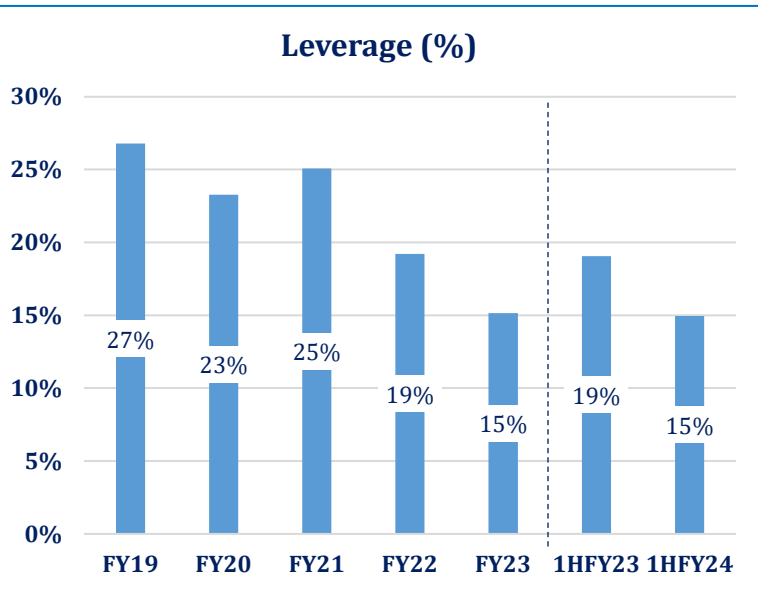


Note: Data pertains to ~9 PACRA-rated/ listed players. Margins are revenue-weighted.

# Technology

## Financial Risk | Borrowing and Leverage

- As at End-Apr'24, total borrowings of the sector stood at PKR~10.5bln (End-Apr'23: PKR~10.0bln), up ~5.2% YoY. Total long-term borrowings during this time comprised ~19.0% of the total borrowings (End-Apr'23: ~16%) and were up ~28.1% YoY, while overall short-term borrowings represented ~50% (End-Apr'23: ~35%), and recorded ~45.9% YoY rise.
- Discounted borrowings comprising LTFF and EFS stood at PKR~0.4bln as at End-Apr'24 (End-Apr'23: PKR~0.5bln), registering a decline of ~7.4% YoY. Meanwhile, export financing recorded at PKR~2.9bln as at End-Apr'24 (End-Apr'23: PKR~4.4bln), down ~33% YoY. Other short-term borrowing made up ~50% of the total borrowing as at End-Apr'24, reflecting sector players' increased working capital financing requirements.
- During FY19-23, the sector recorded, on average, leverage of ~21.8%, indicating thereby lower reliance on borrowings. In FY23, borrowings were down ~9.8% YoY. In line with borrowings trend, interest coverage improved to ~0.4x in FY23 and sustained the momentum in 1HFY24, coinciding with ~2.7% YoY lower borrowings during the period.

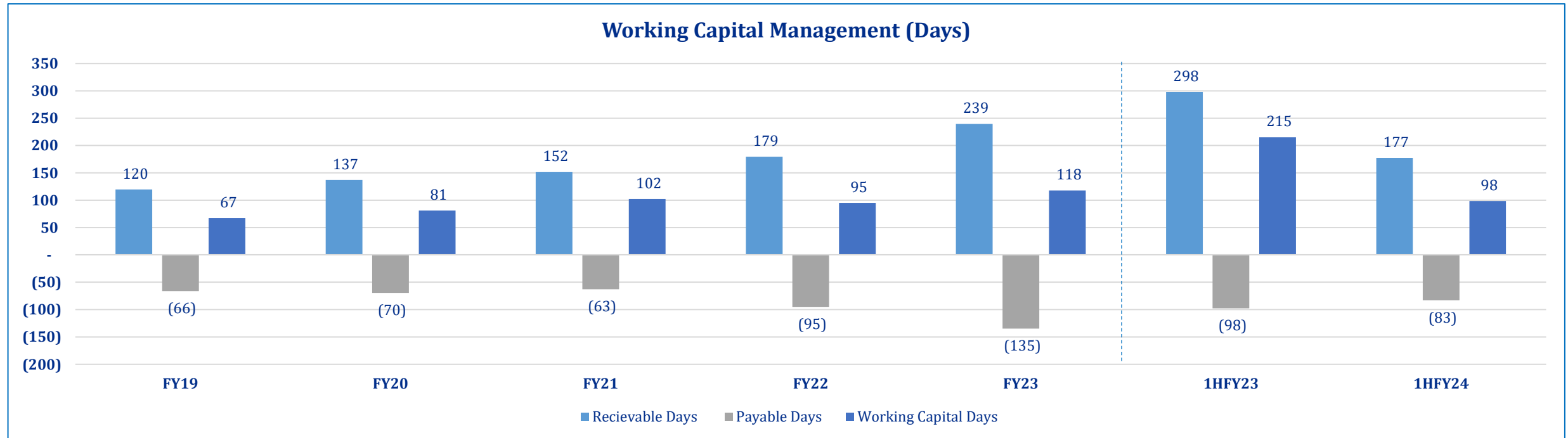


**Note:** Borrowing Mix pertains to SBP Classification "Computer Programming and Related Activities". For the leverage and Coverage analysis, data pertains to ~9 PACRA-rated/ listed sector players.

# Technology

## Financial Risk | Working Capital Management

- The sector’s working capital cycle is largely a function of trade receivables and payables. Meanwhile, revenues are mostly contract-based and a greater length of contract can lead to increase in trade receivable days. Net working capital days in FY23 stood at ~118 days, compared with ~140 days during SPLY, down ~22 days YoY.
- A breakdown of the working capital cycle reveals that the decline came on the back of increased receivable days, which grew ~60 days YoY while average payable days also increased by ~40 days YoY, reflecting thereby the overall economic slowdown and the aforementioned nature of business contracts. In 1HFY24, however, the working capital cycle improved by ~117 days, on the back of lower outstanding receivables and payables, with the latter also coinciding with improved coverage and lower borrowings.



## Regulatory Framework

- The technology sector is overseen by the Ministry of Information Technology and Telecommunications (MoITT). In CY18, the ministry introduced a Digital Pakistan Policy with a vision to accelerate digitization and expand the knowledge based economy.
- Some of the key objectives highlighted in the policy are promotion of innovation and entrepreneurship through start up incubators, increase in software exports and IT remittances alongside the domestic market, improve digital inclusion by bridging the urban-rural gap and the gender disparity and attract foreign and domestic investment in the industry.
- In addition, the establishment of IT Parks, Tech Special Economic Zones and National Incubation Centers has vastly improved the ecosystem available for tech companies as these locations are specifically equipped with latest ICT infrastructure and facilities which enable a conducive environment.
- The technology sector is represented by the Pakistan Software Houses Association for IT and ITES (PASHA). The association lobbies with the government and provides its input on policies and legislation related to the industry.
- In FY23 budget, the government has promoted the 2020 Special Technology Zones Ordinance with an objective to establish technology parks, high-tech industrial areas, science and technology zones, knowledge cities and technology incubation zones. Currently Pakistan Software Export Board is managing ~32 thirty-two Special Technology Parks (STPs), out of which ~07 were added during FY23.
- The sector falls under Minimum Tax Regime. Currently, ~0.25% tax on export receipts is applicable on companies register with the PSEB and 1% on companies not registered with it. Meanwhile, tax exemptions to companies operating in the SEZs are still applicable.

# Technology

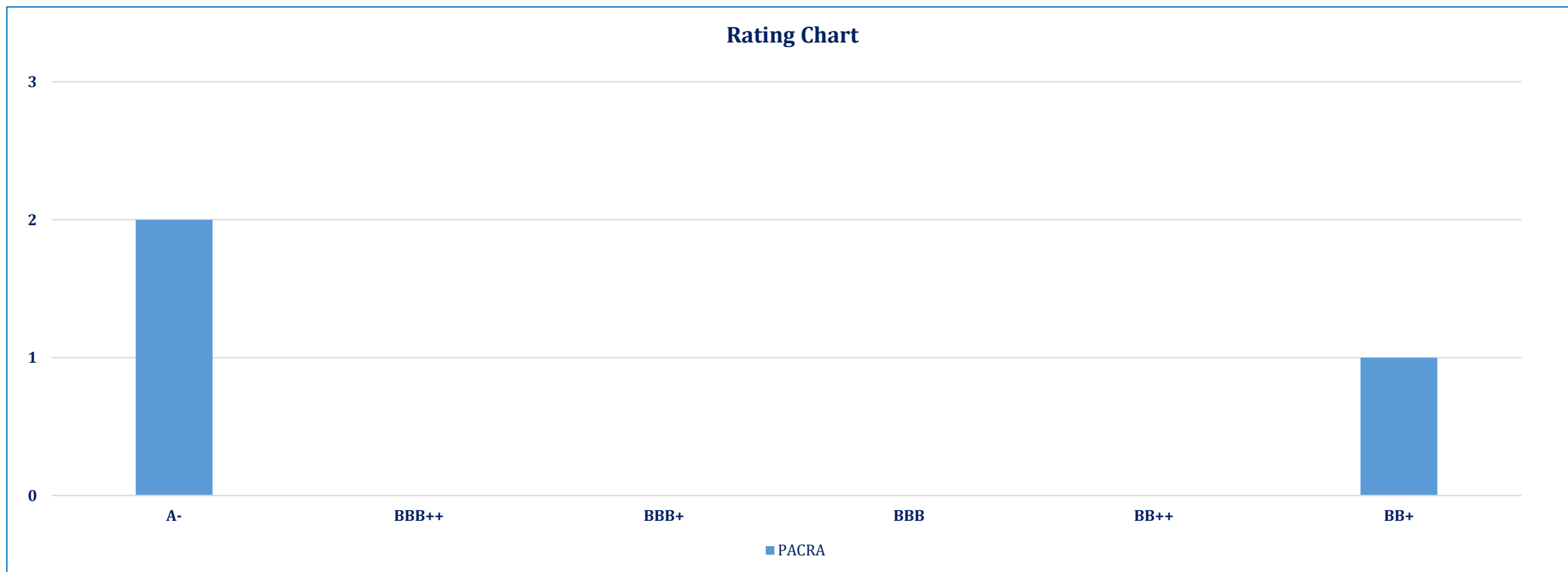
## Duty Structure

- The sector falls under Minimum Tax Regime.

HS Code	Description	Custom Duty		Additional Custom Duty		Income Tax		Sales Tax	
		FY23	FY24	FY23	FY24	FY23	FY24	FY23	FY24
8471.3010	Laptop Computers, Notebooks Whether Or Not Incorporating Multi Media Kit	3%	3%	2%	2%	12%	12%	18%	18%
8471.3020	Personal Computers	3%	3%	2%	2%	12%	12%	18%	18%
8471.3090, 8471.6090	Other	3%	3%	2%	2%	12%	12%	18%	18%
8471.4120	Large Or Main Frame	3%	3%	2%	2%	12%	12%	18%	18%
8471.5000	Processing Units Other Than Those Of Sub-heading 8471.41 Or 8471.49,	3%	3%	2%	2%	12%	12%	18%	18%
8471.6010	Key Boards	3%	3%	2%	2%	12%	12%	18%	18%

## Rating Curve

- PACRA rates 3 entities in the sector, with long-term rating bandwidth of A-to BB+. The company also rate one debt instrument with long term rating of AA.





# Technology

## SWOT Analysis

- Regulatory structure supports local sector and encourages exports.
- Conducive environment due to the presence of IT Parks, Tech SEZs and Start-Up Incubators.
- Relatively lower income tax compared to other sectors.



- Service-related players are dependent on conditions in client industries and sectors
- Low availability of skilled labor graduating from top universities.

- Ever changing technological platforms and evolving technologies.

- Significant investment incentives have been provided for local and foreign investors.
- Growing urbanization and digital literacy to create demand in the long term.
- Focus on automation in local industry

# Technology

## Outlook: Stable

- In FY23, Pakistan's GDP (nominal) stood at PKR~79.7trn (FY22: PKR~63.3trn), contracting, in real terms, by ~0.17% YoY (FY22: ~6.3% growth). The Service segment held ~53.6% share in GDP during the year. However, the provisional data released by National Accounts reveals that Pakistan's GDP during FY24 is expected to clock in above PKR~100.0trn in nominal terms with expected GDP growth rate in real terms of ~2.4%, depicting an improved economic activity during FY24 compared with SPLY. The SBP estimates GDP growth at ~2-3% for FY24, while IMF's forecast for the same stands at ~2.0%.
- Pakistan's technology sector contributed ~1.7% to country's GDP in FY23 (SPLY: ~1.9%), with market size recording at PKR~1,320bln in FY23, an uptick of ~7.3% YoY. In 9MFY24, sector's market size recorded growth of ~10.5% YoY. During the year, exports of overall computer services remained stable at USD~2.1bln (FY22: USD~2.1bln). Software and Automation & Process exports, the main constituents of computer services exports, registered YoY growth rates of ~-0.2% and ~0.6% during the year. In 9MFY24, these recorded growth rates of ~6.0% and ~46.0% YoY, while overall computer services exports registered ~19.9% YoY growth.
- The USA was the top destination for computer services exports, with export value amounting to USD~1,416bln during FY23 (FY22 USD~1,493bln), ~5.1% decline YoY. Export value in the case of UK clocked in at USD~200bln during FY23, recording ~7.4% decline YoY. In 9MFY24, the USA remained the top destination for exports (same as FY23) with exports value recording at USD~1,172bln, an uptick of ~11.0% YoY, followed by the UK, where exports value amounted to USD~210bln during the period, ~35.5% YoY increase.
- In FY23, average gross margins dipped marginally to ~30.0% (SPLY: ~32.0%) owing to ~24.7% YoY higher average cost of goods. However, players were able to sustain gross margins owing to ~39% YoY currency depreciation and only a minimal ~0.2% YoY dip in computer services exports. Meanwhile, ~23.7% YoY higher average finance costs led to sector's average net margins recording at ~9.0% in FY23 (SPLY: ~14.0%), nearing COVID-levels. During the year, borrowings were down ~9.8% YoY. In line with borrowings trend, interest coverage improved to ~0.4x in FY23 and sustained the momentum in 1HFY24, coinciding with ~2.7% YoY lower borrowings during the period.
- The Information Technology (IT) and Enabled Services sector had been granted various incentives in FY24 budget in order to boost exports, including, but not limited to, removal of regulatory duty on IT-related equipment, continuation of concessionary fixed tax rate of ~0.25% for exports for FY24-26 and concessionary tax rate of 20 percent for banking company's income from additional advances to sector players. With expected uptick in computer services exports, the sector's performance is likely to stay rangebound going forward in the short to mid-term.

# Technology

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