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Edited by Nadeem Javaid & Faheem Jehangir Khan

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Edited by Nadeem Javaid & Faheem Jehangir Khan



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PART I

INVESTMENT & EXPORTS

Research Papers

DECODING THE EAST ASIAN SUCCESS AND UNLEASHING FDI'S POTENTIAL TO BOOST LOCAL LEARNING: DEVELOPING A POLICY ROADMAP FOR PAKISTAN

Twangar Kazmi¹ and Mujahid Abdullah²

ABSTRACT

East Asia's Foreign Direct Investment (FDI)-driven learning model offers significant and practical lessons to developing economies, such as Pakistan, on pursuing a path towards sustainable export-led growth. FDI stands as an important critical catalyst for economic growth, especially in export-driven strategies, as demonstrated by the success of East Asian Economies. These nations have effectively utilised FDI to drive technological advancements, bolster local industrial capabilities, and foster innovation. In contrast, Pakistan faces significant challenges in attracting impactful FDI due to barriers such as underdeveloped infrastructure, limited domestic investment, and insufficient human capital. The study categorises East Asian experiences into cohorts, examining their diverse policy approaches ranging from Japan's post-war reconstruction to China's dominance in manufacturing. Insights from these economies underscore the effectiveness of liberal market policies, strategic investments in infrastructure, and the importance of creating an attractive business environment to stimulate FDI inflows, along with domestic investment. A favourable set of mediating factors, essential for absorbing foreign technologies, including effective legal systems, greater market freedom, and a robust domestic investment environment, amplifies FDI spillovers. The FDI spillovers facilitate the rapid acquisition and adoption of technology and expertise in host countries, leading to significant productivity gains.

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1. INTRODUCTION

Background and Context

Foreign Direct Investment (FDI) has emerged as a vital driver of economic growth, particularly in the context of export-oriented strategies. The success stories of East Asian economies, such as South Korea, Japan, and China, have demonstrated the transformative potential of FDI in boosting the productivity and innovation of local industries. This research project seeks to decode the strategies employed by these economies and devise a policy roadmap for Pakistan to leverage export-oriented FDI for local learning and economic advancement.

Extensive literature establishes the significance of FDI for economic development. Export-led growth, a hallmark of East Asian economies, emphasises the role of FDI in driving technological advancements, improving local industrial capabilities, and fostering innovation. The experiences of these economies offer valuable insights into the mechanisms through which FDI promotes technology transfer and capacity building in domestic industries.

Pakistan faces several challenges that hinder its trade competitiveness and lack of sustained growth in exports, both in terms of quantity and movement up the value chain. Pakistan's FDI has stalled for the past decade, and it has been relying heavily on a few bilateral arrangements, mainly to keep it afloat. However, there is an excellent opportunity for FDI to be a catalyst for economic growth, given that there is a favourable set of circumstances. FDI, backed by the right policies, can steer the economy on a sustainable path towards export-led economic growth, with an emphasis on knowledge creation and innovation.

Purpose and Scope of the Study

This study conducts a comparative analysis of East Asian economies, aiming to identify existing gaps in Pakistan's policy and highlight areas that require attention for sustainable, export-oriented economic growth. It aims to provide policy recommendations and a roadmap to attract export-oriented FDI in Pakistan that leads to an enhancement in local firms' productivity, know-how and capacity to innovate.

Research Questions:

- What role did FDI play in the East-Asian economies' success, and how can that serve as a model for export-led growth in Pakistan?
- What are the influencing factors, both passive and active, that shape the impact of FDI on enhancing domestic industry competitiveness, including the transfer of technology and know-how?
- How did the economic policies and labour strategies in East Asia contribute to the attraction of FDI and impact its spillover effects?
- What are the primary factors underlying Pakistan's trade competitiveness challenges?
- How can the insights drawn from the experiences of East Asian economies be effectively applied to shape and inform Pakistan's trade, R&D, and FDI policies for sustainable economic growth and increased global competitiveness?

2. LITERATURE REVIEW

Economic Growth Models and Role of Technology, Knowledge, and Innovation

Over the years, economists and researchers have tried to explain the concept of economic growth. Until the 1970s, the neoclassical models of analysis were used to explain economic growth. These models include the accumulation of labour, capital, and other factors of production with diminishing returns to scale. In them, the economy converges to a steady state equilibrium where the level of per capita income is determined by savings, investment, depreciation, and population growth, but with no permanent income growth.

At the heart of many studies, investment in technology is considered as the main driving force of growth (Smith, 1776). Indeed, investment in technology has been considered fundamental in growth models (Solow, 1957, cited in Nelson, 2005). These growth theories, however, consider technology to be an exogenous factor (Nelson, 1998, 2005). However, more recent literature has pointed towards a different approach in analysing growth by focusing on the mechanisms through which countries adopt technologies at a firm or industry level. Hence, from the 1980s onwards, many papers have focused on endogenising the factor of technology.

Nelson (1998) is one of the first to guide us towards a 'new agenda for growth theory' by the very same principle. He argues that the 'immediate' causes of growth (like investment in technology) are not sufficient in explaining growth and lack some fundamental elements that underlie the process of adopting technologies. Nelson (2005) divides the theories of growth regarding newly industrialised economies (NIEs) into two broad categories: 'accumulation' and 'assimilation' theories. The Former focuses on investment as the key driver towards economic growth rather than the adoption of technology. It stresses that countries will move along their production functions. In contrast, the latter (i.e. assimilation theories) focus on entrepreneurship, learning and innovation as key elements that explain growth.

The Role of FDI in Industrial Transformation and Economic Growth

McDougall (1960) was the first author to systematically discuss external effects (spillovers) among the possible consequences of FDI. Other early studies (Cokden, 1967; Caves, 1971) identified the costs and benefits of FDI. More recent literature, however, has explicitly identified FDI as a source for the transfer of technology.

Some early studies on this (Lundvall & Johnson, 1994; Maskell & Malmberg, 1999) guide us to a new way of understanding the economy, not merely in terms of input-output relations of factors of production, but rather the economy as a dynamic mechanism; firms acquire knowledge, learn to innovate, and these have far-reaching consequences on the performance of the economy. Lall (1993) explains that FDI is the most dominant form of resource and technology transfer from developed to developing countries. 'It is the most packaged form of technology transfer, combining the provision of capital with technical know-how, equipment management, marketing and other skills' (Lall, 1993, p.95). Knowledge flows occur whenever an idea generated by one institution is learned by another institution (Peri, 2005). Therefore, knowledge flows are often described as learning.

Lall (1993) distinguishes two main categories of technology transfers, 'internalised' and 'externalised' forms. Internalised forms refer to that investment where the control of business activities resides primarily with the foreign partner (as in the case of FDI). Externalised forms include licensing, international subcontracting, and joint ventures with local control (may be referred to as non-FDI forms). In the internalised forms of transfer, the transferor has a 'significant and continuing stake in the success of the affiliate,

allows it to use its brand names and to have access to its global technology and marketing networks, exercises control over the affiliate's investment technology and sales decisions, and sees the affiliate as an integral part of the global strategy.' (Lall, 1993, pp. 97). Whereas in externalised forms, one or all of the aforementioned features are missing. The decision of whether the transfer of technology will be internalised or externalised has a lot to do with the nature of the technology, the capability of the buyer and the host government policy.

Altenburg & Meyer-Stamer (1999) find that clusters of firms dominated by foreign firms tend to stimulate upgrading of local firms by involving them in the supply chain of transnationals. An important aspect in this is the nature of the expertise transferred and how it can help local firms upgrade. Hobday (1995) highlights the importance of local subsidiaries exchanging know-how with MNCs and how that contributed to the East Asian success. (This aspect is important, crucial in the discussions to follow, and points us towards a new direction which countries like Pakistan can focus on).

Specific forms of subcontracting known as 'Original Equipment Manufacturer' (OEM) and 'Original Design Manufacture' (ODM) became an important export channel during the 1980s (Hobday, 1995). Subcontracting in OEM involves suppliers building a product to the specifications of a foreign buyer (MNC) and then selling it under the buyer's own brand name. The advantage of this to the supplier is that it can avoid the costs of marketing and distributing the product. Moreover, latecomer firms in the market may not be able to compete with established brands; therefore, OEM becomes a safer channel. Through the process of subcontracting via OEM, technical know-how (design specifications) is transferred to the supplier and often "involves the foreign partner in selection of capital equipment and training of managers, engineers and technicians as well as advice on production, financing and management".

At times, the informal means of learning that take place in an economy are the most crucial in acquiring technology. Copying or gradual improvements are often the ways through which new ways of doing things are learnt. This is indicative of the nature of knowledge and the mode of transfer of knowledge itself. This does not, however, mean that formal means of learning, such as R&D activities, are of no use. Instead, underlying them too, perhaps are these less talked about aspects that need to be taken into consideration while devising policy.

Human capital is commonly recognised as a vital contributor to sustained economic growth through the positive externalities stemming from knowledge spillover, as initially proposed by Romer (1986). Economic research has indicated the potential existence of a causal connection between a nation's openness to foreign investment and the accumulation of human capital. This argument rests on the premise that inward FDI positively influences a country's reservoir of skilled labour due to the diffusion of advanced technology and new knowledge.

Knowledge Spillovers and National Absorptive Capacities

Foreign direct investment (FDI) is a key driver of technological learning and innovation in developing countries. FDI can bring new technologies, knowledge, and skills to the host country, creating spillovers that benefit domestic firms and industries. However, the magnitude and direction of these spillovers depend on various factors, such as the characteristics of foreign investors, the absorptive capacity of local firms, and the institutional environment of the host country.

One of the main channels through which FDI can affect domestic firms is through horizontal spillovers, which occur when local firms in the same industry or sector learn from or imitate the technologies, processes, or management practices of foreign affiliates. Horizontal spillovers can arise from various sources, such as demonstration effects, labour mobility, competition effects, or linkages with suppliers and customers. However, the empirical evidence on horizontal spillovers is mixed and inconclusive, as it depends on several factors, such as the absorptive capacity of local firms, the technological gap between foreign and domestic firms, the degree of market competition, and the characteristics of foreign affiliates.

Another channel through which FDI can affect domestic firms is through vertical spillovers, which occur when local firms in upstream or downstream industries benefit from the presence of foreign affiliates. Vertical spillovers can result from backward linkages, when foreign affiliates source intermediate inputs from local suppliers, or forward linkages, when foreign affiliates sell their output to local customers. Vertical spillovers can enhance the productivity, quality, and innovation of local firms by providing access to advanced technologies, standards, training, information, and markets. The empirical literature generally finds positive and significant effects of vertical spillovers on host country firms.

To develop capabilities, an economy must increase its 'absorptive capacity' (Cohen & Levinthal, 1990)- one of the earliest uses of the term. Absorptive capacity means the presence of relevant infrastructure, the ability to understand and comprehend new forms of technology and the ability to adapt to changes. This capacity can only be increased over time by encouraging domestic firms to employ new methods of production and respond to global technological advancements. Many factors affect the nature, speed, and extent of knowledge transferred. These include the level of cognitive abilities of the local workforce and the competition that prevails in the market to begin with.

Kinoshita (2000) uses cross-country data from 25 developing countries from 1970 to 1990 to investigate the impact of FDI on technological progress (measured by total factor productivity growth) in developing countries. He found that FDI had a positive effect on technological progress, but that this effect was stronger for backward linkages than for forward linkages. He explained this result by suggesting that backward linkages were more likely to involve technology transfer than forward linkages, which were more likely to involve market access.

Other recent studies have also examined the effects of FDI on different aspects of technological learning and innovation in developing countries. For example, He et al. (2019) used a meta-analysis of 40 empirical studies to identify the determinants of FDI forward spillovers in developing countries. He found that FDI forward spillovers were influenced by factors such as the absorptive capacity of local firms, the technological gap between foreign and domestic firms, the ownership structure of foreign affiliates, the mode of entry of foreign investors, and the institutional quality of the host country.

Similarly, Behera (2014) used panel data from Indian manufacturing industries from 1991 to 2008 to analyse the impact of FDI on productivity and innovation spillovers for domestic firms in India. He found that FDI had a positive effect on productivity spillovers, but an adverse effect on innovation spillovers. He argued that FDI could create both competition and cooperation effects for domestic firms, depending on their absorptive capacity and technological gap.

Studies carried out in Pakistan on this have varying results (Ahmad et al., 2014; Iqbal et al., 2014; Khan et al., 2012; Mahmood, 2012; Mustafa & Malik, 2023; Yasmin et al., 2022; Shah et al., 2020). At a firm level, Hussain (2017) was the first to investigate the effects of FDI on productivity of local firms in Pakistan, with results showing that FDI and other control variables, capital intensity, economies of scale, firm's size and firm's age have a positive and significant impact on labour productivity in Pakistan.

Competing Evidence

Some studies have also questioned this transfer of technology and know-how between foreign firms and their subsidiaries (e.g. Perez, 1997; Cantwell, 1989; Guiliani, 2008). They have emphasised that governments should focus on broadening the local knowledge base rather than relying on horizontal and backward linkages for the upgradation of local firms. Aitken and Harrison (1999) use panel data on Venezuelan plants to find that foreign investment in plants negatively affects the productivity of local firms. Haddad & Harrison (1993) conclude from a Moroccan manufacturing study that spillovers do not take place in all industrial sectors. Blomstrom (1986) also concludes that foreign presence does not lead to technology spillovers.

Zaman et al. (2012) in their research indicate that while FDI has a positive impact on Pakistan's economic growth in the long run, trade liberalisation and its interactive terms positively affect short-term growth but negatively impact long-term growth. The results suggest that due to the low quality of human capital in Pakistan, the direct effect of FDI on economic growth turns negative.

Ali et al. (2012) look at the impacts of technology spillovers on total factor productivity in Pakistan for the manufacturing sector and find that foreign R&D capital stock and imports of capital goods have a positive effect, while FDI has an adverse effect. Additionally, the current quality of education hurts per capita GDP, underscoring the importance of quality education and market-driven skills for economic growth.

Conclusion on Literature

The literature on this issue suggests a clear direction for FDI-led knowledge spillovers in host countries, with the potential to enhance the capacity of local firms, provided the correct set of circumstances and policies is in place. There are benefits to be attained through the promotion and fostering of FDI in high-value-added sectors of the economy. In the case of Pakistan, this study emphasises the promotion and development of such inward FDI. While there are many benefits to examining firm-level data, the availability and time constraints of this study have led it to focus on a macroeconomic overview of the East Asian nations, with a sectoral breakdown and selective case analysis, aiming to extract a roadmap for Pakistan.

Literature on FDI spillovers and their determinants in Pakistan is thin, if not non-existent, when compared to global literature on this. Most of the literature regarding Pakistan is available on determinants of FDI inflows and

FDI's impact on economic growth. In general, FDI-driven technology spillovers have not been extensively studied for the country, and the determinants or mediating factors of these spillovers appear to be missing from the literature.

Most empirical studies on the effects of FDI spillovers are firm-level studies conducted on single countries, to analyse domestic firms' characteristics to estimate FDI spillovers (see Behera, 2014; Hong et al., 2016; Li et al., 2001; Liang, 2017; Ni & Kato, 2020; Park & Xiao, 2016). There are a small number of studies which investigate the host country characteristics as enablers of FDI spillovers. For instance, Havranek & Irsova (2011) and Meyer & Sinani (2009) apply meta-analyses on estimates from the existing firm-level empirical literature to observe cross-country differences between FDI spillovers. Farole & Winkler (2014) estimate the impacts of host country characteristics and institutional frameworks as factors of FDI spillovers by combining firm-level outcomes with country-level aggregates on a cross-sectional dataset of World Enterprise Surveys.

To our knowledge, there are no studies that solely examine country-level outcomes using host country indicators and panel data. Another motivation for using panel data is to avoid the issue of reverse causation, i.e., foreign investment may be attracted to a country with some unobservable characteristics that correlate with country-level productivity measures. By using country fixed effects, we capture the effects of these unobservable characteristics.

The literature reviewed still has room for a systematic assessment of policies and national circumstances needed to have optimal absorptive capacity and support the diffusion of technology from advanced economies (especially about the lessons learnt from East Asia). Furthermore, an assessment from the perspective of a struggling developing economy like Pakistan, which seeks to attain similar growth patterns, will provide additional layers of detail that are often overlooked or taken for granted in analyses originating from advanced economies.

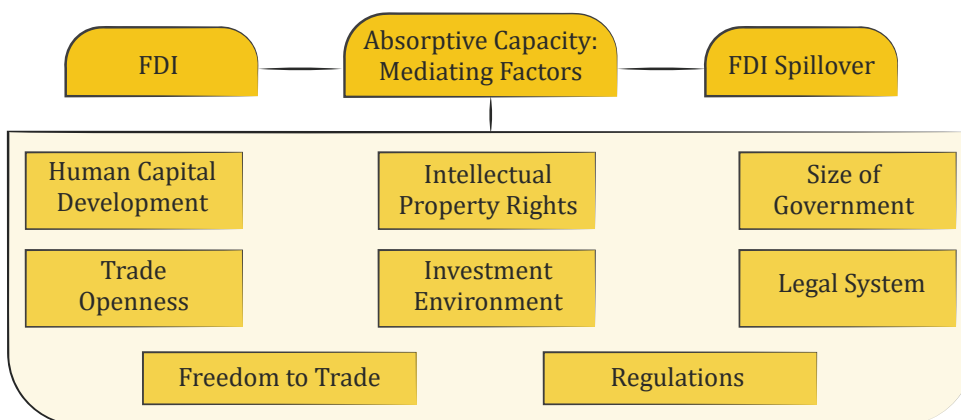
3. METHODOLOGY

Overview and Analytical Framework

This approach provides a comprehensive understanding of the multifaceted dynamics underlying FDI-driven innovation and economic growth. The qualitative component provides nuanced insights into mechanisms and strategies, while the quantitative analysis ensures statistical validity and identifies broader trends, as well as their potential applicability to Pakistan's context. The research methods employed in this study enable the researchers to conduct a country-level policy analysis, case studies within specific industries, and a macroeconomic analysis of factors influencing knowledge spillovers through FDI.

This analytical framework illustrates the interaction between Foreign Direct Investment (FDI) and economic growth, mediated by the absorptive capacity factor. The central element, absorptive capacity, represents the ability of a country to effectively utilise FDI spillovers, which are the beneficial effects of FDI beyond direct investment. Absorptive capacity is influenced by several mediating factors, including human capital development, intellectual property rights, trade openness, investment environment, freedom to trade, regulations, size of government, and the legal system. These factors collectively determine how well a country can absorb and benefit from FDI. The framework suggests that a country's economic growth from FDI is contingent on the strength of these mediating factors, indicating that improvements in these areas can enhance the positive impact of FDI on economic growth.

Figure 1: Analytical framework



Source: Authors' computations.

Phases of Research

Comparative Policy Analysis of East Asian Economies

In the **first phase**, historical trajectories, policy frameworks, institutional setups, and industrial development strategies of East Asian economies are studied and compared. A timeline analysis maps the progression of FDI-related policies and industrial growth. A policy comparative study identifies commonalities and differences in policy approaches. The comparative analysis focuses on a diverse set of East Asian economies, including China, Japan, South Korea, Singapore, Hong Kong, Taiwan, Philippines, and Indonesia. To facilitate the analysis, economies are grouped into distinct cohorts³. Each cohort represents economies with shared characteristics and timelines, enabling a focused analysis to identify the reasons for economic success. This phase uses Timeline Analysis, Policy Analysis, Case Study Identification, and Success Factor Identification.

Case Study of Successful FDI-Driven Industries

The **second phase** of research analyses existing case studies of specific industries within East Asian economies that have effectively leveraged foreign direct investment (FDI) to enhance local learning, innovation, and industrial growth. The researchers identify one case study based on preliminary screening carried out in phase 1. The aim is to provide detailed insights into the mechanisms of technology transfer, knowledge diffusion, and local capacity building. Strategies and outcomes of FDI-driven initiatives are examined, offering valuable lessons that can be applied to similar sectors in Pakistan. This phase investigates Technology Transfer Mechanisms, Collaboration Models, Upgradation of Local Industry, and Policy and Regulatory Support.

Econometric Model: Role of mediating factors

The **third phase** employs a statistical model that aims to estimate the effects of macro-indicators and institutional characteristics on technology spillovers in host countries through foreign direct investment, using a sample of 45 Asian and African countries from 2000 to 2019. Following the methodological approach taken by Farole & Winkler (2014) and Blalock & Gertler (2009), our main econometric model for LP is given as:

³ Cohorts are categorised as follows: Cohort 1: Japan, Cohort 2: Hong Kong, Singapore, Cohort 3: Philippines, Malaysia, Indonesia. Thailand, Cohort 4: China, Vietnam.

Equation 1

$$LP_{it} = \beta_0 + \beta_1 \ln FDI_{it} + \beta_2 (MF \times \ln FDI)_{it} + \beta_3 \ln CI_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$$

Where LP_{it} is the natural logarithm of labour productivity. Labour productivity is defined as the volume of output produced per unit of labour, or specifically, GDP divided by employed people (ILO, 2020). GDP is measured as the Output-side real GDP at current PPPs (in mil. US\$ at 2017 prices), and employed people are measured as the number of persons engaged (in mil.) in a country i at time t . $\ln FDI_{it}$ represents the natural logarithm of inflows of foreign direct investment (FDI) in current US dollars, adjusted for population size (in millions) (World Bank, 2024). We use FDI inflows interacted with host country characteristics to estimate FDI spillovers, which helps us to identify the effects of the host country characteristics on LP, moderated by FDI inflows. $\ln CI_{it}$ is the capital intensity of a country i in time t . This is obtained by dividing capital stock at constant prices by the number of people employed (in millions) in country i in time t . We include this variable as a control because labour productivity is mainly determined by capital intensity (Farole & Winkler, 2014). α_i are country fixed effects, and γ_t are year fixed effects.

Equation 2

$$TFP_{it} = \beta_0 + \beta_1 \ln FDI_{it} + \beta_2 (MF \times \ln FDI)_{it} + \beta_3 \ln CI_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$$

Furthermore, we also use the total factor productivity level in current purchasing power parities of country i in year t (TFP_{it}) as a dependent variable to measure a country's productivity, which is obtained from the Penn World Table (ILO, 2020). It is defined as the share of output not explained by the inputs, where the output of a country i at year j is measured through Real GDP, and the inputs are measured by capital and labour. A Törnqvist production function is estimated using constant returns to scale to measure TFP (see Feenstra et al. 2025 for details). However, since TFP is calculated for the overall country, we cannot distinguish between the productivity of foreign and domestic firms or across different sectors. MF_{it} are mediating factors, which are described in the table below:



Table 1: Mediating Factors of FDI Spillovers

Variable name	Description	Source
HC_{it}	Human capital index of country i at time t	Penn World Table
$lnTO_{it}$	Natural logarithm of trade openness (calculated as sum of imports and exports divided by the GDP of a country i at time t)	Multiple sources compiled by World Bank (2024) – processed by Our World in Data
$lnIPR_{it}$	Natural logarithm of intellectual property rights (calculated by the number of patent applications filed both by residents and non-residents and adjusted by population size (in mil.) in a country i at time t)	World Bank, 2024
$lnIE_{it}$	Natural logarithm of investment environment (measured by gross fixed capital formation as % of GDP in a country i at time t)	World Bank, 2024
SG_{it}	Size of government sub-index (measures government interference in economic activity in a country i at time t, where 0 means maximum government interference and 10 means minimum government interference)	Fraser Institute's Economic Freedom of the World report, 2023
LS_{it}	Legal system and property rights sub-index (measures protection of private property and rule of law in a country i at time t, where 0 means individuals enjoy minimum legal and property rights and 10 means maximum rights)	Fraser Institute's Economic Freedom of the World report, 2023
FT_{it}	Freedom to trade internationally sub-index (measures trade freedoms in a country i at time t, where 0 means minimum freedoms and 10 means maximum freedoms)	Fraser Institute's Economic Freedom of the World report, 2023
RE_{it}	Regulations sub-index (measures government regulations on businesses in a country i at time t, where 0 means maximum regulations and 10 means minimum regulations)	Fraser Institute's Economic Freedom of the World report, 2023

Source: Authors' computations.

Data Sources

The qualitative analysis of cohorts utilises various literature and secondary sources, which are cited individually. Quantitative analyses are based mainly on the following data sources: The World Bank, World Development Indicators; Asian Development Bank Data Bank; Wards Intelligence Data Centre; State Bank of Pakistan, Economic Data; Groningen Growth and Development Centre, 2023, Penn World Table; Fraser Institute's Economic Freedom; ILO; Penn World Table by Groningen Growth and Development Centre.

4. FINDINGS FROM EAST ASIA

Macro-Economic Analysis of East Asian Economies

Economic Growth Trends

Section 4.1 identifies and analyses the different decades of growth among the East Asian economies under consideration. It sheds light on the various decades of growth, providing clarity and context for the subsequent sections.

Starting from the 1960s, the world has been marked by robust economic performance and steady improvements in living standards, often described as the 'East Asian miracle.' Between 1965 and 1990, East Asia surpassed all other global regions in terms of average growth in gross domestic product (GDP) per capita.

Table 2: Decades of Growth (% GDP growth)

		1951-60	1960-69	1970-79	1980-89	1990-99	2000-09	2010-19
1	Japan	8.0%	10.4%	4.5%	4.3%	1.6%	0.4%	1.2%
2	Hong Kong	9.2%	8.9%	9.0%	7.4%	3.6%	4.2%	2.9%
	Singapore	5.4%	8.9%	9.2%	7.8%	7.2%	5.4%	5.0%
	South Korea	5.9%	9.5%	10.5%	8.9%	7.3%	4.9%	3.3%
3	Philippines	6.5%	5.0%	5.7%	2.1%	2.8%	4.5%	6.4%
	Malaysia	3.6%	6.5%	8.2%	5.9%	7.2%	4.8%	5.4%
	Indonesia	4.0%	3.5%	7.2%	5.8%	4.3%	5.1%	5.4%
	Thailand	5.7%	7.8%	7.5%	7.3%	5.2%	4.3%	3.6%
4	China	10.7%	3.3%	7.4%	9.7%	10.0%	10.4%	7.7%
	Vietnam	N/A	N/A	N/A	4.5%	7.4%	6.7%	6.6%

Source: World Bank (2024) & University of the Philippines & Philippine Economic Society (2008).

Table 3: Sectoral Real GDP Growth Rate 1960-2010 (%)

	(1960-1980)				(1980-2000)				(2000-2010)			
Economy	A	I	S	Agg	A	I	S	Agg	A	I	S	Agg
China	3.62	6.41	0.57	3.23	4.88	10.89	10.95	9.4	4.11	10.86	10.52	10
Hong Kong									-3.71	-2.77	4.38	3
Indonesia	3.59	8.36	5.89	5.88	2.78	6.18	5.42	5.21	3.39	3.99	6.77	5.1
South Korea	2.79	12.03	6.01	6.62	2.4	8.31	6.63	6.87	1.35	5.32	3.59	4.2
Malaysia	4.59	8.05	8.9	7.55	2.01	7.6	6.54	6.37	2.89	2.85	6.35	4.5
Philippines	4.06	6.56	4.76	5.28	1.57	1.44	3.1	2.25	2.81	4.1	5.43	4.7
Singapore	2.01	9.16	7.84	8.25	-4.29	6.87	7.52	7.24	-4.31	5.08	5.78	5.5
Thailand	4.61	9.92	7.4	7.31	2.67	7.89	5.47	5.96	2.07	5.18	3.7	4.3
Vietnam					3.65	8.67	6.74	6.4	3.52	8.7	7.09	7
Pakistan	3.59	8.11	6.26	5.52	4.13	5.77	5.4	5.12	2.63	5.91	5	4.7

Note: *A: Agriculture; I: Industry; S: Services; Agg: Aggregate

Source: Park & Shin (2012).

East Asia's economic landscape has undergone a dramatic transformation over recent decades, emerging as a pivotal force in the global economy. This shift began in the 1960s with the emergence of newly industrialised economies, such as Hong Kong, China; the Republic of Korea; and Singapore. These nations, inspired by Japan's export-driven industrialisation model, transitioned from typical developing countries to dynamic economic powerhouses. This wave of growth was later joined by ASEAN members such as Indonesia, Malaysia, and Thailand, followed by the rise of major players like China, which embraced market-oriented reforms and opened its economy to global trade and investment. Countries like Viet Nam are now following similar paths. Table 2 shows the economic growth patterns decade-wise, with green indicating decades of high average GDP growth. It is noteworthy how growth has transitioned from cohort 1 to cohort 4, with one country handing over the reins to the next emerging one, also known as the flying geese model.

Foreign Direct Investment in East Asia

Historically, the primary sources of Foreign Direct Investment (FDI) in Asia were Japan and advanced nations in Europe and North America, as illustrated above. However, in recent years, emerging Asian economies, notably Hong Kong, China, the People's Republic of China (PRC), the Republic of Korea (ROK), and Singapore, have rapidly emerged as significant contributors to FDI

in Asia. Currently, more than 45% of FDI inflows to developing Asia come from within the region, indicating a notable shift in investment patterns in the Sectoral and Industrial Growth of East Asia.

In 2017, East Asia claimed the largest portion of intra-regional FDI, accounting for 56.1%, followed by Southeast Asia at 27.2%. The increasing integration of trade within the region is supported by a consistent rise in intra-regional FDI, particularly from Japan, the PRC, and the ROK to the broader Asian region, with a focus on ASEAN countries.

Many of these investments are directed towards local or regional markets, driven by the expanding middle class and robust purchasing power in the ASEAN market. As a result, there is a growing trend of goods and products from these investing countries being manufactured and marketed within ASEAN, rather than being imported. This shift contributes to Japan's declining share in the overall ASEAN trade.

Firm-level data suggest that, historically, greenfield investments.⁴ were the dominant mode of entry for multinationals investing in Asia, accounting for an annual average of 65% of total investments from 2003 to 2017.

Table 4: Net Inwards FDI (% of GDP)

		1970-79	1980-89	1990-99	2000-09	2010-19
1	Japan	0.0%	0.0%	0.1%	0.2%	0.3%
2	Hong Kong	2.3%	4.8%	6.2%	21.9%	35.6%
	Singapore	5.8%	9.7%	12.0%	16.7%	22.0%
	South Korea	0.7%	0.4%	0.7%	1.2%	1.0%
3	Philippines	0.5%	0.5%	1.7%	1.4%	1.9%
	Malaysia	3.1%	3.2%	5.8%	3.0%	3.4%
	Indonesia	1.9%	0.4%	1.2%	0.5%	2.1%
	Thailand	0.6%	1.0%	2.6%	3.3%	2.2%
4	China	0.0%	0.5%	4.0%	3.7%	2.4%
	Vietnam		0.0%	6.8%	5.2%	4.7%

Source: World Bank (2024).

⁴ In a green-field investment, a parent company creates a new operation in a foreign country from the ground up. This often includes large-scale investments in acquiring/leasing land, building plants, purchasing machinery to the parent company's own specifications.

Summarising East Asia's Economic Growth Trends

This sustained growth has positioned East Asia at the forefront of the global economic stage, outshining mature economies and other developing regions. A key result of this growth has been a significant reduction in poverty. Asia's economic expansion has been fuelled by a blend of factor accumulation (notably in labour and capital) and productivity growth. The shift of labour from agriculture to more productive manufacturing sectors, combined with a youthful workforce, heavy investment in education, and labour market flexibility, has significantly boosted the region's productivity and growth.

Policy Analysis: The East Asian Cohorts

In this section of policy analysis, the paper examines the economic journeys of the East Asian nations under consideration, exploring their unique paths to development and the policy pathways they have chosen to achieve them. The study is structured around four distinct cohorts, each representing a group of countries with similar developmental trajectories and policies.

Cohort 1

Japan

Post World War II, Japan's economy was destroyed, but what remained was a desire to build back better. Following the war, Japan faced the stark reality of having lost over a quarter of its industrial capacity, leaving behind a surplus of depreciated capital stock that served no practical purpose. This unique situation provided Japan with the opportunity to swiftly embrace a plethora of new technologies without the need to wait for existing assets to undergo complete depreciation, thus aiding Japan's eager drive for fresh beginnings and innovation.

This research places Japan in cohort 1 as the leader of the East Asian nations that developed over the last half of the 20th century. It is often easy to label this growth and progress as a 'miracle' or 'exception' at the risk of not understanding the critical paths and processes of development. During the period spanning from the 1970s to the 1980s, Japan embarked on a dedicated path of export-oriented industrialisation, strategically luring Foreign Direct Investment (FDI) by cultivating favourable business environments and investing in robust infrastructure. To facilitate FDI, the government established Export-Import Banks and extended incentives to foreign

enterprises. However, in subsequent years, Japan transitioned to a more domestically focused growth model, diminishing its reliance on FDI. Simultaneously, Japan made substantial investments in Research and Development (R&D) and technological innovation, with key support from government agencies such as the Ministry of Economy, Trade, and Industry (METI). By fostering collaborative research and partnerships with foreign companies, Japan aimed to promote technology transfer and innovative advancements.

Cohort 2

Hong Kong

Hong Kong has consistently maintained an open and liberal market, earning its reputation as an FDI hub. It achieved this status by offering low taxes, minimal government intervention, and strategic access to the vast Chinese market. Throughout this period, Hong Kong's FDI policies remained relatively stable. The city-state primarily focused on its flourishing financial and service sectors, attracting talent and knowledge workers from around the world. Moreover, it established science and technology parks to nurture innovation and facilitate technology transfer, albeit with a limited presence in domestic manufacturing. Instead, Hong Kong played a pivotal role in finance and logistics, contributing to regional innovation.

The economic landscape of Hong Kong has undergone a significant transformation, evolving into a highly service-oriented structure. Hong Kong, once dominated by domestic merchandise exports, emerged as a re-export-oriented economy. Domestic goods exports, which averaged 48.9 per cent in the early 1980s, plummeted to a record low of 12.1 per cent during 1996-98. Concurrently, the share of re-exports more than doubled, reaching 71 per cent in 1996-98. Service exports experienced substantial growth, increasing from HK\$29.2 billion in 1980 to HK\$264.7 billion in 1998. The significant relocation of the manufacturing industry to China in the 1980s and early 1990s played a pivotal role in this industrial transformation. Hong Kong's manufacturing sector, primarily focused on producing light consumer goods with low technology content, faced challenges due to rising land and labour costs. Consequently, firms restructured and relocated labour-intensive production processes to Mainland China, capitalising on cheaper resources. This strategic move allowed them to enhance cost efficiency and competitiveness without diversifying into capital- or technology-intensive goods.

Singapore

Singapore adopted a proactive approach to attract FDI by offering incentives, tax breaks, and regulatory support to multinational corporations (MNCs). This endeavour was bolstered by the establishment of industrial parks and substantial investments in infrastructure. Over time, Singapore has transformed into a global financial and technology hub, with a robust focus on education and research and development (R&D). This concerted effort has led to its evolution into a knowledge-based economy. Initiatives like the 'Research, Innovation, and Enterprise 2020 Plan' underscored the nation's commitment to fostering innovation. Singapore strategically positioned itself as a technology and innovation hub, promoting technology transfer through government support and collaborative endeavours with various stakeholders.

Between 1960 and 1992, Singapore's GNP experienced a thirteenfold increase, propelling the nation from the 33rd highest per capita income globally in 1965 to the 17th position by 1992, surpassing countries such as Spain, New Zealand, and Ireland (World Bank, 1994). Full employment has been sustained since 1973, and absolute poverty is virtually non-existent. Gini coefficients for individuals hovered around 0.46 in the mid-1980s.

Between 1970 and 1979, manufactured exports emerged as the primary driver of Singapore's economic growth. The proportion of direct manufactured exports to GDP surged from 12.7% in 1966 to nearly half in 1979 and nearly three-fifths in 1992. From the 1970s to the 1990s, Singapore experienced consistent economic growth, earning recognition alongside Hong Kong, South Korea, and Taiwan as one of the "Four Tigers" that drove Asian economic prosperity. During this period, labour-intensive industries were shifted to other ASEAN nations, making way for the emergence of high-technology industries and services. The People's Action Party (PAP) played a pivotal role in fostering a stable, corruption-free government characterised by robust central development planning and social policies. Despite occasional paternalistic and authoritarian practices, along with one-party dominance, the PAP retained a substantial popular mandate. This era witnessed the emergence of a distinct Singaporean identity, distinct from the Malay and Chinese identities, as the nation increasingly integrated itself into the global economy.

Singapore has become a significant recipient of Foreign Direct Investment (FDI), with average annual inflows reaching nearly US\$25 billion since 2007. While some restrictions on foreign direct investment persist in specific sectors, such as broadcasting/news media, legal services, and retail banking,

Singapore actively promotes investment through a range of tax and non-tax incentives. These incentives aim to stimulate local companies to expand, engage in international production, invest in research and development (R&D), training, and seize procurement opportunities. Additionally, incentives are provided to encourage companies to establish their global or regional headquarters in Singapore, fostering technology and knowledge transfer and enhancing the city-state's appeal as a services hub. State ownership remains substantial in key sectors such as electricity, telecommunications, transport, and ports, facilitated through enterprises in which Temasek holds shares.

South Korea

Over the past five decades, the Republic of Korea has undergone a swift transition from a low-income to a high-income status. Since the early 1960s, the economy has experienced rapid growth, propelled by competitive export-oriented manufacturing, substantial investment, increased educational attainment, and a growing working-age population. Deep structural policies, institutional improvements, sound macroeconomic strategies, and a focus on industrialisation through export competitiveness supported this growth.

South Korea's trajectory saw an initial reliance on state-led development with limited FDI. However, it subsequently shifted towards a more open FDI policy, leading to the liberalisation of FDI regulations, the provision of investment incentives, and the establishment of export-processing zones. This shift aimed at actively attracting FDI to bolster export-oriented industrialization. Concurrently, South Korea pursued technology transfer with a sense of urgency through state-led initiatives. Government agencies, such as the Korea Institute of Science and Technology Evaluation and Planning (KISTEP) and the Korea Institute for Advancement of Technology (KIAT), played pivotal roles in supporting innovation and technology startups. South Korea's conglomerates, known as chaebols, have also played a significant role in technology transfer and innovation development, contributing to the nation's remarkable growth in these areas.

Cohort 3

Philippines

Soon after its independence from the US in 1946, the Philippines enacted the policy of import substitution, leading to an increase in import-substituting FDI. The US was the largest investor, due in part to certain privileges afforded by the laws, which initially focused on investments in trade and public utilities

but shifted towards manufacturing by the late 1960s. The 1970s saw a decline in FDI due to political and economic instability in the country, which led to a focus on liberalisation and deregulation to attract FDI. In the mid-1980s, the Philippines' government policy was characterised by economic liberalisation with a focus on trade and investment, and with the associated privatisation of government-controlled companies. The 1990s were characterised by sector-wise reforms in the financial and transportation sectors of the economy, followed by the enactment of the Foreign Investment Act of 1991. The Act removed most restrictions on the extent of foreign ownership in export enterprises, allowing foreigners to invest up to 100% equity in selected industries. In the mid-1990s, the Philippines started developing special economic zones under the Philippine Economic Zone Authority to promote FDI.

In recent years, the Philippines has transitioned into a services-oriented economy, with services accounting for 61% of the country's GDP. Manufacturing's share has declined due to trade reforms, which have impacted international competitiveness. While service exports, particularly business processing outsourcing, have thrived, manufacturing struggles to maintain its market share.

Malaysia

The Malaysian government in the early 1960s primarily focused on import substitution and FDI to meet local demand; however, due to its small population, economies of scale were limited. Malaysia's FDI policy heavily relied on tax holidays, with the industrialisation policy primarily centred around the Pioneer Industries (Relief from Income Tax) Ordinance of 1958, later replaced by the Investment Incentives Act in 1968, which emphasised employment creation and economic diversification. Favouring a strategic shift from import substitution to export orientation, specific industries were targeted for investment, especially in the semiconductor industry. In the mid-1980s, generous incentives were introduced to revive FDI inflows, including the 1986 Promotion of Investment Act. Tax incentives, investment tax allowances, and infrastructure allowances were provided, encouraging FDI in manufacturing, agriculture, and other sectors. Malaysia also promoted sequential investing and encouraged the establishment of Free Zones for export-oriented manufacturing, allowing for minimal customs controls, duty-free imports, and streamlined customs facilities, with 100 per cent foreign ownership permitted in these zones.

Thailand

Thailand's foreign investment policies evolved in line with the country's changing development strategies. Initially, high tariff barriers attracted foreign Multinational Enterprises (MNEs) seeking to establish assembly production for the domestic market. This was followed by a second wave of Foreign Direct Investment (FDI) in the late 1980s, driven by favourable labour costs, exchange rates, and export promotion policies, which led to the establishment of export-oriented platforms for foreign investors. These policies created a clear divide between domestic market-oriented and export-oriented production, shaping FDI patterns in the country. Firms with export-oriented projects enjoyed fewer restrictions, tax incentives, and import duty exemptions, while those focusing on the local market faced restrictions, minority ownership requirements, and land leasing limitations. Thailand's policies towards FDI remained relatively stable, eventually leading to the gradual liberalisation of restricted sectors, a process that accelerated during economic crises. The Board of Investments (BOI), established in 1954, is tasked with implementing investment policies and offering fiscal incentives. It plays a key role in implementing these policies, granting fiscal incentives, and easing restrictions on foreign investment. Over time, policies reflected both import substitution and export promotion strategies, with the imposition of tariff surcharges aimed at protecting promoted firms.

CASE: Despite enduring global economic crises, the Thai automotive industry exhibited robust growth, particularly in the production of pickup trucks and parts exports. Mr. Vallop Tiasiri, President of the Thai Automotive Institute (TAI), played a pivotal role by providing strong leadership and fostering collaboration between Foreign Direct Investment (FDI) and local firms, effectively linking them with policymakers.

Bridging Local Auto Part Suppliers and Japanese FDI Auto Makers, the Technology Promotion Association (TPA), an independent non-profit organisation founded by Thai students who studied engineering in Japan, has been pivotal in promoting Japanese management practices, technology, and language to Thai individuals for nearly four decades. In 2007, it established the Thai-Nichi Institute of Technology. Meanwhile, the Thai Automotive Institute (TAI), initially a government-created entity but now financially autonomous, designs automotive master plans and implements policies. Under the Automotive Human Resource Development Program (AHRDP, 2006), firms like Denso, Honda, Nissan, and Toyota collaborate to teach lean production, mould & die techniques, skill certification, and Toyota Production System (TPS) principles to Thai suppliers, bolstered by support from organisations such as JICA and JETRO.

Indonesia

Over the years, Indonesia's policy stance towards inward investment has been closely tied to developments in the oil sector, leading to fluctuations in attitudes towards foreign investors. Initially, in the late 1960s, the country had relatively liberal FDI policies under the Foreign Capital Investment Act of 1967. However, stringent conditions were imposed on inward investment during the 1970s, coinciding with increased oil revenues and domestic resistance. With declining oil revenues in the late 1980s, Indonesia recognised the potential role of FDI in economic development, leading to a new investment promotion drive from 1986 onwards. This drive included relaxing limits on foreign ownership, facilitating investment licensing procedures, and further liberalisation in May 1994, allowing full foreign ownership and reducing the number of sectors closed to foreign investors. The policy shifts were part of broader economic reforms, emphasising trade policies, state-owned sectors, and financial sector liberalisation. The periods of import substitution industrialisation, which have remained a dominant goal of the government, were followed by a shift towards export orientation. The overall shift towards deregulation and outward orientation since the mid-1980s has emphasised export promotion as a key goal of FDI policy.

Todo & Miyamoto (2006) use firm-level data from Indonesia to examine the impact of FDI on knowledge spillovers and the role of local R&D activities in Indonesia. They found that FDI had a positive effect on knowledge spillovers, but that this effect was stronger for local firms with higher R&D intensity. They suggested that local R&D activities enhanced the absorptive capacity and complementarity of local firms, which enabled them to benefit more from the knowledge provided by foreign affiliates.

Cohort 4

China

China has experienced significantly faster growth than the global average, particularly post-1978. Consequently, China's share of the world economy, measured nominally, has surged from under 2 per cent in 1978 to 18.4 per cent in 2021. In 1952, manufacturing represented the smallest sector, contributing less than 20 per cent to the national GDP. However, by 1975, it surpassed the agriculture and service sectors to become the largest sector, accounting for 46 per cent of the national GDP. China's adoption of import substitution, a prevalent policy for developing countries at the time,

distinguished itself through a high saving rate (25–30 per cent) and rigorous planning. Despite being one of the world's poorest nations, China effectively channelled savings into targeted sectors, establishing a comprehensive industrial base by 1978 and transitioning from an agrarian to an industrialising society.

Beyond industrial development, China also improved the education and health of its citizens, following a distinct approach from India, which focused more on higher education. China's strategy proved successful in the early stages of economic growth, especially when there was a demand for unskilled workers. Following 1998, as China entered the middle-income stage (officially becoming a middle-income country in 2002), it expanded higher education to meet the growing demand for skilled workers.

Today, more than 80% of FDI in China is greenfield investments, and most FDI is in the manufacturing industry. By 2001, FDI in manufacturing accounted for 70% of the total FDI projects, 56% of the total amount of FDI, and 60% of the total amount of registered capital in FDI in China.

Kimura (2012) uses firm-level data from the Chinese electrical and electronics industry from 1998 to 2007 to analyse the effect of FDI on the growth of local firms in China. He found that FDI had a positive effect on the growth of local firms in terms of sales and employment, but an adverse effect on their profitability and productivity. He attributed this result to the competition effect of FDI, which forced local firms to lower their prices and increase their output, but also reduced their profit margins and efficiency.

Feng (2009) uses firm-level data from China to examine the impact of FDI on innovation output and input of domestic firms. He found that FDI had a positive effect on innovation output (measured by patent applications), but an adverse effect on innovation input (measured by R&D expenditure). He explained this paradox by suggesting that FDI could induce two types of innovation behaviour among domestic firms: imitation or innovation. He argued that imitation was more likely to occur for backward linkages than for forward linkages, as backward linkages provided more opportunities for learning from foreign affiliates, while forward linkages provided more incentives for innovation to meet the demand of foreign affiliates.

Vietnam

Since the implementation of *doi moi* (economic renovation), Vietnam has undergone remarkable industrial growth. “Doi moi” refers to Vietnam's economic renovation policy initiated in 1986. This policy marked a shift from a centrally planned to a socialist-oriented market economy. It aimed to introduce economic reforms, liberalise trade, encourage foreign investment, and improve productivity. The objective was to boost economic growth, enhance industrialisation, and modernise various sectors of the Vietnamese economy. The policy has been crucial in transforming Vietnam into one of the fastest-growing economies in the region.

Despite facing severe economic challenges stemming from the collapse of the Soviet Bloc, the Asian financial crisis, and the more recent global financial crisis, industrial value-added has exhibited an impressive average annual growth rate of 8.3 per cent (between 1986 and 2012), marking an 8.6-fold increase over this period. This swift industrial development spurred transformative shifts in the economy. The competitiveness of the manufacturing industry has witnessed a substantial enhancement, accompanied by a diversification in its structure. In the late 1990s, a predominant share of the country's exports consisted of rice, oil, and food, collectively accounting for over half of the export basket, with no significant presence of high-tech exports. However, by 2012, the share of these three commodities had diminished to around one-quarter, while manufactured goods commanded nearly 70 per cent of the export composition, including a noteworthy 15 per cent classified as high-tech products.

Analysis of East Asian Economies and Pakistan's Economic Growth

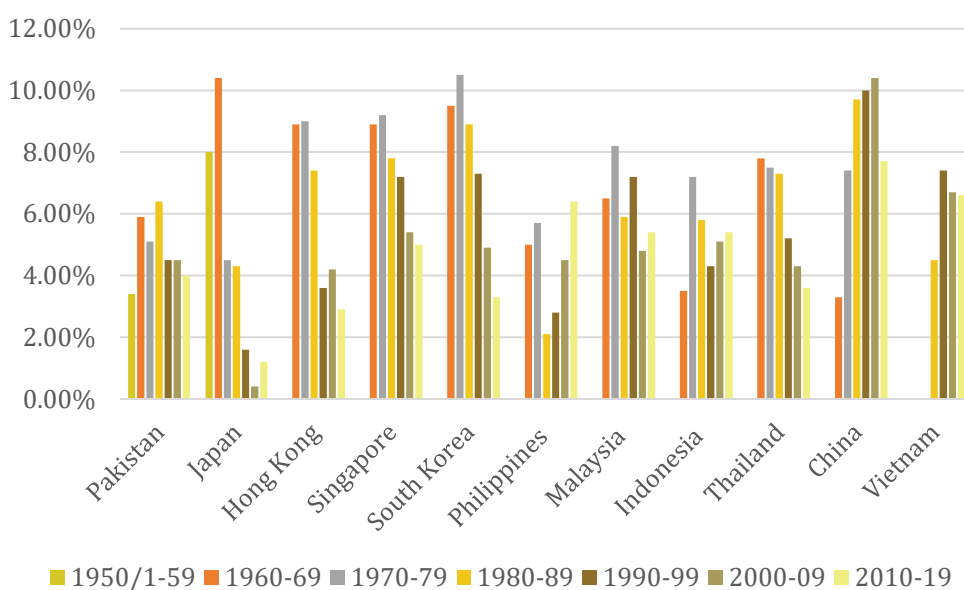
Pakistan's Macro-Economic Comparison with East Asia

During the 1960s, Pakistan's average GDP growth exceeded that of the Philippines, Indonesia, and China, while its manufactured exports were higher than those of Malaysia, Indonesia, Thailand, and the Philippines (Husain, 2023). This promising position indicated a significant opportunity for Pakistan to establish itself as an emerging Asian giant. In 1996, both Pakistan and Vietnam had similar export volumes (approximately USD 10 billion). However, today, Vietnam's exports have surged to USD 371 billion (GSO, Vietnam, 2023), while Pakistan's exports lag at USD 32 billion (SBP, 2023). Economic stagnation and decline following 1970 have prevented Pakistan from pursuing its potential. Even in the South Asia region, despite starting

much better (in the 1960s), the country now finds itself at the very bottom. India and Bangladesh now seem to be joining the ranks of what could be the *fifth cohort of Asian Tigers*.

Upon a deeper investigation into Pakistan's growth patterns compared to those of East Asian economies, it becomes clear that our average decade-wise growth has not surpassed 6.25 per cent, with an all-time average of 4.83 per cent. When examining the three highest consecutive decades of growth, only the Philippines and Indonesia fall below Pakistan, but both exceed Pakistan in the recent two decades of growth (2000-2019).

Figure 2: Real GDP Decades of Growth - Pakistan and East Asia



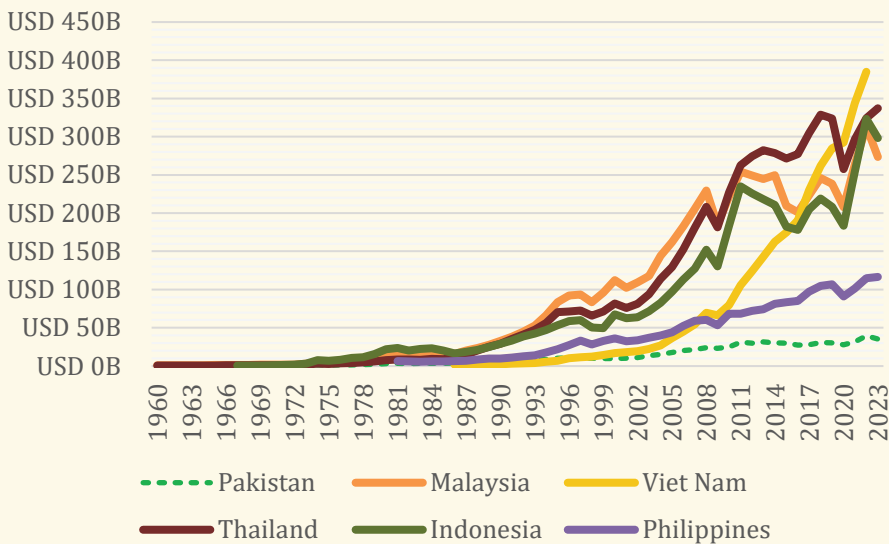
Source: World Bank (2024).

The past three decades have been exceptionally poor for Pakistan's economic performance compared to economies in the region, especially those in East Asia. The main takeaway here is that Pakistan's economic performance never took off from where it should have in 1990 onwards. By 1990, most of the economies in this analysis had either achieved decades of sustained and high growth (above 7%) or went on to achieve high economic growth in the three decades to follow, as is evident, Pakistan fell short on both accounts.

Export comparisons further reveal the stark differences in development trajectories of countries in East Asia and Pakistan. Figure 3 below shows that the selected countries for this comparison all had exports under USD 50b in 1992 and crossed USD 100b by 2010, apart from the Philippines, which took another ten years to do so.

Box 1: Regional Growth Perspective

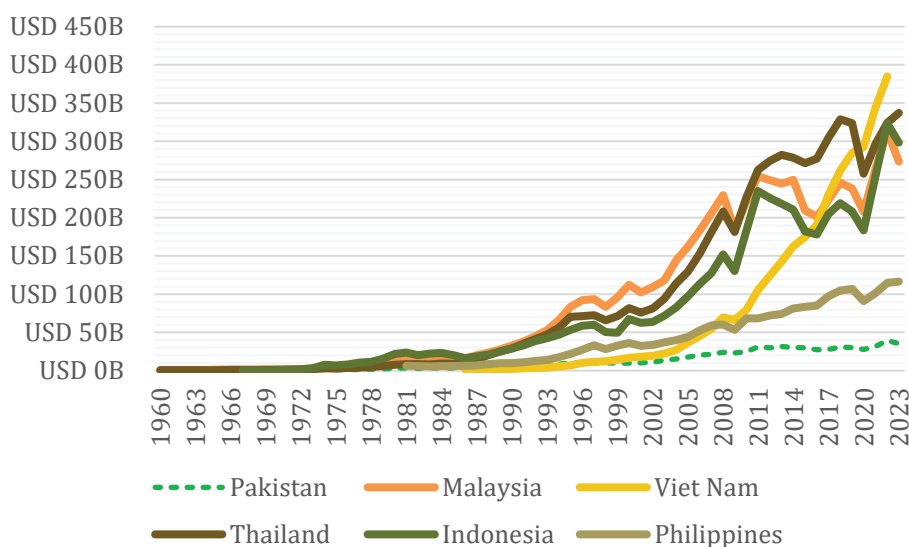
Figure 3: Real GDP Growth for South Asia region



Source: World Bank (2024).

The growth patterns reveal that over the past three decades, the difference in growth trajectories between Pakistan and its neighbours has increased. With Bangladesh and India nearing the 6% average growth in the decade ending 2019 (before the pandemic), Pakistan struggles to reach 4%. The country has not been able to sustain any substantial growth compared to its neighbours. The reasons behind this are discussed in sections of this paper, especially about the lack of industrial upgradation and export-oriented growth.

Table 5: Export Comparison - Pakistan and Selected East Asian Economies



Source: World Bank (2024).

Case study of a Successful FDI-driven industry

Automobile industrial clusters in China

The section is based on He (2008). An automobile industry cluster is a term for an economic ecosystem within a specific region, characterised by the central role of the automobile sector, with the parts and components industry forming the supply chain upstream and the professional services industry downstream. This cluster is characterised by a high level of concentration of businesses that engage in a wide range of cooperative interactions, which may be either vertically or horizontally aligned, thereby enhancing the synergy of their interdependent operations—the synergistic effect of these clustered industries results in significant cost efficiencies and a boost to innovative capabilities.

The automotive industrial chain encompasses a broad and deep array of sectors, including metallurgy, iron and steel, machinery, electronics, rubber, petrochemicals, plastics, glass, chemicals, textiles, and others. Moreover, it is connected to commerce, vehicle maintenance services, insurance, transportation, and road infrastructure development, among other areas. The automotive sector is intricately interlinked with these industries, depending heavily on them and also driving their advancement. By adopting a focused industrial cluster approach, the automobile sector not only bolsters its own

growth but also stimulates swift progress across these associated industries. Within such clusters, a highly specialised division of labour emerges, paving the way for mass production and sales, which significantly cuts down on both production and transaction costs. This consolidation of the industrial chain ultimately enhances the competitive edge of the leading industry.

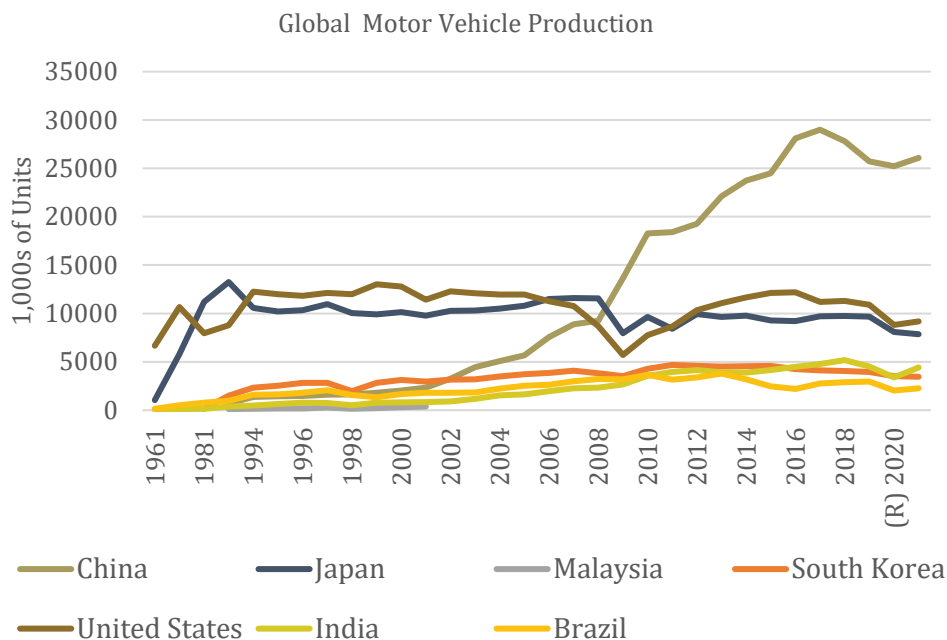
The trajectory of China's automotive industry has undeniably been influenced by the broader dynamics of China's political economy. To comprehend and value its growth, it is crucial to situate its evolution within the broader context of China's industrialisation. This process has been centrally directed and moulded by distinct industrial policies, which are explored in this section. The historical narrative of the automotive industry is delineated through four pivotal phases of development: the era of central control and planning, spanning from 1949 to 1979; the proliferation phase, from 1979 to 1994; the concentration phase, from 1994 to 2004; and the most recent phase, from 2004.

The Beijing-Tianjin corridor, separated by a mere 130 kilometres, stands as a pivotal hub for China's automotive industry. This area is home to a host of key players, including Beijing Hyundai, Beijing Jeep, LHB, Beijing Benz, and Tianjin's own FAW Toyota and FAW Xiali. The region boasts a robust network of suppliers and manufacturers of automotive parts, including Tianjin Denso and Tianjin Stanley, among others.

The automotive value chain in China has undergone a significant transformation. Initially, the Chinese automotive industry operated within a closed market prior to 1980. It then transitioned to a stage with selected Joint Ventures (JVs), such as Volkswagen–FAW, which introduced mainstream passenger car production. Over time, China has evolved into one of the largest global markets, hosting major players like Volkswagen, BMW, Mercedes-Benz, Mazda, Nissan, Honda, Ford, General Motors, Hyundai, Toyota, and Suzuki, alongside numerous domestic car manufacturers.

In the earlier stages, entire designs and key components were imported. However, as local production has expanded, the importation of finished vehicles has significantly declined. While designs are still predominantly imported, there has been a notable increase in locally sourced content, with various contracts being awarded to Chinese suppliers or joint ventures between foreign and Chinese entities. Mirroring the Original Equipment Manufacturers (OEMs), all of the top ten global first-tier suppliers have established operations in China, actively participating in multiple JVs with local suppliers.

Figure 4: Evolution of Car Production in Selected Newly Industrialised Economies and Regions, 1961–2021



Source: Wards Intelligence (2023).

The government's vigorous support has propelled the industry forward, particularly since the 1980s, cementing the automotive sector as a cornerstone of Beijing's industrial landscape and a key economic component for Tianjin. Strategic collaborations, such as the alliance between Tianjin Automotive Group and FAW Group, along with Beijing Automobile Holding Company's expansion with entities like Beijing Foton, Beijing Hyundai, and Beijing Benz-Dyke, have solidified the region's reputation as a significant automotive cluster.

This cluster benefits immensely from its strategic location, serving as China's political heartbeat and an economic powerhouse. It enjoys burgeoning market demand and is supported by an advanced infrastructure for production and distribution. A landmark development in this sector was the establishment of the Beijing Jeep joint venture in May 1983, a pioneering and significant joint venture in China's automotive history, and at the time, the largest of its kind.

Case Specific Learnings

- Partnerships with global giants from the United States, Japan, South Korea, and Germany, including industry heavyweights like VW, Honda, GM, Buick, Toyota, Nissan, Hyundai, Kia, Daimler-Benz, and Ford, have bolstered local production.
- This collaboration has spawned a wave of domestic brands that are not only thriving locally but also carving a niche in international markets.
- The development of the automotive industry in Shanghai was shaped by the Chinese government's strategy to enhance the 'Chinese car' segment through the support of local component manufacturers.
- The tariff structure was designed to encourage the use of domestically produced technology components.

Today, the spotlight is on China's burgeoning electric vehicle manufacturers, poised to revolutionise the global automotive landscape.

Econometric Analysis: East Asia and the Extended Group of Countries

Table 6: Summary Statistics

	count	mean	sd	min	max
lnLP	530	10.376	0.742	8.417	12.071
TFP	530	0.644	0.216	0.237	1.393
lnFDI	530	0.459	0.792	0.007	6.254
HC	530	2.612	0.449	1.581	4.352
lnTO	530	4.196	0.680	2.781	6.093
lnIPR	530	4.527	1.737	-1.539	8.360
lnIE	530	3.147	0.250	2.231	3.796
SG	530	7.006	1.067	3.586	9.094
LS	530	5.232	1.405	1.858	8.715
FT	530	7.198	1.326	2.317	9.785
RE	530	6.429	1.243	2.949	9.409
lnCI	530	11.648	0.916	9.033	13.298

Source: Authors' computations.

Our regression results using Pooled OLS and fixed effects estimators are presented in Table 7.

Table 7: Regression Results of Host-Country Characteristics on LP and TFP

	LP			TFP		
	OLS	FE	FE year	OLS	FE	FE year
lnFDI # HC	-0.032 (0.030)	0.127*** (0.040)	0.029 (0.026)	-0.091*** (0.015)	-0.057*** (0.014)	-0.078*** (0.016)
lnFDI # lnTO	0.013 (0.021)	0.122 (0.108)	0.039 (0.115)	0.003 (0.009)	-0.003 (0.028)	-0.023 (0.028)
lnFDI # lnIPR	0.067*** (0.012)	-0.065** (0.029)	-0.044** (0.022)	0.022*** (0.007)	-0.032** (0.014)	-0.029** (0.013)
lnFDI # lnIE	-0.047** (0.024)	0.127*** (0.026)	0.045** (0.019)	-0.029 (0.032)	0.025 (0.021)	0.008 (0.020)
lnFDI # SG	-0.023*** (0.006)	0.004 (0.005)	0.004 (0.004)	-0.004* (0.002)	-0.006* (0.003)	-0.007** (0.003)
lnFDI # LS	0.000 (0.007)	0.052*** (0.012)	0.017 (0.011)	-0.003 (0.003)	0.028** (0.012)	0.026** (0.011)
lnFDI # FT	0.031** (0.013)	-0.023 (0.021)	0.015 (0.019)	0.028*** (0.009)	-0.012 (0.011)	-0.001 (0.010)
lnFDI # RE	0.026** (0.013)	0.044*** (0.008)	0.027*** (0.007)	0.011* (0.006)	0.005 (0.006)	0.001 (0.005)
Year dummies			Yes			Yes

*** Significant at the 1 percent level; ** Significant at the 5 percent level; * Significant at the 10 percent level. Note: Each cell represents a separate regression and shows the coefficient of the interaction term of log of FDI and a host-country characteristic. All regressions control for the natural logarithm of capital intensity. Results are from pooled OLS and fixed effects regressions. The data on total factor productivity is available for 35 countries in our sample, whereas data on labour productivity is available for 49 countries—robust standard errors in parentheses.

Source: Authors' computations.

5. DISCUSSION

Factors Influencing the Ability (Determinants) of FDI to Generate Spillovers

The literature review and policy analysis reveal that the role of mediating factors and absorptive capacities offers a potential to explain the high-growth performance of East Asia. Likewise, they also offer a potential direction for Pakistan in terms of policy change. Foreign Direct Investment (FDI) serves as a conduit for knowledge transfer and productivity enhancement in host economies. However, the effectiveness of FDI in generating knowledge and productivity spillovers depends on several key factors (see Annexe 3 for Types of Knowledge Spillovers from the East Asian Growth Models). This section examines the determinants that influence the capacity of FDI to foster knowledge and productivity spillovers in the specific context of the countries under study (see Annex 2 for Context of East Asia's Economic Success).

Intellectual Property Rights (IPR)

A robust Intellectual Property Rights (IPR) framework is essential for safeguarding intellectual assets and encouraging innovation-driven FDI. Literature supports the notion that robust IPR frameworks are essential for safeguarding intellectual assets and encouraging innovation-driven FDI. For instance, Falvey et al. (2006) highlight that strong IPR protection attracts FDI by reducing the risk of intellectual property theft and encouraging multinational corporations (MNCs) to invest in high-technology sectors. Additionally, empirical studies by Park & Xiao (2016) suggest that effective IPR enforcement leads to greater technology transfer, research collaboration, and knowledge dissemination, particularly in countries with established innovation ecosystems.

In our analysis, the protection of IPR is associated with an increase in FDI spillovers in the pooled OLS (see Section 4.5); however, when controlled for heterogeneity between countries and years using fixed effects, their coefficients become negative. This indicates that the relationship between IPR and FDI spillovers is complex. Upon a deeper analysis, there is indeed a linear and direct correlation between IPR and labour productivity (see Annexe 4), however, its interaction with FDI is not straightforward. The issue of causality exists in the absence of controls for country and year heterogeneity.

This apparent inconsistency may be due to highly developed economies with a pre-existing skilled workforce not being influenced by additional gains from FDI spillovers, as compared to less developed countries with a relatively less skilled workforce. Hence, countries with higher IPR protection, proxied by a high number of patent applications per population, have diminishing effects of FDI on increasing productivity.

In general, countries with strong IPR protection, such as Japan and South Korea, ensure that investments in intellectual capital are adequately protected, encouraging multinational corporations (MNCs) to share proprietary knowledge and technologies within agreed bounds. Consequently, in the long run, host countries may benefit from enhanced innovation capacities, skill development, and productivity gains driven by FDI-induced knowledge spillovers.

Investment Environment

Gross Fixed Capital Formation (GFCF) refers to the net investment in physical assets such as machinery, buildings, and infrastructure within an economy. It represents the value of acquisitions of new or existing fixed assets by the business sector, governments, and households (excluding their disposable items). GFCF is a crucial indicator of economic health and productive capacity, reflecting the level of investment in long-term physical assets that contribute to economic growth. Our results support the argument that countries with higher levels of domestic private investments (InIE), measured by gross fixed capital formation (% of GDP), have more substantial FDI spillovers, measured through labour productivity.

The relevance of GFCF to the analysis of FDI spillovers lies in its role as a proxy for the domestic investment climate and the economy's ability to absorb and utilise foreign investments effectively. Higher GFCF indicates a robust domestic investment environment, which is essential for supporting and amplifying the positive effects of FDI. A higher rate of GFCF suggests that an economy is continuously enhancing its productive capacity, infrastructure, and technological base, making it more attractive to foreign investors and better positioned to benefit from knowledge spillovers.

Legal System

The legal system of a country plays a pivotal role in safeguarding intellectual property rights (IPR), enforcing contracts, and resolving disputes, all of which are essential for facilitating knowledge and productivity spillovers from FDI.

Strong legal institutions are fundamental in providing a stable environment that attracts foreign investors (La Porta et al., 1997). They ensure that the rights of investors are protected, thereby fostering an environment conducive to long-term investments. As noted by Maskus (2000), strong IPR regimes are critical for attracting FDI in high-technology sectors where proprietary knowledge and innovations are key assets. Effective IPR protection enhances the enforceability of technology transfer agreements, licensing arrangements, and joint venture contracts, thereby encouraging MNCs to engage in activities that lead to significant knowledge spillovers to domestic firms.

Our quantitative results support this view and show that better legal systems (LS) have a positive impact on FDI spillovers, both on labour productivity and total factor productivity.

Japan and Singapore serve as cases where strong legal frameworks and efficient judicial systems have played a significant role in attracting FDI and facilitating productivity spillovers (Christopoulou et al, 2021; Arif-Ur-Rahman & Inaba, 2021). Japan's legal system, known for its rigorous protection of intellectual property and efficient enforcement of contracts, has been instrumental in attracting FDI in high-tech industries. Similarly, Singapore's legal infrastructure, characterised by its transparency, efficiency, and strong IPR protection, has made it a preferred destination for foreign investors. In Singapore, the establishment of the Intellectual Property Office and the Singapore International Arbitration Centre has further strengthened the legal environment for FDI. These institutions provide comprehensive support for the protection of intellectual property and the resolution of commercial disputes, thereby enhancing the confidence of foreign investors.

Size and Role of Government

The size and role of government in the economy significantly influence the ability of FDI to generate knowledge and productivity spillovers. Minimal government interference allows market forces to allocate resources efficiently, promote competition, and encourage FDI inflows that drive technological diffusion and productivity growth. It fosters an environment where market forces can operate freely, leading to efficient resource allocation and increased competition. A limited role of government in economic activities promotes entrepreneurship and innovation by reducing the regulatory burden on businesses, whereas excessive regulation and government intervention can stifle entrepreneurial activity and discourage investment.

Results from quantitative analysis carried out in section 4.5 also support this view, where countries with higher levels of government interference in economic activity (SG) have a significant negative, albeit small, impact on FDI spillovers on total factor productivity. This suggests that excessive government intervention, bureaucratic red tape, and regulatory inefficiencies may impede FDI spillovers by creating barriers to entry, distorting market incentives, and stifling entrepreneurial activity. Additionally, countries with fewer regulations (RE) impeding market freedom see a significantly positive impact of FDI spillovers on Labour Productivity.

Countries with limited government intervention and regulatory burdens, such as Hong Kong and South Korea, tend to create a conducive environment for innovation, entrepreneurship, and investment. Hong Kong's laissez-faire economic policies and minimal regulatory barriers have made it one of the most attractive destinations for foreign investment. The ease of doing business in Hong Kong, coupled with its open-market policies, has facilitated substantial FDI inflows, driving technological diffusion and productivity growth across various sectors.

South Korea, although it has a more active government role compared to Hong Kong, has implemented policies that reduce regulatory burdens and promote competition. The country's focus on creating a business-friendly environment through deregulation and support for innovation has attracted significant FDI, particularly in high-tech industries. This has led to extensive knowledge transfer and productivity gains, as foreign firms bring advanced technologies and managerial practices into the domestic market.

Trade

Trade Openness

Open trade policies enable the inflow of foreign capital, technology, and expertise, which, according to studies, are essential for boosting productivity and fostering innovation in host countries (Edwards, 1998; Asongu & Odhiambo, 2020). They support the view that countries with fewer trade restrictions tend to experience higher growth rates and greater economic benefits from FDI, as open markets allow for more efficient resource allocation and enhanced competition.

However, from our analysis, no significant impact of FDI on productivity spillovers can be seen in countries that are more open to trade (TO). This is indicative of trade openness not being a sufficient condition for FDI-driven

spillovers to materialise. Additionally, it is also likely that the quantum of trade as a percentage of GDP may be a weak proxy of real trade inclinations, especially if non-capital imports dominate the total trade.

Freedom to Trade

In our quantitative results from OLS analysis, countries with higher levels of freedom to trade show significant positive FDI spillovers. This can be attributed to the fact that open economies are more likely to attract foreign investors who bring in advanced technologies, managerial skills, and new business practices. The inflow of FDI in such environments stimulates competition and innovation, resulting in enhanced productivity and economic growth. However, the positive impact of trade freedom on FDI spillovers diminishes in fixed effects regressions. This indicates that the relationship between trade freedom and FDI spillovers is not uniform across all countries and periods. Fixed effects models control for unobserved heterogeneity by accounting for country-specific and time-specific factors, revealing that the benefits of trade freedom may be contingent upon other structural and institutional variables unique to each country.

Human Capital Development

Investments in human capital development, including education, training, and skills enhancement, are critical for leveraging FDI to generate knowledge and productivity spillovers in host economies. Countries that prioritise education reform, vocational training, and lifelong learning initiatives, such as Taiwan and Malaysia, are better positioned to absorb and utilise foreign technologies and managerial practices effectively. A skilled and adaptable workforce enhances the absorptive capacity of domestic firms, facilitates technology absorption and adaptation, and drives innovation-led growth.

However, the empirical results from the analysis indicate that the interaction coefficient of human capital (HC) is insignificant for labour productivity with year fixed effects, but negative for Total Factor Productivity (TFP). This suggests that countries with higher human capital may see a diminished effect of FDI on productivity. One possible explanation for this is that highly skilled economies may already be operating at a high level of efficiency and innovation, thus additional FDI does not have as substantial an impact on further productivity gains. This aligns with the findings of Borensztein, De Gregorio, and Lee (1998); Wang and Wong (2011), who argue that the effectiveness of FDI in promoting growth depends on the pre-existing level of human capital (education) in the host country.

Barriers to FDI Spillovers in Pakistan

Pakistan stands at a pivotal juncture in its economic trajectory (see Annex 1 for Pakistan's Economic Performance), where the promise of Foreign Direct Investment (FDI) holds significant potential for fostering technological advancement and knowledge diffusion across industries. This section explores key challenges, ranging from trade openness and investment promotion to human capital development, each crucial in shaping Pakistan's ability to harness FDI for sustainable economic growth. By analysing these barriers, we aim to uncover the complexities and nuances that define Pakistan's economic landscape and offer insights into strategies for enhancing the transformative impact of FDI on the local economy.

Trade Openness

Pakistan's heavy reliance on import tariffs for tax revenue has undermined trade integration and export competitiveness. High tariffs, combined with a weak tax administration, have led to prolonged protection of domestic industries, which has hindered their development and competitiveness. The National Tariff Policy (NTP), approved in November 2019 (for a period of five years) after extensive consultation by the Ministry of Commerce (MOC), represents a strategic shift in Pakistan's tariff approach. Unlike previous policies, which primarily aimed at revenue generation, the NTP reorients tariffs as a tool for promoting trade and eliminating anti-export bias. It focuses on efficient resource allocation, removing distortions in the domestic economy, and fostering competitiveness for domestic industries. Sectors like textiles, automotive, and renewable energy receive targeted attention. These principles include cascading tariffs, strategic protection, and import substitution. However, similar policy initiatives have been taken in the past in Pakistan. Moreover, importantly, the desire to protect local industry is still present in the shape of 'strategic protection' and 'competitive import substitution', both with provisions for domestic protection in the current NTP. This does not align well with the objectives outlined in the policy itself, as history has shown that such protection seldom ceases to exist and instead perpetuates existing market inefficiencies and a lack of competitiveness.

Non-tariff barriers also pose significant challenges to trade in Pakistan, including cumbersome customs procedures, regulatory compliance requirements, and bureaucratic red tape. NTBs contribute to trade inefficiencies, increase transaction costs, and hinder the smooth flow of goods across borders. Cumbersome administrative processes and a lack of transparency inhibit trade facilitation measures, slow clearance procedures and lead to delays.

Impact of Trade Barriers on FDI Spillovers:

- High tariffs create a less favourable environment for FDI by increasing the cost of imported inputs and intermediate goods necessary for production. This can deter foreign investors who rely on global supply chains, thereby limiting the inflow of FDI.
- High import tariffs protect domestic industries from international competition, which often leads to inefficiencies and a lack of innovation. Without competitive pressure, domestic firms may not seek to improve productivity or adopt new technologies, thus limiting the positive spillovers from foreign firms that do invest.
- Foreign firms often look for markets where they can easily import necessary inputs and export finished products. High tariffs restrict market access, making Pakistan a less attractive destination for FDI. This restricts the potential for FDI to generate backward and forward linkages with local firms, crucial for spillover effects.
- Protectionist policies can lead to misallocation of resources by directing investment towards less efficient sectors. This not only hampers overall economic efficiency but also diminishes the potential for FDI to bring about technological and managerial advancements across the economy.

Promoting Foreign and Domestic Investment

It is pertinent to note that the bulk of the investments in any developing country over a long period of time come from domestic sources. On this front, too, Pakistan has been stuck in a low-savings, low-investment trap. The economy does not generate enough resources for there to be adequate savings that lead to investments. Private sector financing in this regard has also been geared towards government borrowing and not the SME sector, for instance. The State Bank of Pakistan has already explained this in detail in a number of publications on this topic. Therefore, any investment or existing investment that takes place in the country becomes important in terms of its impact on the economy. It also becomes even more crucial to ensure that the investments that do take place are leading to the right kind of value addition to products and are export-worthy.

Impact of Low-Saving Low-Investment on FDI Spillovers:

Pakistan's low-savings and low-investment scenario significantly constrains the country's ability to attract and effectively utilise FDI. This situation has several implications for the potential spillovers from foreign investments:

- Low domestic investment in infrastructure, such as transportation, energy, and telecommunications, deters foreign investors. Even if FDI does enter the country, the lack of adequate infrastructure limits its efficiency and productivity, reducing potential spillovers. High-quality infrastructure is crucial for the smooth operation of businesses and the efficient movement of goods and services.
- Domestic firms lack the financial capacity to engage in joint ventures or partnerships with foreign investors. This limits opportunities for technology transfer, sharing of managerial expertise, and collaborative innovation, which are key channels through which FDI spillovers occur.
- Pakistan's low-investment economy lacks the necessary infrastructure, technology, and skilled workforce to absorb and benefit from FDI. Foreign investors thus find it challenging to integrate with local businesses, reducing opportunities for technology transfer and knowledge spillovers.
- Successful FDI spillovers depend on strong linkages between foreign firms and local enterprises. However, with limited domestic investment in sectors such as SMEs, the capacity of local firms to engage with and learn from foreign investors is constrained, hindering the potential for meaningful spillovers.
- Investments have not been directed towards high-value, export-oriented sectors, thus inhibiting the economy's ability to build the competitive industries needed to attract quality FDI. This misallocation of resources perpetuates inefficiencies and reduces the overall impact of FDI on economic growth.

Human Capital Development

While education is often the primary focus in evaluating human capital, other factors, such as physical health, skill sets, and societal attributes, also play a significant role. The World Bank's Human Capital Index (HCI), introduced in 2018, is a pivotal tool in this analysis, ranking 157 countries on various

educational and health parameters to project the human capital a child born today would achieve by age 18. This index evaluates five critical indicators: child survival rates up to age 5, expected years of schooling, harmonised test scores to gauge learning quality, adult survival rates up to age 60, and the proportion of children under 5 not suffering from stunted growth.

Pakistan's position in the HCI is concerning, ranking 134th out of 157 countries, trailing behind its regional and peer economies. This ranking aligns with the United Nations' Human Development Index (HDI), where Pakistan stands at 150th out of 189 countries. A concerning aspect of Pakistan's HCI findings is the average expected schooling years for children, at 8.8 years, which places Pakistan 127th globally. More alarming is the quality-adjusted education level in Pakistan, estimated at around 4.8 years, markedly below regional averages. This discrepancy highlights a significant learning gap in Pakistan, exceeding the global average. The national Education Survey by Alif Ailaan in 2013 underscores public concern over the lack of quality education in Pakistan. Nearly half of the respondents rated the country's education quality as poor, with a majority believing this deficit hinders Pakistan's economic performance relative to its neighbours.

Implications on FDI Spillovers:

A critical implication of Pakistan's underdeveloped human capital is its inability to absorb and implement advanced technologies introduced by foreign investors effectively. The benefits of technological advancements brought by foreign firms are contingent upon the local workforce's capacity to understand, utilise, and adapt these technologies.

- Pakistan's workforce lacks essential skills and education, which effectively prevents it from contributing to industrial innovation and productivity. This skill deficit limits the ability to adopt and utilise new technologies and processes introduced by foreign firms, thereby reducing the potential for technology transfer and knowledge spillovers.
- Without a foundation of strong educational attainment, the capacity for local industries to engage in innovative activities is severely limited. This has impacted the ability to develop new products, enhance existing processes, and respond to shifting market demands.
- A lack of skilled researchers and engineers has hampered the country's ability to conduct meaningful R&D activities. This not only

affects the development of homegrown technologies but also the ability to effectively collaborate with foreign firms on joint innovation projects.

- Due to the lack of skilled labour, foreign investors have limited their investments to low-skill, low-wage industries, such as basic manufacturing or assembly operations. This has also limited the potential for economic diversification and the development of high-tech, high-value sectors.
- Pakistan may miss out on attracting FDI in cutting-edge industries such as information technology, biotechnology, and advanced manufacturing, where the demand for skilled labour is high. These industries not only offer higher wages but also have significant potential for positive spillovers in terms of knowledge and technology transfer.

Poor health outcomes reduce labour force participation and productivity. Based on the data provided above, Pakistan's workforce is not physically healthy and cannot sustain the rigorous demands of industrial activities, which impacts overall productivity and economic growth.

6. CONCLUSION

This research reveals key factors influencing the ability of Foreign Direct Investment (FDI) to generate knowledge and productivity spillovers in host economies, including strong intellectual property rights (IPR), a robust investment environment, an efficient legal system, strategic government interference, trade openness, and human capital development. For Pakistan, addressing barriers such as trade openness, low domestic investment, and underdeveloped human capital is crucial to harnessing the full potential of FDI for sustainable economic growth. Enhancing trade policies, fostering a conducive investment environment, and prioritising human capital development can significantly improve Pakistan's ability to benefit from FDI-induced knowledge and productivity spillovers in line with the East Asian successes. Pakistan currently finds itself excluded from the ranks of emerging Asian economies for the time being. Given this context, Pakistan must develop an economic roadmap that is feasible, apolitical, empirically backed, and sustainable.

7. POLICY RECOMMENDATIONS

Policy Discussion – Current Status

In the next decade, the Government of Pakistan has prepared trade and investment policies backed by the policy documents listed below to guide its economy into the future. In general, policy discussions on industry, trade, and development are not new in Pakistan, and numerous policy documents have been released over time. A few relevant official documents on recent policy developments are listed in Table 8 below to inform the subsequent discussions:

Table 8: List of Recent Policies and Frameworks on Industry, Trade, and Development

Name of Policy	Year(s)	Government Department/Agency
Pakistan Investment Policy	1997 2013 2023	Special Investment Facilitation Council (SIFC) Board of Investment
Auto Industry Development and Export Policy 2021-2026	2021	Engineering Development Board, Ministry of Industries and Production
SME Policy 2021	2021	Small and Medium Enterprise Development Authority (SMEDA)
Science, Technology, and Innovation Policy (STI)	2012 2022	Ministry of Science and Technology
Strategic Trade Policy Framework 2020-25	2015 2020	Ministry of Commerce
Textiles and Apparel Policy 2020-25	2020	Ministry of Commerce
E-Commerce Policy of Pakistan	2019	Commerce Division
National Tariff Policy 2019-24	2019	Ministry of Commerce & Textile

Source: Authors' computations.

- The **Pakistan Investment Policy 2023** (PIP, 2023), evolving from the Investment Policies 1997 and 2013, claims to adopt a bold, radical, and implementable multi-pronged policy approach to attract more high-quality investments into the country. The objectives of promoting investment in high-quality, export-oriented, technology-driven (especially exceptionally high technology and digital technology) and sustainable, inclusive economic growth,

industry innovation, and infrastructure development, as well as addressing the gender gap, are ambitious goals to have at the policy level (and not the first of their kind). Many aspects of this policy cover what is required at the policy level (PIP, 2023, pp. 4-13). The link between investment and technology and skill development is, however, not present.

- As detailed in Pakistan Vision 2025 and the **Strategic Trade Policy Framework (STPF) 2020-2025**, the country aims to attract high-quality FDI to boost its economy and integrate with global value chains, aspiring to become an upper-middle-income country. According to the trade targets set by the STPF under different scenarios of policy effectiveness, Pakistan exceeded the export targets of FY 2020-21 (USD 24.64b) and FY 2021-22 (USD 29.10b), however failed even to come close to the targets of FY 2022-23 (USD 32.98b) and FY 2023-24 (USD 36.2b) by USD 5.03b and USD 5.17b respectively.
- Data clearly shows that the strategic trade framework did not meet the Ministry of Commerce's expectations and targets. In the outgoing fiscal years of 2023 and 2024, Pakistan's performance fell between scenario 1 (status quo) and scenario 2 (medium). Scenario 3, titled 'optimistic,' indicated that achieving these targets was unlikely from the outset.
- **Pakistan Science, Technology, and Innovation (STI) Policy 2012** briefly addresses the role of FDI as an enabler of technology transfer and the creation of absorptive capacity. The updated STI policy of 2022 places greater emphasis on developing human resources and enhancing knowledge of emerging technologies.

Policy Discussion – Areas of Improvement

Husain (2023) provides valuable historical insights and suggestions for a future policy on industrialization. This study supports his view that the state and market need to act as complementary forces and not binary ones. While the East Asian Miracle may still be a source of debate, our analysis shows that trade liberalization and promoting domestic competitiveness were critical, alongside the government's broader role in correcting market failures.



- **Role of government:** The frequency of major global shocks and climate events, such as pandemics, wars, and natural disasters, especially in Pakistan, has increased significantly, significantly impacting economies around the world. Governments must address anomalies preventing markets from functioning efficiently, acting as facilitators rather than inhibitors. In Pakistan, a new policy paradigm is needed that simultaneously evaluates and pursues investment, industry, technology, innovation, and trade. While it may be ambitious to seek a 'theory of everything,' this study proposes greater policy coherence. Improving the export base will result from multiple policies working together to enable a marketable, price-competitive, and globally relevant domestic production.
- **Protectionary Policies:** Numerous commentators on Pakistan's economy have extensively covered the 'infant industry' argument, which has failed due to a lack of benchmarks and mechanisms for effective monitoring and evaluation. Protection measures, including licensing, tariffs, and subsidies, are intertwined with the political setup, where policymakers have conflicts of interest in key traditional sectors (e.g., steel, fertilisers, chemicals, sugar, rice), studied in-depth by Malik & Duncan (2022). The protection of these industries distorts the market, preventing capital from shifting to more profitable, higher-value-added industries. Furthermore, the same set of business families is incentivised, and their profits are protected and prioritised over market efficiency. Therefore, protection should only guard against externalities that inhibit the transition to greater value-added products or technological advancements that bring the economy into parity with global competition. Hence, the definition of 'protection' must be revised, a concept currently lacking in the country's policies.
- **Role of FDI:** Inward FDI acts as a stimulus for both domestic investment and the economy in general in more than one way. FDI is attracted due to a set of favourable circumstances and eventually leads to spillovers in terms of labour productivity and TFP growth, as highlighted in the findings sections of this study. In Pakistan's case, this spillover is less likely to occur organically due to the underlying structural issues, unless there is a focused policy approach to pursue this. This approach should include the linking of incentives highlighted in the PIP 2023, along with enhancing the capacity of local human resources, as elaborated in the STI Policy 2022. Section 8.2 of the PIP 2023 comes close to addressing this, while presenting its

framework on a 'Strategic Approach to Achieving Pakistan Investment Aspirations' (Pakistan Investment Policy, 2023, p. 6). The framework, however, lacks clarity on how inward FDI would impact local R&D and innovation. It also misses out on illustrating the knowledge spillovers that will lead to increases in the skilled workforce and the prerequisites for that to take place.

- **Global Value Chains:** Pakistan's Investment Policy (PIP) 2023 must include OEM, OBM, and ODM subcontracting policies to allow integration into global value chains. Domestic firms involved in local or global value chains gain varying advantages that depend on the type of investments through FDI spillovers. Thus, ensuring the right kind of investment will also allow for the right kind of gains for the domestic industry. This implies moving away from the import substitution policy, which is still part of the PIP 2023, and integrating into the global value chain. The focus on Pakistan's manufacturing sector is also missing in the PIP 2023. While there is an excellent potential for the services industry, particularly in IT, there is a vast potential for manufacturing, which will be forgone if the country pursues a premature shift to the services sector, signs of which are already emerging.
- **Industrial Clusters:** The development of clusters is also another area that needs more attention in the current set of policies. The dynamics of clusters (investigated in depth by the likes of (Schmitz & Nadvi, 1999; Hobday, 1995; Altenburg & Meyer-Stamer, 1999) need to be incorporated in future policies. Clusters do not form on their own; they require a set of circumstances (Schmitz & Nadvi, 1999), either occurring by chance or strategically developed through government intervention. Evidence from Pakistan, documented by Schmitz and Nadvi (1999), shows that SMEs in clusters do not always remain small, and some dominate the industry. The importance of clusters for industrial and economic growth is not adequately covered in any policy. These aspects of cluster formation should be included in the national investment policy.

Key Policy Recommendations

Structural Reforms

1. Elimination of short-termism; continuity of policy and removing the political conflict of interest preventing long-term policies from taking root and materialising
 - a. Enhanced role of autonomous bodies, such as the State Bank of Pakistan, to ensure smooth transition of economic policies after the end of one term of government
2. A multi-party-political consensus, endorsed by leading national economists, on economic reform targeted at FDI-supported export-oriented re-industrialisation. Custodian and implementer of this reform package should be a non-political autonomous entity (free from the bounds and influence of federal/provincial governments that change every 5 years or sooner).
3. Depoliticise the Special Investment Facilitation Council (SIFC) and move away from ad-hoc arrangements, expand its vision, and increase the economic ambition (targets).

Research and Development

- 4.. A comprehensive investors' needs assessment for enhancing FDI in export sectors, outlining the minimum requirements of potential foreign investors to Pakistan.
5. assessment. Assess with projections of competitors to Pakistan's traditional export sectors (such as Textiles) and seize opportunities for capturing a greater market share based on changing global export trends. Identify and prioritise target markets based on criteria such as market size, growth potential, geographical proximity, cultural affinity, trade agreements, changing trade partners, and changing competitor dynamics.
6. Conduct a capacity and quality gap analysis of Pakistan's manufacturing sector and that of global competition in key export sectors.

7. Conduct thorough market research to identify new export opportunities and shifting consumer preferences in both new and existing markets. Target regions with untapped potential, tailoring export strategies to capitalise on emerging trends and diversifying the export mix. Share these insights with the private sector to enhance competitiveness.
 - a. Leverage data analytics, AI market intelligence tools, and trade promotion agencies to identify high-potential export markets based on factors such as demand trends, tariff structures, regulatory environments, and comparative advantages.
8. Conduct a thorough analysis of key local and global value chains involving Pakistani firms to inform and shape future policy decisions.

Regulatory

9. Carry out a study on the IPR regime and suggest changes in laws that protect intellectual property rights, including patents, copyrights, and trademarks.
10. Develop an efficient dispute resolution mechanism for intellectual property cases to avoid lengthy court procedures for foreign and domestic firms.
11. Re-evaluate the effectiveness of Technology Parks and assess the degree of knowledge sharing and technology transfer among firms and institutions and provide suggestions for their improvement.
12. Reassess and evaluate the performance of the Export-Import Bank of Pakistan (EXIM Bank) in terms of its effectiveness in achieving the objective of enhancing the competitiveness of Pakistani exporters.

Trade Measures

13. Implement a rules-based trading system allowing trading partners and investors the confidence to do business under stable and predictable conditions.
14. Strengthen market access for exports by negotiating trade agreements, reducing tariff and non-tariff barriers, and expanding preferential trade arrangements with key trading partners.

15. Streamline trade procedures and prioritise initiatives to simplify customs clearance processes, expedite trade documentation, and harmonise regulatory standards to reduce transaction costs and enhance the ease of doing business.
16. Strengthen international cooperation and collaboration with bilateral and multilateral partners, including development agencies, international financial institutions, and regional organisations, to support Pakistan's export promotion objectives by providing technical assistance, capacity building, and market access support.
17. Actively engage in trade negotiations, participate in regional economic integration initiatives, and leverage international trade forums to enhance market diversification and export competitiveness on a global scale. A vibrant regional economic corridor and interconnectivity enhance the chances for economic growth. Immediate neighbours are the most suitable candidates for trade and innovation gains, partly due to geographical continuity and similar culture and values.

Human Capital Development and Technology Transfer

18. Increase meaningful government expenditure on education, skills development, and vocational training programs to build a skilled workforce, enhance productivity, and meet the demands of a knowledge-based economy.
19. Enhance access to education, healthcare, and social services, promote inclusive economic opportunities, and empower marginalised communities to participate in and benefit from economic development initiatives.
20. Invest in the establishment and development of bilateral/multilateral research institutes and innovation centres focused on key industries.
 - a. Develop an autonomous automotive institute focusing on developing human resources, piloting latest technology, developing master plans, and collaborating with leading automobile companies (such as Denso, Honda, Nissan, Toyota) to enable transfer of technology and know-how.



21. Facilitating technology transfer by expanding or promoting the mandates of existing planning and development departments, such as the Ministries of Planning, Development & Special Initiatives, Commerce, and Science and Technology.
22. Facilitate technology transfer and licensing agreements to enable Pakistani firms to access cutting-edge technologies and expertise from foreign partners. This involves promoting collaboration with multinational corporations, research institutions, and technology providers to acquire, adapt, and deploy advanced technologies that enhance productivity and competitiveness.

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ANNEXURES

Annex 1: Pakistan's Economic Performance

In this section we will try to understand Pakistan's economic growth with respect to the various mediating factors that emerge from our assessment of East Asia's economic success.

Pakistan has had an average GDP growth rate of over 5% for four decades until 1988-89, leading to a reduction in poverty levels from 40% to 18% by the end of the 1980s. This includes some remarkable achievements such as transforming from a food importer in 1947 to self-sufficiency and even exporting agricultural products like wheat, rice, and sugar. Per capita income surged from less than \$100 in 1947 to approximately \$500 in 2003. The manufacturing sector saw significant growth, producing goods for domestic and global markets, including steel, cement, automobiles, and textiles. Infrastructure development was substantial, with improvements in roads, highways, and electricity generation. Modernization in transportation and communication resulted in higher living standards, evident in increased vehicle ownership, phone connections, and television access.

However, this economic growth must be seen from a regional economic growth perspective, where many of these gains could be considered as bare minimum. Countries in the Asian region, with similar circumstances and even fewer resources were able to grow much more rapidly and sustain that growth for longer periods of time as discussed in section 5.

Therefore, critical factors such as the speed and sustainability of growth, trade and investment policies, and economic development relative to comparable economies are important. For the purpose of this research, this section will focus primarily on economic growth, FDI, exports growth and innovation in Pakistan.

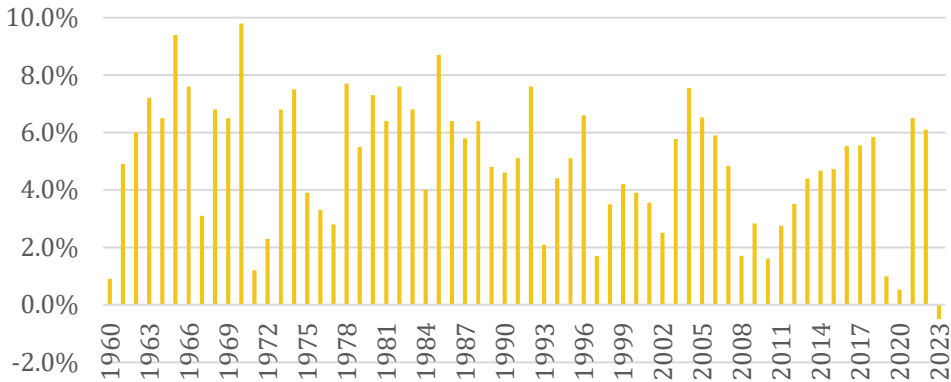
Economic Performance in a Nutshell

Table 1: Real GDP Growth of Pakistan– Decade Wise

	1951-59	1960-69	1970-79	1980-89	1990-99	2000-09	2010-19	2020-2023*
Pakistan	3.39%	5.89%	5.08%	6.42%	4.49%	4.51%	3.96%	3.16%

Source: GOP (2023).

Figure 1: Real Annual GDP Growth of Pakistan

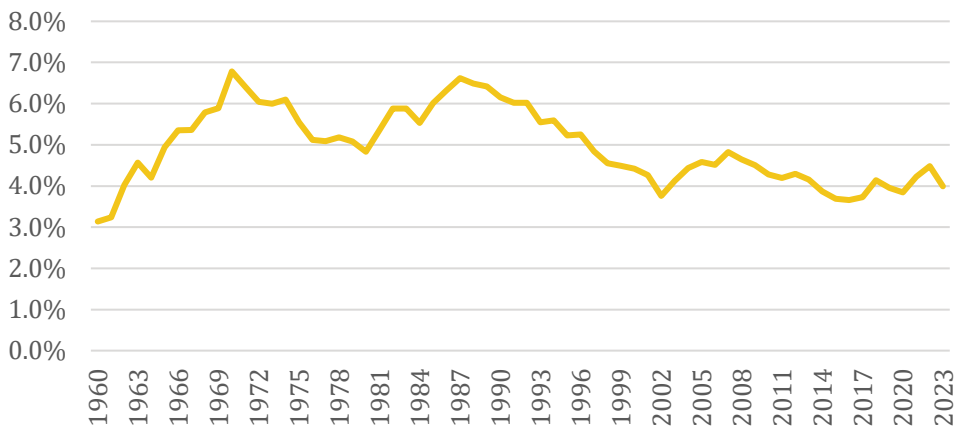


Source: GOP (2023).

*It is worth noting that year 2020 was the pandemic year with global slow-down and Pakistan was no different with a GDP of 0.53%, already suffering from an economic slow-down in 2019. The years of 2021 and 2022 showed a 'V' shaped recovery with GDP Growth Rates of 6.1% and 6.5% respectively, and eventually the growth slumped again to -0.5% due to home-grown political and economic crises coupled with global price hikes.

The out-going decade of 2010-2019 was the second worst decade of economic growth since the decade of independence from the British. A 10-year moving average graph shows that the decades ending 1970 and 1987 were the best in terms of economic growth even though they still left much to be desired.

Figure 2: 10-year Moving Average of Real GDP Growth: Pakistan



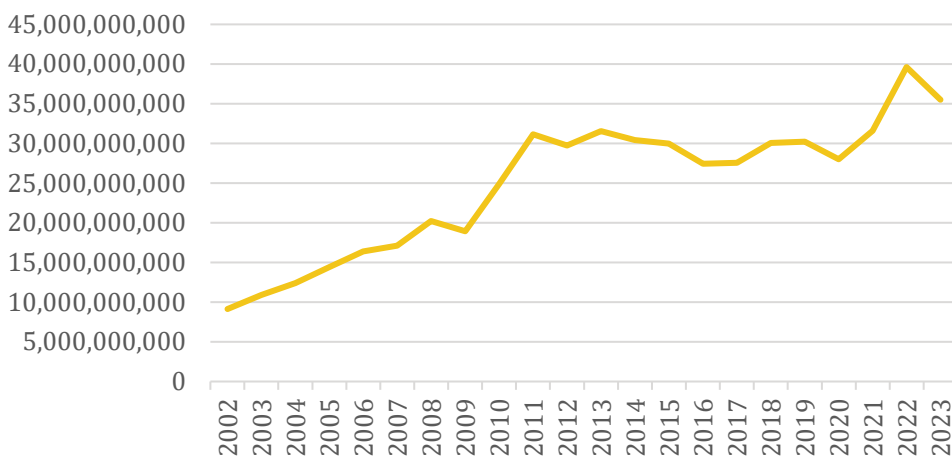
Source: GOP (2023).

Export Performance

Pakistan's exports, which primarily consist of low value-added textile products, have dwindled from about 15% of GDP in 2003 to roughly 11% today. This decline in exports, combined with a stagnant product mix and a reduction in the variety of exported goods, has led to a decrease in Pakistan's share of global exports from the early 1990s to a mere 0.13% in 2020.

Pakistan's export basket is predominantly made up of textiles, clothing, agriculture, and services, lacking in technological sophistication and restricted to the lower end of value chains. These sectors are traditionally reliant on either low-technology or labour-intensive processes and are significant contributors to the country's value addition. They not only dominate the industrial sector but also are the primary consumers of domestic raw materials. This situation contrasts with countries like Sri Lanka and Vietnam, which have diversified and upgraded their export portfolios.

Figure 3: Total Exports of Pakistan 2003-2023 (USD)



Source: GOP (2023).

Industrial Evolution

Since the 1950s Pakistan has undergone several economic policy shifts, starting from the import substitution industrialization in 1950-60, nationalization of industry in 1970, privatization in 1980, liberalization in 1990, further privatization and market diversification in 2000, and towards de-industrialization since 2010.

Pakistan's export profile has long been shaped by its industrial configuration and the availability of certain factors, resulting in a predominance of textiles, cotton, leather, food, and raw materials in its export mix. These sectors, characterized by resource-dependence and labour-intensive practices, account for 73% of the nation's total exports. The products from these industries generally fetch lower prices on the international stage, and their market share in global exports is modest.

The composition of Pakistan's export portfolio reveals that medium to high-technology products constitute a meagre 6% of total exports, whereas exports rooted in low-tech textile industries represent a substantial 60%. Pakistani manufacturing sectors lack dynamism and rank among the slowest growing in the global industrial sphere, offering scant opportunities for technological advancement or skill enhancement. The textile industry, despite being a primary manufacturing sector with an extensive production chain conducive to incremental value addition, engages in limited value-added processes.

The country's export relationships are marked by limited diversity, with a heavy reliance on a small number of trading partners, notably including the United States and European countries. Recent developments in the global market have significantly heightened competition for Pakistan's textile and apparel exports. This surge in competitive pressure came about after 2005 when the Agreement on Textiles and Clothing (ATC) eliminated quotas on textile and garment exports, thus liberalizing trade in these commodities.

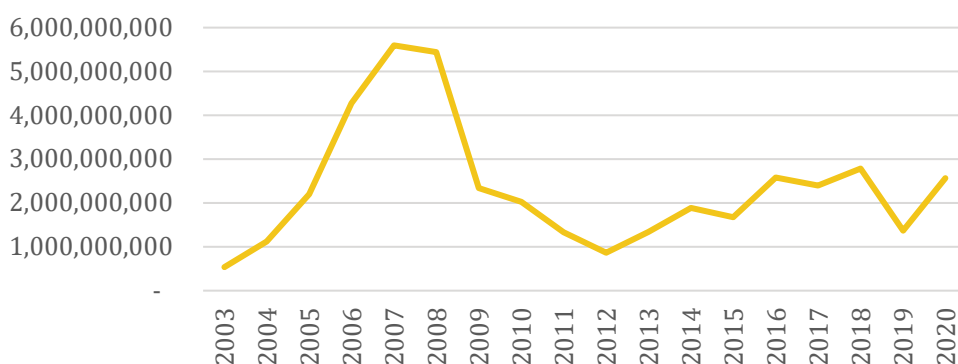
The Current Account remained under pressure with long cycles of significant deficit and brief periods of surpluses. It is true that many political circumstances and external factors such as the COVID-19 have contributed to these cycles and lack of sustained economic growth. However, let us also analyse some critical underlying factors that have been consistently hindering growth.

Foreign Direct Investment

Despite the widely recognized role of foreign direct investment (FDI) and multinational corporations in bolstering export growth, as confirmed by economic research, Pakistan's export-focused manufacturing has failed to draw in significant FDI. This results in an export infrastructure that is neither complex nor advanced technologically, indicative of a competitive disadvantage that is unsustainable for economic progress. Pakistan's

reluctance to ascend the value chain has placed it in direct competition with lower-income nations that export low-tech goods at more advantageous wage rates. Meanwhile, nations with economic standings like Pakistan have progressed to higher technology pursuits.

Figure 4: Foreign Direct Investment in Pakistan



Source: GOP (2023).

Annex 2: Context of East Asia's Economic Success

Factors of Growth

Accumulation of Labor and Capital: The initial phases of growth in East Asian economies were characterized by significant investments in physical and human capital. This was coupled with the mobilization of labour resources to drive industrialization and productivity gains. For instance, Japan's post-war recovery and subsequent industrialization were driven by investments in infrastructure, technology, and human capital. Similarly, the Asian Tigers capitalized on their abundant labour resources and directed substantial investments towards building physical infrastructure, expanding industrial capacity, and enhancing human capital through education and training programs.

Technological Advancement: While labour-intensive manufacturing industries initially drove growth, sustained expansion was underpinned by technological innovation, adoption of advanced production methods, and investment in research and development (R&D). The accumulation of labour and capital enabled early growth and sustained expansion was driven by the relentless pursuit of technological advancement and innovation. These economies

recognized the imperative of upgrading production processes, adopting advanced technologies, and investing in research and development (R&D) to enhance productivity, competitiveness, and overall economic resilience.

Government Intervention: Active government involvement in economic planning, industrial policy formulation, and infrastructure development played a pivotal role in shaping the growth trajectories of these economies, fostering an environment conducive to investment, innovation, and industrial upgradation. Central to the success of Japan, the Asian Tigers, and NIEs was the proactive role of governments in shaping economic policies, fostering conducive business environments, and providing targeted support to strategic industries. Through comprehensive industrial policies, investment incentives, and infrastructure development initiatives, governments created the necessary conditions for private sector-led growth, innovation, and industrial diversification (this aspect of growth is important as government intervention that enables private sector growth is different from one that inhibits it).

Knowledge Spillovers from Export Orientation and FDI: Emphasis on export-oriented strategies, market diversification, and integration into global value chains enabled these economies to capitalize on external demand, generate foreign exchange earnings, and fuel economic expansion. The export-oriented strategies pursued by these economies not only enabled them to tap into global markets but also facilitated the dissemination of knowledge and technology across domestic industries. High rates of foreign direct investment (FDI) and strategic placement of comparative advantages in the global value chain further catalysed knowledge spillovers, technology transfer, and skill development, driving productivity gains and fostering industrial growth. The presence of vibrant industrial clusters, knowledge networks, and technology transfer mechanisms facilitated the diffusion of knowledge and best practices within and across industries, driving productivity improvements and innovation-led growth.

Export-oriented policies and high levels of foreign direct investment (FDI) facilitated knowledge spillovers and technology transfer, contributing to industrial upgrading and innovation. Integration into global value chains allowed East Asian economies to leverage their comparative advantages and enhance competitiveness.

Role of Global Value Chains and Local Clustering

Participation in global value chains played a pivotal role in integrating these economies into the global economy, enabling them to leverage their comparative advantages, specialize in high-value-added activities, and capitalize on economies of scale. Moreover, the presence of vibrant industrial clusters and local agglomeration effects facilitated collaborative learning, innovation diffusion, and synergistic interactions among firms, institutions, and stakeholders within regional ecosystems. Participation in global value chains and the clustering of industries in certain regions fostered economies of scale, specialization, and knowledge diffusion. Localized industrial clusters promoted innovation, efficiency, and collaboration among firms, driving economic growth and competitiveness.

The automobile industrial cluster in China as explained in section 6.1 is a prime example of how an economic ecosystem develops partly through the support of the government and partly due to favourable market circumstances. The depth of local regional supply chain integration became one of the pre-requisites for a successful cluster formed in Tianjin, China.

Sustained Decades of Economic Growth

The economies under study grew at high rates over a long-period, thus leading to a sustained trajectory and strength of economic growth. This sustained growth was not merely a result of transient factors, temporary in nature, such as spikes in consumer spending, temporary tax breaks or subsidies, or one-time infrastructure projects, leading to short-lived periods of prosperity. Instead, it was underpinned by several enduring factors that fostered long-term economic expansion.

One of the pillars of sustained economic growth in East Asia has been the implementation of ***structural reforms and the maintenance of policy stability***. Governments in the region enacted policies aimed at fostering macroeconomic stability, improving the business environment, and enhancing regulatory frameworks. By maintaining a conducive policy environment, these economies were able to attract investment, stimulate innovation, and sustain long-term growth trajectories.

East Asian economies recognized the importance of investing in ***human capital and infrastructure*** to support sustained growth. Significant resources were allocated to education, healthcare, and skills development, laying the foundation for a healthy and productive workforce and a

competitive economy. Additionally, investments in infrastructure, including transportation networks, energy systems, and telecommunications, facilitated economic integration, trade, and connectivity, contributing to overall economic development. Recognizing that human capital is a critical driver of comparative advantage, East Asian governments invested in initiatives to develop a skilled and adaptable workforce capable of meeting the demands of a rapidly evolving global economy. Policies focused on improving education quality, promoting lifelong learning, and enhancing vocational training to equip workers with the technical, analytical, and soft skills needed to excel in knowledge-intensive industries. By nurturing a highly educated and skilled labour force, these economies were able to leverage human capital as a source of competitive advantage and foster innovation-led growth.

Technological advancement and innovation played a central role in sustaining economic growth in East Asia. Governments in the region prioritized research and development (R&D) initiatives, incentivized innovation, and promoted collaboration between academia, industry, and government agencies. By embracing emerging technologies and fostering a culture of innovation, East Asian economies were able to drive productivity gains, enhance competitiveness, and diversify their economic base. East Asian economies recognized the pivotal role of research and development in sustaining long-term economic growth and enhancing comparative advantages. Governments allocated resources to support R&D activities in strategic industries, fostering innovation, technology transfer, and knowledge creation. By investing in R&D infrastructure, collaborative research initiatives, and incentives for private-sector innovation, these economies were able to stay at the forefront of technological advancements and product differentiation, thereby strengthening their competitive positions in global markets.

Another key factor contributing to sustained growth in East Asia was the **diversification of the economic structure**. These economies transitioned from being primarily agrarian or export-oriented to developing dynamic and resilient industrial sectors. By enabling the growth of manufacturing and service industries, diversifying export markets, and promoting value-added production, East Asian nations were able to reduce their dependency on any single sector or market, thereby mitigating risks and sustaining growth momentum. East Asian economies demonstrated a remarkable ability to adapt to changing global economic dynamics and external shocks. Whether faced with financial crises, natural disasters, or geopolitical uncertainties, these nations have consistently demonstrated resilience and agility in

responding to challenges. Flexible policy frameworks, robust institutional arrangements, and proactive measures to mitigate risks have enabled East Asian economies to navigate periods of volatility and maintain long-term growth momentum.

East Asian economies adopted ***strategic trade and industrial policies*** aimed at nurturing key sectors with potential for comparative advantage and export competitiveness. Governments provided targeted support to priority industries through subsidies, tax incentives, and trade facilitation measures to stimulate investment, innovation, and productivity growth. By aligning industrial development strategies with comparative advantage considerations, these economies were able to create synergies between domestic production capabilities and global market demand, thereby enhancing their competitiveness and resilience to external shocks.

Rather than solely relying on low-cost production and labour arbitrage, East Asian economies emphasised the importance of ***quality enhancement and value addition*** in their export-oriented industries. Governments implemented policies to incentivise investments in product quality, design innovation, and branding strategies to differentiate their products and command premium prices in competitive international markets. By prioritising value-added manufacturing and service sectors, these economies were able to capture higher margins and sustain growth in the face of intensifying global competition.

The sustained economic growth witnessed in East Asian economies is the result of a combination of factors, including structural reforms, investment in human capital and infrastructure, technological advancement, diversification of the economic structure, and adaptability. By addressing both short-term challenges and long-term structural constraints, East Asian nations have been able to achieve and sustain high levels of economic growth, setting a benchmark for other countries striving for development and prosperity.

Governments' Attention to Increasing Comparative Advantage

East Asian governments recognized the importance of identifying and nurturing sectors where they possessed inherent strengths or the potential to develop a competitive edge. Through ***comprehensive strategic planning exercises and policy frameworks***, governments systematically assessed the comparative advantages of their economies and devised targeted interventions to enhance competitiveness in key industries. Economies that

recognised the significance of comparative advantages early on were able to proactively formulate strategies to capitalise on their inherent strengths and position themselves competitively in global markets. By identifying and nurturing sectors where they had a relative efficiency advantage, governments laid the foundation for sustained economic growth and development.

Early recognition of comparative advantages allowed governments to engage in strategic planning exercises aimed at identifying and nurturing sectors with inherent strengths or growth potential. By analysing factors such as natural resources, human capital, technological capabilities, and market dynamics, policymakers developed targeted strategies to promote the development of industries where the country had a competitive edge. Armed with insights into their comparative advantages, governments formulated policies and incentives to support the growth of priority sectors. This involved providing subsidies, tax incentives, access to financing, and regulatory reforms to create an enabling environment for businesses to thrive. Moreover, policies aimed at promoting innovation, entrepreneurship, and skills development can further enhance the competitiveness of domestic industries. Early realization of comparative advantages allows governments to prioritize investments in critical infrastructure, technology, and human capital development. By directing resources towards areas where the country has a comparative advantage, policymakers can utilise public spending as the required investment to stimulate economic growth in the identified strategic sectors.

Governments in East Asia made significant ***investments in infrastructure development***, technological innovation, and industrial upgrading to strengthen their comparative advantages. By modernizing transportation networks, expanding energy and telecommunications infrastructure, and promoting technological innovation through research and development (R&D) initiatives, governments created an enabling environment for businesses to thrive and compete effectively in global markets.

Governments actively ***promoted international trade and investment*** to capitalize on comparative advantages and enhance economic competitiveness. Through trade liberalization measures, bilateral and multilateral trade agreements, and investment promotion policies, governments facilitated greater market access for domestic producers and attracted foreign direct investment (FDI) in strategic sectors, thereby expanding export opportunities and fostering economic growth.

Recognizing that **human capital** is a critical determinant of comparative advantage, governments prioritized investments in education, skills development, and workforce training programs. By equipping the labour force with the necessary knowledge, skills, and competencies to excel in modern industries, governments enhanced the productivity and efficiency of domestic businesses, enabling them to compete more effectively in global markets and sustain economic growth over the long term.

By ***embracing innovation and fostering a culture of continuous improvement***, these economies were able to sustain their growth momentum and adapt to changing market dynamics effectively. The global economy is constantly evolving, driven by technological advancements, changes in consumer preferences, and shifts in geopolitical dynamics. As such, economies must continuously adapt to emerging trends and market conditions to remain competitive. This requires a proactive approach to policy reform, regulatory flexibility, and investment in research and development.

Continuous adaptation involved embracing technological innovation and upgrading industrial capabilities to stay ahead of the curve. Governments supported the adoption of new technologies through incentives for research and development, collaboration with the private sector, and investment in digital infrastructure. By fostering a culture of innovation and entrepreneurship, economies unleashed their creative potential and drove productivity gains across sectors.

Human capital plays a pivotal role in maintaining comparative advantages and driving economic growth. Continuous investment in education, training, and skills development ensures that the workforce remains adaptable and resilient in the face of evolving job requirements.

Developing an Export Base

In East Asia, governments have played a pivotal role in fostering export-led growth through proactive and purposeful state intervention. They have implemented a range of policies and initiatives to support export-oriented industries. These include offering financial incentives, such as tax breaks and subsidies, establishing export processing zones, and providing infrastructure support, including building ports, roads, and telecommunications networks. By creating a conducive environment for exporters, governments have incentivised businesses to focus on producing goods and services for foreign markets.

Engaging in ***strategic trade agreements*** has been a key strategy for East Asian economies to expand their export markets and enhance their competitiveness. These agreements have taken various forms, including bilateral free trade agreements (FTAs), regional trade blocs, and participation in multilateral trade negotiations such as the World Trade Organization (WTO). By reducing trade barriers and facilitating market access, these agreements enabled exporters to tap into new markets and diversify their export destinations, thus reducing dependence on any single market and increase production leading to greater economies of scale. Export-oriented economies often face challenges related to market access barriers, including tariffs, quotas, and non-tariff barriers such as technical regulations and standards. East Asian countries have actively engaged in trade negotiations and diplomacy to address these barriers and promote a more open and conducive global trading environment. By advocating for trade liberalization and participating in regional and multilateral trade agreements, these countries have sought to expand market access and create new opportunities for their exporters.

Diversifying export products and markets is essential for mitigating risks and seizing new opportunities. East Asian economies have pursued strategies to diversify their export portfolios by expanding into new product categories and geographic regions. This diversification helps reduce vulnerability to external shocks and fluctuations in global demand. For example, countries like South Korea and Taiwan have successfully transitioned from being predominantly exporters of labour-intensive goods to becoming leaders in high-tech industries such as electronics and semiconductors.

Many East Asian countries have established dedicated ***export promotion agencies*** to provide support and assistance to exporters. These agencies offer a range of services, including market research, trade facilitation, export financing, and promotional activities. By helping exporters navigate regulatory requirements, identify export opportunities, and access export-related services, these agencies play a crucial role in facilitating trade and boosting export competitiveness.

Investing in ***infrastructure*** is essential for enhancing export competitiveness by reducing transportation costs, improving logistics efficiency, and enhancing connectivity to global markets. East Asian governments have made significant investments in infrastructure development, including building ports, airports, roads, and telecommunications networks. These investments have helped improve the efficiency of supply chains, reduce transit times, and lower transaction costs for exporters, making it easier for them to compete in international markets.

Coordinating policies across different government agencies and departments is essential for creating an enabling environment for export growth. East Asian governments have adopted coordinated approaches to trade policy, industrial policy, and investment promotion to maximize the impact of their export promotion efforts. By aligning policies related to trade, investment, finance, and infrastructure development, governments can create a supportive ecosystem that encourages businesses to invest in export-oriented activities and seize opportunities in global markets.

Annex 3: Type of Knowledge Spillovers from the East Asian Growth Models

The flow of knowledge in the economy is a complex concept, and this study does not attempt to go into the finer details of what takes place, either from organisational behaviour or human cognitive dimensions. However, it is sufficient to know, for this study, that the exchange of knowledge or know-how happens continuously. For firms or individuals to benefit, there needs to be a certain degree of value attached to the provision and acquisition of this knowledge for a successful barter to take place. Furthermore, not all aspects can be explained solely through contemporary economics, as culture, work ethics, and tradition also play a significant role.

Implicit Knowledge Transfer

Organisational Dynamics: Within firms and industries, knowledge is often transferred implicitly through day-to-day interactions, collaboration, and shared experiences among employees. This form of knowledge spillover is evident in the innovative practices and operational efficiencies observed in sectors such as electronics, automotive manufacturing, and semiconductor production.

Human Capital Development: Investments in education, training, and skill development contribute to the accumulation of human capital, fostering a conducive environment for knowledge spillovers. As individuals acquire new skills and expertise, they bring valuable knowledge to their workplaces, driving productivity gains and innovation diffusion across industries.

Explicit Knowledge Transfer

Technology Transfer: Collaborations with foreign firms, joint ventures, and licensing agreements have facilitated the transfer of explicit knowledge, particularly in high-tech industries such as electronics, robotics, and information technology. The adoption of advanced technologies and best practices has fuelled technological upgrading and industrial transformation in sectors like automotive manufacturing and precision engineering.

Research and Development (R&D) Investments: Government support for R&D activities and innovation ecosystems has promoted explicit knowledge spillovers by fostering knowledge creation and diffusion. Investments in research institutions, technology parks, and innovation clusters have facilitated collaboration between academia and industry, leading to breakthrough innovations in sectors such as biotechnology, nanotechnology, and renewable energy.

Cultural and Social Factors

Work Ethics and Tradition: Cultural attributes such as diligence, discipline, and teamwork have facilitated knowledge spillovers by fostering a culture of innovation and continuous improvement. The strong work ethic and emphasis on excellence in countries like Japan, South Korea, and Taiwan have contributed to knowledge sharing and collective learning within organizations and communities.

Knowledge Networks: Social networks and informal channels have played a pivotal role in facilitating knowledge spillovers by connecting individuals, firms, and institutions within innovation ecosystems. Professional associations, industry clusters, and academic networks have served as platforms for exchanging ideas, expertise, and market intelligence, driving innovation and entrepreneurship.

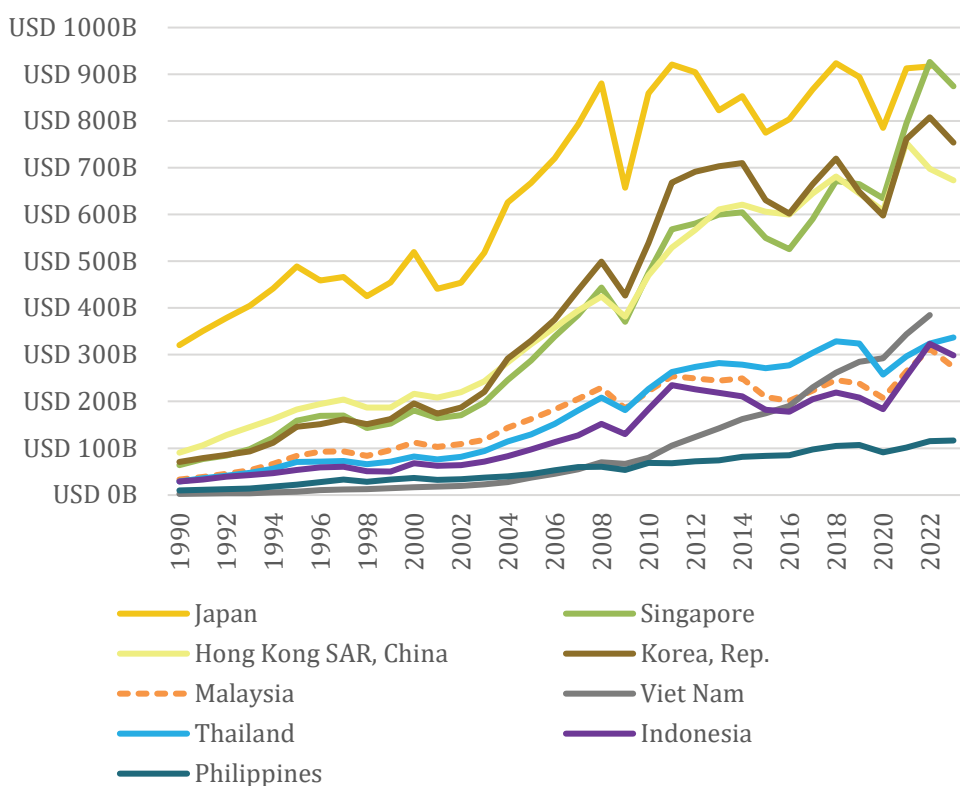
Policy Interventions

Knowledge-Based Policies: Governments have implemented knowledge-based policies to promote innovation, entrepreneurship, and knowledge-intensive industries. Initiatives such as research grants, technology parks, and intellectual property protection have incentivized knowledge creation and diffusion, fostering a conducive environment for innovation-driven growth.

International Collaboration: Engaging in international collaboration and knowledge exchange initiatives has enhanced knowledge spillovers by facilitating cross-border learning and technology transfer. Participation in global innovation networks, joint research projects, and knowledge-sharing platforms has strengthened the absorptive capacity of domestic firms and institutions, driving innovation and competitiveness in the global market.

The types of knowledge spillovers observed in the growth models of Japan, the Asian Tigers, and Newly Industrialized Economies in East Asia encompass both implicit and explicit forms of knowledge transfer, driven by organizational dynamics, human capital development, technology transfer, cultural factors, and policy interventions. By understanding and harnessing these knowledge spillovers, these economies have been able to foster innovation, productivity growth, and sustainable development.

*Figure 5: Exports of East Asian Economies 1990-2023 (USD Current)**

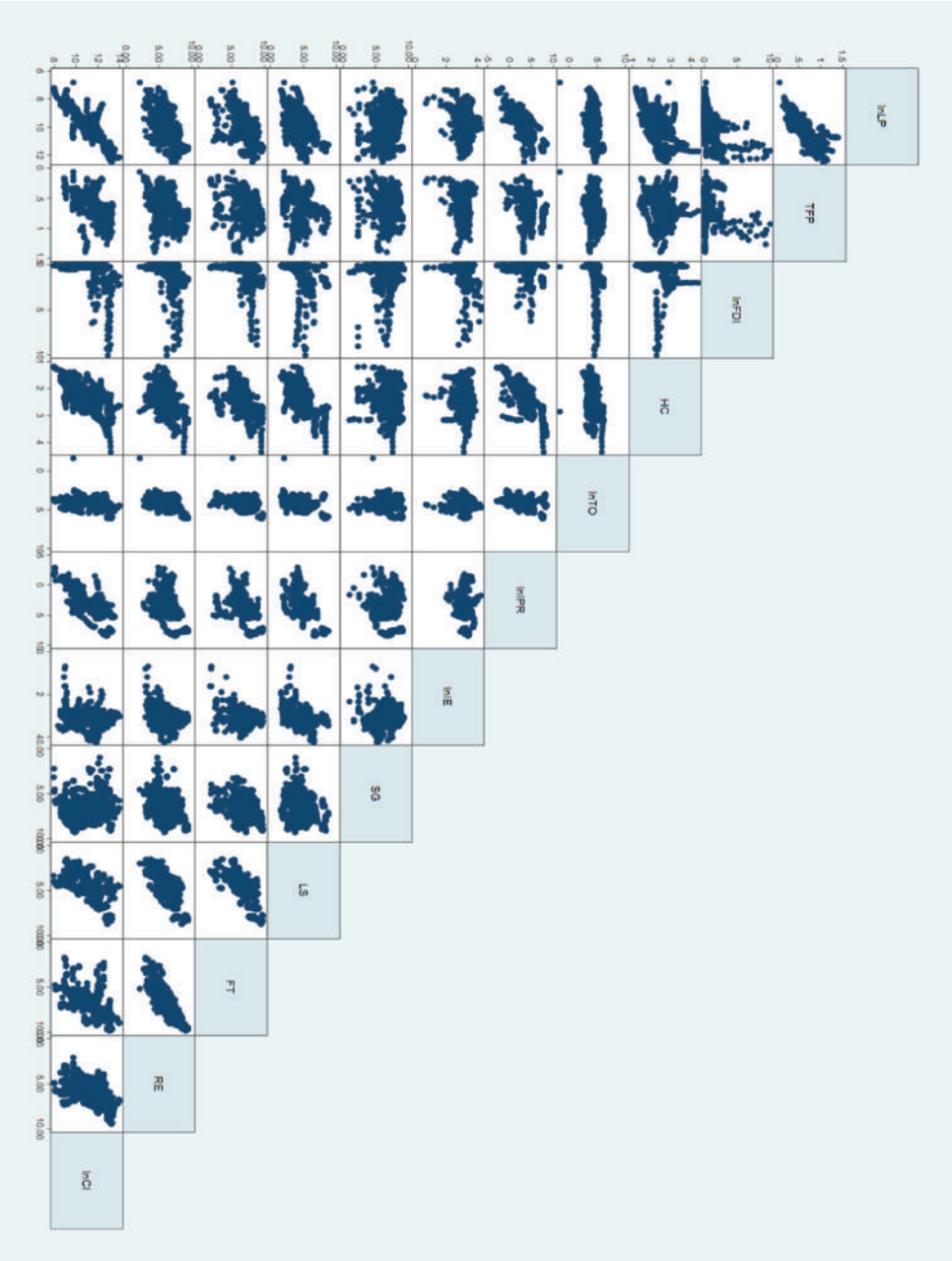


**Excluding China.*

Source: World Bank (2024).



Annex 4: Scatterplot Matrix



Source: Author computation using regression data sources.

DECAPITALIZATION IN THE PAKISTAN STOCK EXCHANGE

Abdul Wahid¹ and M. Zubair Mumtaz²

ABSTRACT

The primary objective of this study is to identify firm-specific and market-related factors influencing the listing gap in the Indian Market and the Pakistan Stock Exchange (PSX) from 2010 to 2023. During this period, Pakistan experienced a significant listing gap, with only 67 companies listed while 170 were delisted, resulting in a net gap of 103 firms. For this analysis, we have selected 60 delisted firms each from the Indian market and the PSX and matched them with 60 firms of similar size that remained listed on each of the two markets. Our findings suggest that cost-push inflation in Pakistan has led to unsustainable earnings for various firms and sectors, impairing their ability to pay dividends. Additionally, smaller firms struggled to become part of the PSX, diminishing their financial visibility, value, and growth prospects. Consequently, their book-to-market value decreased, weakening their bargaining power with financial institutions and leading them to leave the PSX to maintain their status. Moreover, the governance ecosystem of the PSX poses significant challenges. A substantial portion of the KSE index is dominated by state-owned enterprises (SOEs), and their boards, often occupied by bureaucrats, are also involved in policymaking by the Securities and Exchange Commission of Pakistan (SECP).

In addition, the supremacy of the banking, oil and gas, cement and fertiliser sectors in the PSX is generally owed to government policies. Targeted governmental actions are necessary to improve financial stability and visibility of firms, given the unfavourable conditions facing investment banks, ETFs, and the textile industry. We find that a supportive regulatory and economic climate are the key factors for the long-term viability of listed firms.

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To reduce the probability of delisting, it is critical to simplify the listing and regulatory processes, reduce compliance costs, provide a level playing field for all firms (all sectors should get the same opportunities in terms of incentives, tax rebates, etc.), monitoring of newly listed firms to help them meet listing requirements. Besides, favourable market dynamics and confidence of the firms in the market will help boost market activities. The findings of this study are of use to the SECP, which regulates the ecosystem of the PSX.

1. INTRODUCTION

Background

According to Pour & Lasfer (2013), firms may list their shares on stock exchange as a strategic measure to enhance their bargaining power with financial institutions, reduce their reliance on debt financing, and increase their visibility and reputation. This enhancement in bargaining power can be achieved by reducing leverage, improving the market-to-book value ratio—which indicates an increase in the firm's value through rising share prices—and enhancing visibility and growth prospects (Boers et al., 2017).

However, certain publicly traded companies may choose to delist from a stock exchange. There are two classifications of delisting: voluntary and involuntary. Voluntary delisting occurs when the governing bodies of a company elect to withdraw its status as a publicly listed entity. Various factors may influence this decision, including financial challenges, non-compliance with listing standards, corporate consolidations, or cost-benefit trade-offs (Liao, 2020). On the other hand, involuntary listing may be initiated by the exchange authorities upon failure of a company to meet listing requirements (Park et al., 2018).

A variety of models have been developed to test the causes of the delisting of shares e.g. (a) size of a firm hypothesis, (b) management entrenchment hypothesis, (c) leverage hypothesis, (d) cost-benefit trade-off hypothesis, (e) window of opportunity hypothesis, (f) financial distress hypothesis, (g) financial visibility hypothesis, and (h) undervaluation hypothesis. Bartlett (2009) hypothesized that firm size is significantly associated with a firm's propensity to delist. This proposition has two implications: (1) larger firms are potentially more efficient at amortising fixed costs, and (2) the propensity of small firms to delist increases when the recurring costs of listing increase. This indicates that the larger the firm size, the smaller the probability of delisting. Firm market capitalisation and the book value of assets were used as proxies to measure the firm's size (see Bartlett, 2009; Blay & Geiger, 2001; Phillips, 2011).

Renneboog et al., (2007) identified the role of the management entrenchment hypothesis in a firm's propensity to delist. The proposition implies that weaker incentive alignment in publicly listed firms with higher managerial ownership (Chahine & Goergen, 2013; Forst et al., 2014). This relationship is also referred to as leverage. When promoters or managers of newly issued

IPOs retain a high proportion of shares, they may use the firm's resources to serve their own interests, to increase their ownership and control. To the extent this happens, the consequence is more management entrenchment and an increased propensity to delist (Wahid & Mumtaz, 2020). This paper examines the effect(s) of entrenchment on a firm's propensity to delist. The size of the post-issue promoter's group holding of shares (PIPH) and the ratio of management shareholding in outstanding shares are used as proxies for managerial entrenchment.

Another hypothesis used to explain the incidence of firms delisting is the size of leverage. Pour & Lasfer (2013) find that the primary concern of UK firms applying for listing on the AIM is the opportunity to rebalance their capital structure rather than to finance their growth opportunities. This proposition has been tested by Bharath & Dittmar (2010). The authors conclude that voluntarily delisting demonstrates a higher level of leverage than other firms. The firm's leverage has been used as a proxy for the leverage buyout hypothesis, which suggests a higher likelihood of delisting among more leveraged firms.

The cost-benefit trade-off hypothesis is also considered a significant determinant of delisting. Kim & Weisbach (2008) argued that firms probably go public to raise funds for investments, transfer wealth from new shareholders to existing shareholders, and increase liquidity. To some extent, these benefits are counterbalanced by the costs of listing (Fjesme, 2019; Huibers, 2020). These costs include (a) registration and underwriting fees, (b) auditing and disclosure, and (c) agency problems. A listed firm's marginal benefit/cost ratio being less than the shedding of avoidable costs could be one of the reasons for delisting (Martinez & Serve, 2017). The firm's growth (an increase in its market capitalisation) and an increase in the liquidity of its shares (trading volume) are proxies of the cost-benefit trade-off hypothesis. We hypothesise that the higher the stock's liquidity and the faster the firm's growth, the smaller the probability of going private.

The window of opportunity hypothesis has been used to explain the poor performance of IPOs in the long run (Benninga et al., 2005). This hypothesis proposes a strong relationship between the timing of issuance and low stock returns. It has been argued that firms knowingly overprice their issues during the hot market IPO activity period, resulting in low returns in the long run (Ritter, 1991). Suppose that the window of opportunity hypothesis is an accurate description of firms' behaviour. In that case, newly listed firms raise funds from the market at such prices (Mumtaz et al., 2016) which tend to

overvalue its growth prospects and opportunities (Lee, 2012; Loughran & Ritter, 1995). If investors recognize the initial overpricing in the long run, the market adjusts the pricing downward, which may cause the firm to delist.

The financial distress hypothesis proposes that high costs of financial distress tend to deter firms from going public (Bharath & Dittmar, 2010). Studies reported mixed findings; some indicate that the cost of financial distress significantly impacts a firm's propensity to go private, and some argue in favour of just the opposite (Weir et al., 2008; Wilson & Wright, 2013). In studies addressing this question, the current ratio and revenue growth rate have been used as proxies to indicate financial distress. The higher the current ratio and the faster sales growth, the lower the likelihood of delisting.

Another hypothesis relates to financial visibility, which is the ability of a firm to attract an adequate level of investors' interest and recognition (Ferreira et al., 2014; Mehran & Peristiani, 2010). The intermediate role played by the security advisor, or nominee advisor in the case of AI, leads to a higher level of the firm's financial visibility. The enhanced visibility is manifested as enhanced liquidity, increased institutional shareholding and a larger trading volume of stocks. Previous studies used nominee or security advisor holding, stock liquidity, institutional shareholding, and trading volume as proxies to measure financial visibility. See (Boot et al., 2010).

The hypothesis proposes a negative relationship between the degree of financial visibility and the decision to delist. Higher financial visibility of a firm is associated with a smaller likelihood of delisting. The undervaluation hypothesis is also one of the crucial driver of delisting. This hypothesis suggests that when managers have private information about the undervaluation of stocks, they may decide to delist to avoid listing costs (Renneboog et al., 2007; Weir et al., 2005). Tobin's Q, market-to-book ratio, or price-earnings ratio tests a stock's undervaluation.

Several recent empirical studies have also highlighted a decline in the number of firms on the exchanges in the last three decades. This is explained by macroeconomic reasons such as changes in economies of scale that favor integrating private firms rather than the initial public Offerings (IPOs or regulatory changes to listing requirements. The low rate of new listings and the high probability of delisting explain the trend. They also highlight that the decline in the number of listed firms is due to the high delisting rate. They also highlight that the low rates of new listings and the greater delisting explain it - 54% and 46% respectively.

Since 1974, the Karachi Stock Exchange (KSE) has seen the delisting of 361 companies. Out of these, 113 firms voluntarily delisted from the KSE and reverted to private status after repurchasing their shares. These are significant numbers given that, as of 2023, only 525 companies were listed on PSX.

The reasons for delisting vary, including voluntary cessation of operations, conversion of specific closed-end mutual funds to open-ended ones, compulsory dissolution due to court orders, and non-compliance with listing regulations.

Problem Statement

Delisting is a global phenomenon where companies remove their shares from stock exchanges, a trend that began in the United States in the 1980s. To date, globally, more than 76,000 firms have been delisted. Most exchanges typically exhibit a positive listing gap—meaning the number of firms listed in a specific period exceeds those delisted. For instance, India experienced a positive listing gap with a net increase of 1,315 companies from 2010 to 2023. Conversely, during the same period, PSX faced a net listing shortfall of 103 companies, with only 67 new listings versus 170 delistings. This study examines the factors contributing to delisting in Pakistan by comparing them with those in the Indian market.

Objectives of the Study

The following are the objectives of this study: To identify firm-specific factors, such as financial performance and corporate governance, that influence a firm's propensity to delist.

1. To examine the effects of regulatory stringency and market dynamics that render firms vulnerable to delisting.
2. To conduct a sectoral analysis to pinpoint common and differing factors among the sectors with the highest delisting rates.
3. To ascertain the factors related to financial visibility by examining sectoral means, mainly focusing on identifying oligopolies that occupy a significant portion of the index and their practical roles.
4. To compare the Pakistan Stock Exchange with the Indian market to highlight commonalities and differences.

Importance of the Study

The stock market is integral to a country's economic development, serving as a crucial platform where companies can raise capital and investors can buy and sell securities. This exchange channels funds from investors to companies, allowing them to finance various activities such as research and development, acquiring new technologies, and constructing facilities. Furthermore, the stock market facilitates the public listing of company shares, enabling these entities to gather funds for expansion, innovation, and job creation.

In addition to aiding companies in raising capital, the stock market offers investors a venue to diversify their portfolios and manage risks. By investing in a variety of companies, investors can mitigate their risk exposure to any single entity. Additionally, the stock market allows companies to access capital more efficiently and quickly than traditional bank loans, accelerating economic growth. However, the Pakistan Stock Exchange (PSX) has been experiencing decapitalization. Simultaneously, high borrowing costs due to elevated interest rates complicate business investments in new projects and consumer purchases of durable goods. These high rates also diminish the capital available for business investments and hiring, stifling economic growth in Pakistan.

This study aims to assist policymakers and regulatory bodies in identifying the core issues and underlying causes of decapitalization, which could lead to increased portfolio investment inflows and a more robust capital market for large and small firms.

2. LITERATURE REVIEW

Overarching Theory

The prevailing theoretical framework underpinning the phenomenon of delisting is Utility Theory, which underscores the principle of rationality. Rationality in this context is founded upon the assessment of trade-offs between costs and benefits. Consequently, when the costs associated with maintaining a listing surpass the benefits derived from being listed, firms opt to initiate the delisting process. This tradeoff proved effective not only in cases of voluntary delisting but also in involuntary delisting. Recent regulatory changes, including the implementation of the Sarbanes-Oxley Act in the United States, have contributed to increased costs for publicly listed firms.

Consequently, the financial requirements for companies to remain listed have escalated in recent years. As a result, many of the smaller companies that went public in the late 1990s may wish to reconsider their decision (Renneboog et al., 2007).

Benefits of Listing

Liquidity Hypothesis

One of the fundamental reasons for a company to go public is to enhance its liquidity, and if it does not seem possible, then the company is more likely to keep its status private (Meera et al., 2000). Likewise, many businesses prefer going public to increase their market share. Moreover, according to (Witmer, 2005), a firm faces the risk of having its stock delisted if the liquidity of its operations drops to an unacceptable level. The reason for this is the inverse link that exists between liquidity and the bid-ask spread and, by extension, the value of the firm (Pham et al., 2020). These companies may have lower financing costs because they can profit from easier asset valuation (Tutino et al., 2014). This could result in a lower interest rate being offered on the desired debt financing.

On the other hand, sometimes, a company may delist itself from the stock exchange if it decides it no longer wants to be active in trading (Pour & Lasfer, 2013). For example, according to the life cycle theory, companies that have reached the maturity stage can benefit from delisting, as it can help them avoid listing fees. This strategy leads the business to leverage its financial stability and reduces its dependency on external funds. Moreover, according to the research conducted by Pour & Lasfer (2013), many of the companies that delisted from the London Stock Exchange in 1995 went public for the first time in order to make their capital structure more stable. They had to delist because they were unable to raise capital from the market.

According to Geranio & Zanotti (2012), the presence of information asymmetry serves as a crucial predictor of PTP (Public-to-Private) transfer and significantly impacts the valuation of companies. In this context, market lack of interest is considered the primary driver of undervaluation by many researchers. This approach creates a discrepancy between the company's value and what outsiders perceive it to be. Insiders have a better idea of the organization in which they are interested in investing, while outsiders only have access to the publicly available information (Goh et al., 2002). One possible reason for this gap is the ineffectiveness of managers in communicating the value generated by market enterprises to their stakeholders (Jahansoozi, 2006).

Financial Visibility

According to the financial visibility hypothesis given by Witmer (2005) when a global company plans to list its shares in the United States (US), the number of its shareholders increases by a factor of 29%. This shows that analysing the reasons for insufficient inclusivity is meaningless in a regulatory market environment. In contrast, Chaplinsky & Ramchand (2011) argue that if the number of foreign businesses listed on the New York Stock Exchange rises, the United States market may lose some of its power to draw the attention of analysts. This means that the appeal of companies listed on foreign stock markets may decrease, making it harder for them to stand out. Nevertheless, it is projected that, contrary to Witmer's article, the US market will continue to attract the interest of specialists.

For an explanation, the number of listed businesses has an increasing effect as the number of firms increases and is one of the many elements that affect a company's visibility. Smaller companies may have less of an impact than larger ones because of the larger ones' disproportionately substantial research expenditures, which only deliver marginal advantages. This might be the case since larger organizations often gain more from their investments in research (Beyer et al., 2011; Geranio & Zanotti, 2012).

Undercover Play

Some companies choose to exit the financial market as a counter strategy, unlike companies that hope to profit from financial visibility through going public (Baker et al., 2002). In other words, withdrawing from the financial markets is one way to operate covertly and undetected by the market as a whole or by individual rivals (Pour & Lasfer, 2013). All publicly listed firms are significantly exposed to their various stakeholders. The motivation is to ensure fairness and openness. Therefore, a company can withdraw from the global market and restrict the publication of financial information by unilaterally withdrawing from the capital markets. This would be done so that the people's financial information does not get out (Donaldson & Preston, 1995; Healy & Palepu, 2001; Leuz et al., 2008).

One of the major benefits of companies transitioning from public to private ownership is the elimination of public scrutiny over their business operations. As stated by (Bartlett, 2009), private companies are not required to comply with the stringent transparency and disclosure requirements as listed companies. This lack of transparency facilitates the formation of cartels and groupings among companies and brokers (Harrington Jr, 2006).

Similarly, in Pakistan, markets have long been criticised for cartel-like behaviour, where the companies significantly manipulate prices and supply for their own benefit. The sugar and cement industries are examples of such companies (Ali et al., 2015; Darr, 2020). Through delisting, companies within sectors like these can continue their operations with less oversight. Moreover, a lack of transparency in financial matters can lead investors to perceive a high risk due to Pakistan's volatile stock market history (Chohan et al., 2024). Based on this, it can be inferred that the purpose of PTP deals is to compensate for the stock market's lack of liquidity. Therefore, if a corporation wants to retain a shareholder, the shareholder may be coerced into purchasing shares in a company in which they have no interest.

Cost of Utility

Agency Cost

Managers act as representatives of shareholders and are incentivised with higher compensation for expanding the company beyond its minimum requirements. Therefore, managers tend to receive higher compensation and gain greater influence. According to this theoretical framework, companies can exit markets with lower growth prospects, thereby reducing the likelihood of management involvement in non-productive enterprises. To achieve business growth, the management can either undertake ventures that have a low Net Present Value (NPV) or invest the available free cash flow at a cost that is less than the cost of capital (Kreilkamp et al., 2023; Nienhaus, 2022; Ning et al., 2017).

Contrary to that, the demand for dividends by shareholders as opposed to the company's reinvestment in growth or abandonment of unproductive efforts (payout policy) can potentially create a conflict of interest. In this phenomenon, if a company delists from a stock exchange, the concentration of equity will decrease, allowing a group of individuals to exert greater control over the company. These individuals have a financial interest in the firm and can control its operations. The resolution of agency problems may be possible after the restoration of control (Bøhren et al., 2012).

Risk Sharing

One of the advantages of being a publicly traded company is that its shareholders may band together to absorb financial losses. When the risk of the assets is high and the owner is either risk-averse or sufficiently confident

about the predicted return on the assets, trading on exchanges is a feasible alternative that should be examined. If the risk associated with the assets is minimal and the company is listed, it may be better for the company to become private rather than remain public. Owners share the benefits of risk reduction with a lower risk aversion, and those with a higher risk tolerance (Bass et al., 2017; Gómez-Mejía et al., 2007).

For instance, companies in the United States (US) contemplating leveraged buyouts can benefit from risk-sharing. Martinez & Serve (2017) found that firms with lower beta risk, a standard metric of idiosyncratic risk, are more inclined to participate in PTP deals. The risk-sharing hypothesis was found to be a significant factor in determining whether or not a company should be delisted (Bortolon & Da Silva, 2015; Frank & Goyal, 2004).

Listing Regulations

Expenses associated with being listed on stock exchanges are a major factor for many companies when making the choice to go private. Public companies have faced a significant barrier over the past decade in the form of shifting regulations and an increase in the minimum amount of money required to be listed, even if all of these costs, such as investor relations and disclosure obligations, are accounted for when a company plans to enter the capital markets through an initial public offering (IPO) (Magni et al., 2022). The amount of money a company needs to get listed has increased in recent years. For this reason, Carney (2005) suggests that "many of the smaller companies that went public in the late 1990s, as well as foreign issuers that entered the US market, may wish to rethink their decision." The question of whether this is the optimal next step requires careful consideration.

For an explanation, Miller & Frankenthaler (2003) argue that economic instability in the capital markets and the stringent regulations imposed by the Sarbanes-Oxley Act compelled publicly traded companies to evaluate the cost-benefit ratio associated with continuing to trade their shares on the financial market. Likewise, Bortolon & Da Silva (2015) find some reasons for the delisting of companies listed on the Brazilian Stock Exchange. These reasons include lack of record updates, absorption through mergers, voluntary requests for delisting, and severe financial issues such as liquidation and bankruptcy.

Listing Cost

It has been observed that when listing requirements are relaxed or tightened, a different set of companies becomes eligible for listing. Harsher rules do not necessarily indicate that fewer businesses will be listed since harsher standards might make a listing more desirable. However, this drop can be explained by stricter criteria that lead to fewer postings. After the enactment of SOX in 2002, exchanges revised listing rules to incorporate new corporate governance mandates (Crain & Crain, 2005).

Historically, there was no tightening of either the initial or maintenance listing criteria between 1996 and 2002. In 1996, NASDAQ updated its listing requirements. The results, however, were inconsistent. While raising the asset size threshold, NASDAQ opened the door to companies that had previously been excluded from listing. There was probably an increase in the number of new listings on the market because of the revisions to the listing requirements. The number of publicly traded companies will also be affected if the price of listing on the stock exchange is adjusted (Bushee & Leuz, 2005).

Delisting Loss

The debate on whether delisting is beneficial or not remains open. For instance, Pour & Lasfer (2013) compiled a large body of research in which they assessed the positive and negative aspects of delisting. Chandy et al., (2004) examine what they refer to as the "dark side" of delisting in their research. As soon as a corporation gives up its status as a publicly listed company, the value of the company's shareholders, the liquidity of the stock, and the reputation and visibility of the management all take a tumble (Troy & Romm, 2004). In contrast, (Renneboog & Vansteenkiste, 2018) studies the possible favourable ramifications that may arise from this phenomenon. Both groups concluded that there is a possibility that this phenomenon will have a positive impact. Several factors within a company can influence the decision to transition it from a public to a private entity. These factors include the potential for tax savings (Weir & Wright, 2006), a decrease in agency costs resulting from the realignment of incentives (Renneboog et al., 2007), the transfer of information from stakeholders to shareholders (Weir & Wright, 2006), as well as direct and indirect costs.

Nevertheless, many researchers believe that delisting on a stock exchange may have serious and lasting impacts on companies, investors, employees, and stakeholders. For instance, delisting removes a company's ability to issue new shares and raise funds, which limits its growth and investment

opportunities. Since the company's shares are no longer publicly traded, the company's financial and operational information is less accessible to investors (Breheny, 2023; Pour & Lasfer, 2013). This diminished visibility makes it challenging to attract new investment. Furthermore, being listed often signifies adherence to certain financial and regulatory standards, and losing this status can be seen as a failure, erode investor confidence, and make it challenging to secure new investors (Martinez & Serve, 2017). Hence, maintaining compliance with listing standards and plain communication is important to evade adverse consequences.

Other Factors Causing Companies to Delist

Size of Organization

According to (Bortolon & Da Silva, 2015), the decision to transition to a private ownership structure within the context of the life cycle is dependent on the size of the company. They further argue that small and medium-sized enterprises are more vulnerable to asset undervaluation and delisting risks than large enterprises. This aspect can be partially justified by the observation that small and mid-sized companies are less visible and less appealing to market agents. Consequently, the attractiveness of delisting is enhanced by the underestimation of the company that occurs due to the asymmetry of this information (Seru et al., 2010). However, the expansion of a company is dependent upon the expenses associated with the dissemination of necessary information to the capital market, which can diminish as the company experiences growth (DeAngelo et al., 1984).

The size of the firm and the proportion of freely traded shares should also be taken into consideration (Arbel & Strebel, 1982). Incorporating low floating makes the advantages of being a publicly traded company less advantageous. This is because illiquidity is more frequent when the float is low (Fama & French, 1995). Although small businesses consistently outperform the market, reliable data on them can be challenging to obtain. Additionally, the primary obstacle for institutional investors to invest in small stocks is the issue of insufficient liquidity. Investments in liquid securities are simpler to liquidate and have less of an effect on the market (Clark, 2023). Although small-cap securities are less expensive than those of larger companies, institutional investors may be reluctant to participate in them. This is because staff at small-cap firms are often fewer in number (Jensen, 1986).

Dividend Policy

Participation in the capital markets requires a dividend policy that is both consistent and current. This is being done to attract many potential investors and enhance the company's market standing. The company's dividend policy provides potential investors with essential information about the business. For example, the seven growth organizations are dependent on their payment policies, but their owners would be hard-pressed to anticipate all the consequences of a shift in these policies. As a result, the current shareholder base of a value-oriented company may be unsupportive of the company's choice to pursue development ambitions while considering a change in dividend policy. Due to this opposition, the stock price may decline if shareholders decide to sell their shares. Moreover, if a company's dividend strategy is not as strong as before, it can leave the capital market to protect its value (MacKay, 2023; Maverick, 2022; Scot, 2024).

Obtaining Temporary Funding

According to Geranio & Zanotti (2012), a growing percentage of companies are pulling out of the market soon after their Initial Public Offering (IPO). There are several scenarios in which a company can choose to have a brief existence as a publicly listed company, including capitalising on a temporary bull market and then quickly exiting the market after favourable conditions have passed or coming to terms with the fact that going public was the wrong option. After accounting for all costs, the IPO price is greater than the last disclosed price; hence, the company has incurred a loss. However, a favourable spread between the IPO price and the stock's prior trading price is more typical for companies that can reap the benefits of growing markets (Johnson, 2014).

Free Cash Flow

The free cash flow theory posits that once a company has been delisted from a public market, its management is less inclined to pursue high-risk, high-reward business opportunities. This is especially important in regions with little chances for growth (Jensen, 1986; Jensen & Meckling, 2019). Koh et al., (2013) argue that the knowledge process skills of a company are tied to its knowledge management infrastructure. This paints a complete picture of the impact efficient knowledge management may have on an organization's productivity (Marx & Fuegi, 2020). As a result, several authors, including Joshi (2011), have detailed the considerations management teams need to consider when selecting whether a firm should be public or private.

According to (Lombardi & Ravazzolo, 2016) Managers in the knowledge economy are expected to take risks on projects with negative Net Present Values (NPVs) from time to time in order to drive business growth. If shareholders prefer that FCFs be distributed to them as dividends rather than being reinvested in the business or spent on pointless projects, this might provide a conflict of interest (Carayannis & Grigoroudis, 2014). Investors would rather see FCFs distributed as profits than kept by the firm or wasted on meaningless activities; thus, this is the case. This is because certain investors would rather have the firm invest in more profitable items than keep its free cash flow (FCF). Owners and managers of organizations with much cash on hand sometimes disagree on the best way to disperse that wealth (Renneboog et al., 2007).

Financial Performance

Piotroski (2000) argues that only observing the company's exterior features is insufficient to understand the delisting decision, and that detailed investigation of the company's history and financial data is also required. Delisting choices can be constrained, in fact, by a company's financial performance. He discovered management can decide whether or not to delist by analysing the impact of free cash flow (FCF), agency costs, and financial performance, firm value, and stock returns on these factors (Habib & Ljungqvist, 2000). Management will be able to decide whether to delist based on this information. To delist or not to delist, this information will be invaluable to management.

Likewise, the findings of (Ahmadi & Bouri, 2019) suggest that operational performance may have a significant influence on delisting decisions. For instance, according to (Crocì & Giudice, 2014) a company's operating performance, as measured by return on assets and return on equity, reaches a certain threshold, prompting management to delist the company in order to manage better the rising level of the firm's operating performance. It can be inferred that the company's operating performance is easier to control once it has been delisted. The potential delisting may be quantified according to the writers in question. They state that there are two options for businesses to assess their performance. The first one is that the company can choose to accumulate assets based on market conditions and maintain a public position to seek potential business opportunities. Another option for a company to capitalise on various expansion opportunities is to go private. Hence, management is supposed to speed up the delisting process as firm value increases (Kang, 2017).

Corporate Governance

In the literature on corporate governance, delisting is recommended as a strategic response measure to alleviate institutional conflicts and achieve alignment between management incentives and shareholder interests, particularly in entities with management deficiencies (Jensen, 1986; Kaplan, 1989). According to Jensen (1986), the inclusion of agency expenses within the framework of indirect listing costs is proposed, and the act of delisting can serve as a strategy to alleviate agency conflicts that arise between the principal and the agent. However, there are differing views on the correlation between institutional expenditure and delisting in existing literature. The gap in interests between managers and shareholders will intensify when managers have greater motivation to gain personal advantages (Jensen & Meckling, 2019). We can say that the motivation to engage in the consumption of private benefits of control is heightened in the presence of inadequate corporate governance mechanisms.

Hostak et al., (2013) claim that international companies that delist on the US exchanges have less board governance than other companies. Moreover, (Hofstetter, 2005) It also suggests that companies with weaker governance structures may choose to delist as a means of addressing agency-related problems. In this context, some scholars believe that delisted companies have a more common CEO dualism than listed companies (Weir & Wright, 2006). Also, companies with fewer independent directors are likely to be delisted through privatisation processes because CEOs and board chairpersons are likely to resign (Bailey et al., 2006). Likewise, according to the incentive realignment concept proposed by Kaplan (1989), the delisting process has the potential to realign the incentives of managers and shareholders.

Ownership Structure

The presence of family members serving as board members is a prevalent occurrence in the context of small- and medium-sized firms (van Aaken et al., 2020). Consequently, the board, sometimes referred to as the "family board," wields significant influence over decision-making and sets the agenda for Shareholders Meetings. According to (Wang, 2006) there is a positive correlation between ownership by founding families and the quality of earnings. Fewer anomalous accruals, increased earnings informativeness, and reduced persistence of transitory loss components in earnings see this. According to the findings of (Villalonga & Amit, 2006), it is observed that family ownership is associated with wealth creation only in cases when the founder assumes the role of CEO inside the family or serves as Chairman with

a hired CEO. Moreover, (Bruton et al., 2009) discovered that there is no significant correlation between family control and performance, as evaluated by accounting data. However, the authors suggest that the presence of an independent board, apart from the founding family, has a beneficial effect on performance.

The family-controlled ownership structure is characterised by the ultimate controllers, who possess more than 50% of the total shares in the Board of Directors (BOD) at the end of the year, comprising family members. Consequently, the operational culture within this ownership structure has a significant impact on the business's performance. There appears to be a correlation between family ownership and delisting (Anderson & Reeb, 2003).

3. METHODOLOGY

Population and Sampling

Our population comprises all firms delisted from the Pakistan Stock Exchange (PSX) and Indian Stock Exchanges, specifically the National Stock Exchange (NSE) and Bombay Stock Exchange (BSE). The NSE is India's largest stock exchange, featuring a fully automated, electronic, and screen-based trading system. The BSE, India's first stock exchange, also plays a significant role in this study. Additionally, the study includes listed firms (survivors) that remained on the exchanges and did not delist. These firms were selected as matching firms based on market capitalisation.

A purposive sampling technique has been employed to select the sample, focusing on firms that decided to delist. Delisting can be categorised into two types: voluntary and involuntary. Voluntary delisting occurs when a company decides independently to remove its shares from a stock exchange. Involuntary delisting happens when a stock exchange removes a company's shares from its listing due to non-compliance with the exchange's standards or regulatory requirements. For this study, we specifically considered only firms that underwent voluntary delisting. An equal number of survivor firms (listed) of the same size during the same period were also included. The sample consists of 60 delisted firms and 60 matching firms from Pakistan, with a similar quantity selected from the Indian exchanges. The timeframe for this study spans from January 2010 to September 2023.

Data and Process

Between 2010 and 2023, 67 companies were listed on the Pakistan Stock Exchange (PSX), while 170 companies were delisted. In contrast, 2,223 firms were listed, and 908 firms were delisted from Indian stock exchanges during the corresponding period. For this study, we selected 240 firms: 120 from the PSX and 120 from the Indian stock exchanges. Each group comprises 60 voluntarily delisted firms and 60 survivor firms. The selection criteria involved purposive sampling based on the firms' decisions to delist.

We collected data for the three years preceding the delisting of each selected firm. For instance, if a firm was delisted in 2013, we gathered data from 2010 to 2013. For comparison, we also selected a matching firm with similar market capitalisation, focusing on the same industry. If a direct match within the same sector was not available, a similar sector was chosen for the survivor firm. Financial data were sourced from the firms' financial reports, while governance-related information was obtained from the firms' financial reports and their websites. This approach ensures a robust analysis of the factors influencing delisting decisions and the performance of survivor firms.

Econometric Model and Description

To determine the factors influencing the delisting of Initial Public Offerings (IPOs), we employ the event study methodology, categorising each firm's delisting status as a dummy variable (1 = delisted firm, 0 = listed firm). This methodology has been widely used in previous studies on various financial events, including the demutualisation of exchanges, dividend declarations, mergers and acquisitions, IPO performance, and share splits. The survival time of each company comprises the occurrence of delisting at time $t > 0$ or censoring at time $c > 0$. In cases where delisting and survival are mutually exclusive, it is customary to define an event indicator $\delta \in \{0,1\}$ and an observable survival time $y > 0$. The observable time y represents the measured duration of a right-censored delisting event.

$$y = \min(t, c) = \begin{cases} t & \text{if } \delta = 1, \\ c & \text{if } \delta = 0 \end{cases}$$

We collected data on the identified variables for each of the antecedent events, which are included as explanatory variables in equation (1). Additionally, data have been collected for listed firms of comparable size using the matching firm methodology. The details of the data collection process are as follows:

Table 1: Detail of Data Collection Process

Delisted Firm	Matching Firms
- Firm A voluntarily delisted in January 2013 and withdrew its market capitalisation of 300 million. - We collected the data of each variable mentioned in equation (1) for the last three years before the event occurred	- We selected firms of the same size (in the range of 300 million) e.g. B & C, that were listed on AIM in the same period, i.e. January 2013. - We collected the data of each variable mentioned in equation (1) for the last five years, 1999-1995, of both B & C firms.

Source: Authors' computations.

$$h(t, X) = h_0(t) \exp(\beta_1 EPS + \beta_2 PER + \beta_3 DPR + \beta_4 PM + \beta_5 RG + \beta_6 PG + \beta_7 CR + \beta_8 DE + \beta_9 EPI + \beta_{10} EPD + \beta_{11} FAT + \beta_{12} TAT + \beta_{13} RETA + \beta_{14} Fage + \beta_{15} FSize + \beta_{16} Bsize + \beta_{17} Instown + \beta_{18} Pfloat + \beta_{19} NEDs + \beta_{20} CEOD + \beta_{21} MktVol + \beta_{22} ReCost + \beta_{23} ListCost + \beta_{24} TrdVol)$$

Where; (1)

$h(t, X)$ is the hazard function, dependent on time t and covariates X . $h_0(t)$ is the baseline hazard function, representing the hazard for an individual with a baseline (zero) level of covariates. This function is unspecified, highlighting the semi-parametric nature of the model. $\exp(\beta_s X_s)$ is the exponential term involving a linear combination of covariates of the following independent variables:

Table 2: Details of Data

Abbreviation	Full Title	Calculation	Explanation
EPS	Earnings per Share	Net income / Outstanding Shares	EPS is used to gauge the profitability of a company relative to its outstanding shares of common stock.
PER	Price earnings ratio	Market Price per share/ EPS	It indicates how much investors are willing to pay for one rupee of earnings.
DPR	Dividend payout ratio	Dividends per Share / Earnings per Share	It helps investors understand how much of the company's profits are being returned to shareholders.

Abbreviation	Full Title	Calculation	Explanation
PM	Profit margin	Net Profit/ total sales	Net profit margin indicates how much earnings are available for investors after all expenses have been deducted
RG	Revenue growth	(current sale-previous year's sale)/ previous year's sale	It measures the percentage change in a company's sales over a specified period
PG	Profit growth	(current profit-previous year profit)/ previous year profit	It measures the percentage change in a company's profit over a specified period
CR	Current Ratio	Current assets/ current liabilities	It is a measure of a company's liquidity, providing insight into its ability to pay off short-term debts.
DE	Debt to equity	Debt/ Equity	It is a financial leverage ratio that compares a company's total liabilities to its shareholders' equity.
EPI	Earning power to Investment	Net profit/ investment cost	It measures the profitability of an investment relative to its cost.
EPD	Earning power to debt	EBIT/Interest cost	It measures a company's ability to meet its debt obligations by comparing its earnings before interest and taxes (EBIT) to its interest expenses.
FAT	Fixed assets utilisation	Net sales/fixed assets	It measures a company's efficiency in generating sales from its investment in fixed assets.
TAT	Total assets utilisation	Net sales/total assets	It measures a company's efficiency in generating sales from its investment in total assets (current and fixed assets).
RETA	Retained earnings to total assets	Retained earnings/ total assets	It measures the proportion of a company's total assets that are financed by retained earnings.



Abbreviation	Full Title	Calculation	Explanation
Fage	Firm age	Age of the firm	Firm age refers to the number of years a company has been in existence since its founding (current year-year of incorporation)
Fsize	Firm size	Log of total assets	Log value of total assets of your firm.
BS	Board size	Total number of directors	Total number of directors
Instown	Institutional ownership (%)	Shares Owned by Institutions/ total number of shares	Institutional ownership refers to the percentage of a company's outstanding shares held by institutional investors.
Pfloat	Public Float	Total outstanding shares- restricted shares	It refers to the number of a company's shares that are available for public trading.
NEDs	Number of non-executive directors	Total number of non-executive directors	Non-executive directors (NEDs) are members of the board who are not part of the company's executive management team.
CEOD	CEO Duality	CEO Duality	CEO duality refers to the situation where the roles of Chief Executive Officer (CEO) and Chairman of the Board of Directors are held by the same individual.
MktVol	Market Volatility	Std of index returns	Market volatility refers to the frequency and magnitude of price movements in financial markets.
ReCost	Reporting and Audit Cost	Expected cost incurred at accounts and audit	Reporting and audit costs refer to the expenses incurred by a company in the process of preparing and presenting its financial statements, as well as undergoing external audits.

Abbreviation	Full Title	Calculation	Explanation
ReCost	Reporting and Audit Cost	Expected cost incurred at accounts and audit	Reporting and audit costs refer to the expenses incurred by a company in the process of preparing and presenting its financial statements, as well as undergoing external audits.
ListCost	Listing Cost	Total cost of listing	The listing costs refer to the expenses a company incurs when it decides to list its shares on a stock exchange.
TrdVol	Trading volume	Log of trading volume	Trading volume refers to the total number of shares traded on the market.

Source: Authors' computations.

Econometric Techniques

In this study, we employed the Cox Proportional Hazards Model to analyse and understand the relationship between the survival time of delisted firms and a set of predictor variables as specified in equation (1). This model allows us to measure the hazard ratio for each variable, thereby identifying factors that positively or negatively influence a firm's likelihood of survival or delisting from the stock market. The hazard function, $h(t, X)$, depends on time and covariates X . The baseline hazard function, $h_0(t)$, represents the hazard for an individual with baseline (zero) covariates and remains unspecified, underscoring the semi-parametric nature of the model. The term $\exp(\beta_S X_S)$ involves an exponential function of a linear combination of covariates, where coefficients are the coefficients representing the impact of each predictor variable.

Qualitative Data and Analysis

In this study, we also collected data from higher management of listed and delisted companies over a five-year period, as well as from SECP, PSX officials, and brokers. We conducted interviews and gathered data using closed-ended questions derived from statistically robust variables. We categorised the responses into two aspects: (1) frequency, indicating how many respondents discussed and emphasised each variable, and (2) severity, reflecting the

perceived impact levels of these variables (i.e., very high, high, and moderate). The results were summarised based on these three levels across each group: SECP & PSX, investors & brokers, and companies.

4. FINDINGS AND ANALYSIS

Global Listing Trends

Table 3 illustrates the global listing trends, showing an overall increase in the total number of listed firms worldwide. However, in South Asia, this trend is declining. In the 2000s, there were 6,633 listed companies, but by 2020, this number had fallen to less than 6,300, indicating a higher delisting rate than new listings and a significant listing gap. Similarly, in the United States, the number of listed firms decreased from 5,860 in the 2000s to less than 4,400, reflecting a higher delisting rate and a growing listing gap. The United Kingdom is experiencing a similar downward trend.

These patterns suggest a global decline in equity markets due to various factors, including rising interest rates, the 2007-08 financial crisis and its aftermath, and shifts in investor preferences towards markets offering higher returns and capital gains. This aligns with the preferred habitat model, which posits that capital flows to markets with more favourable conditions. As investor participation declines, stock markets become less attractive to companies, resulting in lower financial visibility and benefits, which prompts firms to delist.

Table 3: Number of Listed Firms Around the World

Host country of firms listed	2000-2004	2005-2009	2010-2014	2015-2020
Canada	2,242	3,791	3,908	3,427
Central Europe and the Baltics	1,015	1,314	1,585	1,210
China	1,224	1,526	2,400	3,345
East Asia & Pacific	10,407	12,809	15,305	18,388
Europe & Central Asia	10,300	10,861	10,466	7,199
United Kingdom	2,414	2,570	1,937	1,706
Latin America & Caribbean	1,411	1,227	1,256	1,186
North America	8,124	8,698	8,141	7,746

Host country of firms listed	2000-2004	2005-2009	2010-2014	2015-2020
South Asia	6,633	5,958	6,470	6,329
East Asia & Pacific	3,052	3,813	5,283	6,494
Europe & Central Asia	1,146	2,050	2,305	1,942
Latin America & the Caribbean	1,402	1,225	1,234	1,167
Upper middle income	5,645	6,716	7,458	8,028
United States	5,860	4,891	4,220	4,373
World	40,087	42,595	44,482	43,488

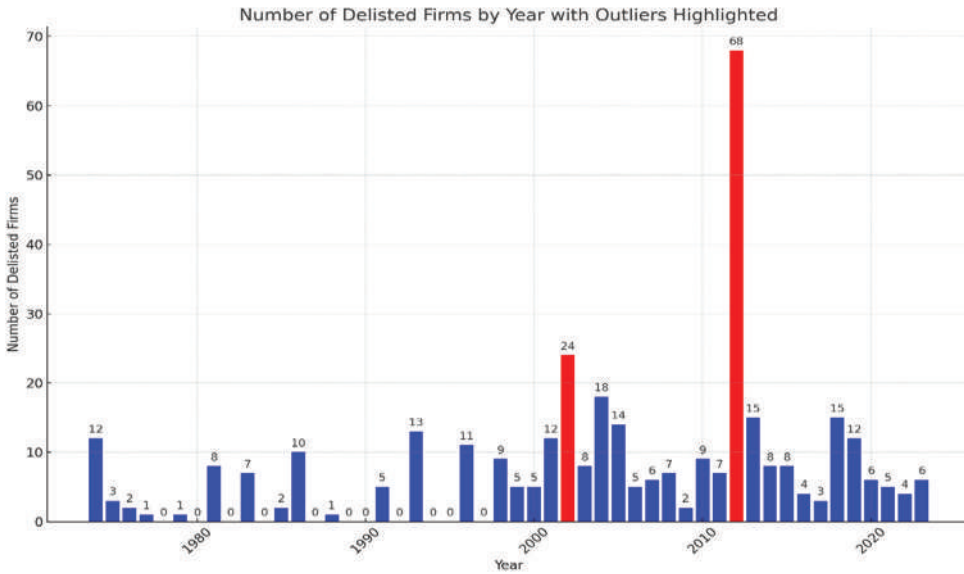
Source: World Bank. (n.d).

Capital Erosion in PSX

Figure 1 illustrates the historical patterns of delisting in Pakistan, highlighting a significant increase after 2010. Interestingly, during the financial crisis of 2007-09, this trend was lower compared to the period following 2010 and between 1990 and 2005. The increase after 2010 can be attributed to domestic crises, such as the energy crisis and severe security issues in Pakistan, which led many firms to shut down. The firms most affected by delisting included textile spinning (17 firms), textile composite (10 firms), exchange-traded funds (8 firms), and investment banks (7 firms). During this period, the energy crisis and the resulting high cost-push inflation compelled many firms to delist. Additionally, in 2012, the government passed the Demutualisation Act to convert the three stock exchanges into a single public limited company instead of a guaranteed limited entity.

Despite the stock index recently reaching over 72,000 points, the Pakistan Stock Exchange (PSX) is currently facing a significant challenge: the delisting of Initial Public Offerings (IPOs) from its platform. This issue undermines its core function of facilitating company listings. From 2010 to 2023, PSX experienced a net decrease of 103 companies, with only 67 companies listing compared to 170 being delisted, as illustrated in figure (2). Similarly, Table 4 illustrates the trends in capital inflows and outflows from 2010 to 2023. Throughout this period, the capital inflows and outflows remained relatively parallel, with specific years experiencing higher outflows and others experiencing higher inflows.

Figure 1: Delisting Trend in PSX since its inception



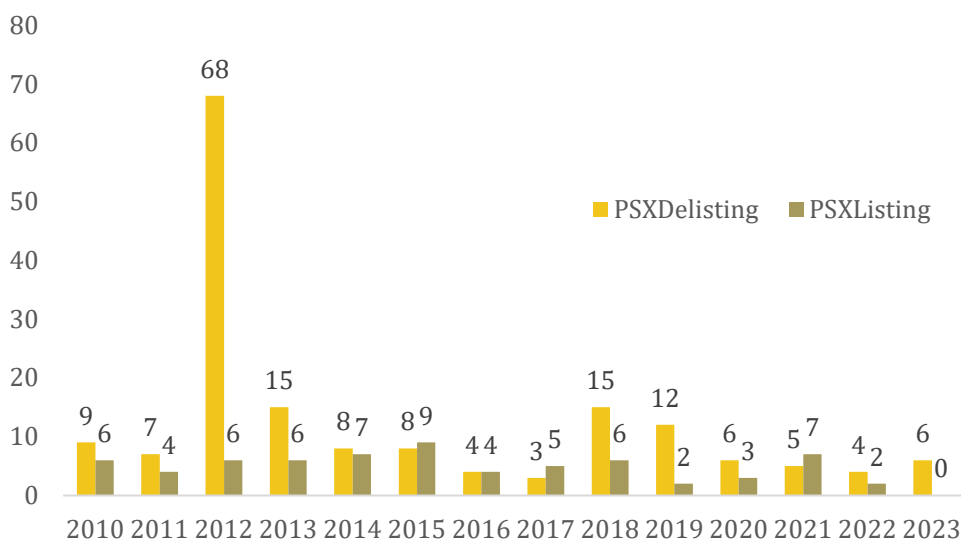
Source: Pakistan Stock Exchange.

Table 4: Flow of Capitalization in Pakistan Stock Exchange (in million)

Year	Capitalization		Decapitalization
	Paid up Capital at Face Value	Total Capital Inflow	Capital Outflow
2010	2,968	3,351	8,944
2011	2,342	3,582	1,945
2012	406	406	6,977
2013	2,080	4,576	10,264
2014	5,700	132,687	8,518
2015	11,247	190,589	722
2016	5,220	8,473	6,341
2017	13,003	14,539	186
2018	1,008	4,328	1,852
2019	1,090	5,025	3,164
2020	2,643	5,817	2,002
2021	3,648	19,279	36
2022	390	840	1,780
2023	101	435	166

Source: Pakistan Stock Exchange.

Figure 2: Listing Gap in Pakistan during 2010-2023



Source: Pakistan Stock Exchange.

Determinants of Delisting at PSX

We employed the Cox Proportional Hazards model to ascertain the robust factors influencing a firm's propensity to voluntarily delist. The findings, detailed in Table 5, highlight firm-specific, market-specific, and governance-related factors that affect the likelihood of delisting. Our analysis of financial performance reveals how effectively a firm's assets are utilised, contributing to the enhancement of investor wealth.

We identify critical financial performance indicators such as Earnings Per Share, Price-Earnings Ratio, Dividend Payout Ratio, and Profit Margin, with respective hazard ratios of 0.705 ($Z = -2.04$), 0.591 ($Z = -2.62$), 0.435 ($Z = -7.49$), and 0.501 ($Z = -12.41$). These findings suggest that superior financial performance metrics are inversely related to the firm's propensity to delist. Primarily, investors prioritise capital gains and dividend yields when investing in stocks. Higher values of these indicators typically increase stock value and dividends, thereby enhancing investor wealth. Consequently, investors are more inclined to allocate resources to firms that either offer higher dividends or whose stock prices are appreciating rapidly. Such dynamics further enhance a firm's financial visibility in the market.

The second aspect, which is firm-specific, pertains to the firm's liquidity and growth, both of which are indicative of the firm's ability to meet its obligations and forecast future growth. Indicators such as Revenue Growth and Profit Growth, with hazard ratios of 0.62 ($Z = -4.55$) and 0.72 ($Z = -2.06$) respectively, suggest that higher growth rates diminish the likelihood of delisting. Conversely, the Current Assets Ratio and Debt-to-Equity Ratio, with hazard ratios of 1.25 ($Z = 0.39$) and 1.38 ($Z = 9.85$), indicate that elevated debt levels increase the likelihood of a firm choosing to delist.

Similarly, the Earning Power to Investment ratio, with a hazard ratio of 1.24 ($Z = 2.09$), indicates that a higher ratio suggests an increased propensity for the firm to delist. The Earning Power to Debt ratio stands at 1.32 ($Z = 2.49$). This suggests that firms with greater earning power are more inclined to utilise and repay debt, as debt financing offers lower costs and fewer codal formalities compared to equity financing, which now demands more stringent codal formalities for continued stock market listing. Similarly, Reporting and Audit Costs, with a hazard ratio of 1.15 ($Z = 1.32$), and Cost of Listing and Trading Volume, with hazard ratios of 0.85 ($Z = -1.65$) and 0.32 ($Z = -1.28$) respectively, reflect the increased codal and listing costs that encourage firms to delist. On the other hand, debt financing, which involves considerably lower codal formalities, becomes more appealing for firms with strong earning power, shifting their financing preference from equity to debt.

Firm Age and Firm Size are also critical factors in Pakistan, with hazard ratios of 0.9 ($Z = -1.78$) and 0.2 ($Z = -4.73$), respectively. This indicates that larger firms are more resilient and better equipped to meet ongoing listing requirements compared to smaller ones. To support SMEs, the GEM-Board has been introduced on the PSX, featuring less stringent policies than the main board. Furthermore, Board Size, with a hazard ratio of 0.7 ($Z = -3.09$), indicates that a larger and more diverse board has a significant influence on a firm's ability to meet codal formalities and remain listed. Conversely, Insider Ownership, with a hazard ratio of 1.5 ($Z = 3.15$), increases the likelihood of delisting. This suggests that, in such a structure of ownership, management prefers to delist, perhaps finding it difficult to cope with the transparency associated with being listed.

The corporate structure of public limited companies often reveals that many boards are interconnected, with members frequently being close relatives or business partners. In several cases, family members and relatives of higher management are integral parts of the board. Conversely, State-Owned Enterprises (SOEs) delisted from the PSX board often suffer from bureaucratic entanglements. Typically, a secretary from a related ministry serves as a board

member of these SOEs and may simultaneously hold positions on various other boards, including policy boards of regulatory bodies like the SECP. This situation fosters an oligopoly dominated by specific families and bureaucrats rather than technocrats, influencing policymaking and creating a rent-seeking ecosystem.

Table 5: Determinants of Delisting at PSX

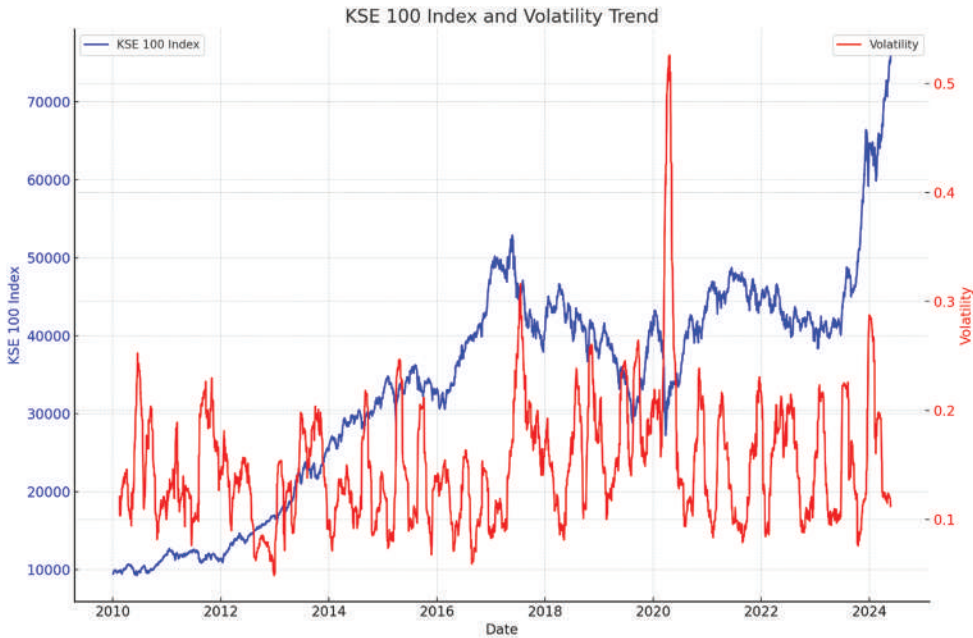
Variables	Haz. Ratio	Std. Err.	Z Value
Firm Financial Performance			
EPS	0.705	0.145	-2.04
Price Earnings Ratio	0.591	0.165	-2.62
Dividend Payout Ratio	0.435	0.052	-7.49
Operating Profit Margin	0.501	0.03	-12.41
Liquidity and Growth			
Revenue Growth	0.62	0.092	-4.55
Profit Growth	0.72	0.152	-2.06
Current Assets Ratio	1.25	0.612	0.39
Debt to Equity	1.38	0.142	9.85
Earning Power and Asset Utilization			
Earning Power to Investment	1.24	0.402	2.09
Earning Power to Debt	1.32	0.492	2.49
Fixed Assets Turnover	1.15	0.563	1.35
Total Assets Turnover	1.11	0.732	1.38
Retained Earnings to Total Assets	1.55	0.641	2.39
Firm Lifecycle			
Firm Age	0.9	0.285	-1.78
Firm Size	0.2	0.156	-4.73
Corporate Governance & Ownership			
Board Size	0.7	0.124	-3.09
Insider Ownership (%)	1.5	0.374	3.15
Public Float (%)	1.25	0.482	1.85
Number of Non-Executive Directors	0.88	0.393	-1.82
CEO Duality	1.1	0.185	0.50
Market Dynamics & Compliances			
Market Volatility	1.3	0.451	1.67
Reporting and Audit Cost	1.15	0.437	1.32
Cost of Listing	0.85	0.28	-1.65
Trading Volume	0.32	0.235	-1.28

Source: Authors' computations.

Finally, the market dynamics and compliance factors, such as Market Volatility (hazard ratio 1.3, (Z = 1.67) indicating more uncertainty and risk in the market, which enhances the firm's propensity to delist. Figure 3 illustrates the trend of the KSE 100 Index alongside its volatility from 2010 to 2024.



Figure 3: Stock Market Movements during 2010-2023



Source: Pakistan Stock Exchange.

This growth, however, is interspersed with periods of significant volatility, as represented in red, highlighting fluctuations in market stability. Notably, from 2010 to 2014, the KSE 100 Index experienced steady growth accompanied by higher volatility, indicating speculative market trends. This occurred despite the industrial production and export volumes of the firms represented on the KSE100 index failing to show corresponding growth.

After 2013, the new government assumed power, placing a heightened focus on industry and the stock market. The period saw increased volatility, notably in 2014, when strikes and a dharna lasting over 100 days contributed to market uncertainty. In 2015, the China-Pakistan Economic Corridor (CPEC) agreement was signed between China and Pakistan. This had a positive impact on the PSX index. Following the launch of CPEC, a Chinese consortium acquired 40% of the shares of the Pakistan Stock Exchange (PSX) after the demutualisation of three exchanges and their consolidation into a single entity, namely PSX.

KSE 100 Index Constituents and Financial Visibility

To gain a deeper understanding of the composition of the KSE 100 index, we have analysed detailed descriptive data concerning its constituents and their financial visibility. As of June 2024, the composition of the KSE 100 index, which is inherently dynamic, reflects the changing weights of its constituent firms. The top six companies account for 25% of the index's weight. This is followed by seven companies, accounting for the next 25%, and 19 companies, comprising another 25% of the index weight. The remaining 68 companies contribute to the final 25% of the index weight. This composition of the index demonstrates a significant concentration of influence among a select group of key players. The net profit margins and dividend payout ratios for these quartiles are, respectively, 23.71%, 25.43%, 11.81%, and 11.06%, and 36.00%, 25.00%, 44.10%, and 25.23%. As shown in Table 6. This data underscores remarkable progress over the last three years. Conversely, various industries are experiencing financial challenges. We have delved further into the data to identify the top five sectors with the highest index weightage.

Table 6: KSE 100 Constituent and Financial Visibility

	Index Weight ≤ 25%	25% > Index Weight ≤50%	50% > Index Weight ≤75%	75% > Index Weight
No. of Companies	6	7	19	68
Volume	1309953.17	1883247.00	2536290.37	2563163.09
EPS Growth (%)	26.68	34.69	644.32	199.54
PEG %	.08	.09	-1.12	-1.66
Net Profit Margin (%)	23.71	25.43	11.81	11.06
Payout Ratio %	36.00	25.00	44.10	25.23
Mkt Capitalization (000's)	208454718.83	272980936.33	86035542.72	46364080.93
No. of INED	3	4	2	3
NED	5	4	4	4
Total Director	10	9	8	9

Source: Authors' computations.

Oligopoly of Rent-Seekers

We examine the top five sectors contributing to 54% of the KSE 100 Index weight. The banking sector emerges as the leader, accounting for approximately 19% of the total index. This sector demonstrates a 28.73% dividend payout ratio, a 13.42% profit margin, and a 39.56% growth in EPS over the last three years. Operationally, the lending of the banking sector is relatively safe, with over 87% of its deposits lent to the state. Consequently, the banks have benefited from policy interest rates that have ranged between 15% and 22% over the past three years. Additionally, the sector's monopolistic stance is reinforced by the near impossibility of new bank entries, which boosts their share value and trading volume, coupled with higher earnings and subsequent dividend payouts.

In the second place, the Oil & Gas Exploration Companies hold 10.56% of the index weightage and report a net profit margin of 32.35% and a payout ratio of 36.75%. Predominantly state-owned, these companies maintain a monopoly, significantly benefiting from the continuous rise in petroleum and gas prices, and thus achieve substantial profits. The fertiliser sector, which holds a monopoly in the market, benefits greatly from subsidies for electricity and gas, which are vital for an agricultural country like Pakistan. This sector consistently sees an upward demand for its products, showcasing a net profit margin of 12.99% and a payout ratio of 43.50%.

The Power Generation and Distribution sector, also characterised by monopolistic tendencies, encompasses various public sector firms and entities operating in public-private partnerships. These firms receive capacity charges even without full utilisation of their plants, leading to an asset utilisation ratio of close to 100%. Consequently, the sector remains profitable despite higher electricity bills based on capacity charges rather than actual consumption.

Lastly, the fifth most prominent sector on the PSX is the Technology & Communication sector, representing approximately 8% of the index. It boasts net profit and payout margins of 23.16% and 36.00%, respectively. This sector holds a monopolistic position in the market with only five companies operating within it. Moreover, the market is expanding rapidly, driven by Pakistan's rapidly growing youth population, which is highly tech-savvy and avidly uses the internet, along with its products and services. This demographic shift is generating substantial profits and earnings for market participants.

Table 7: Top Five Sector of KSE 100 Index

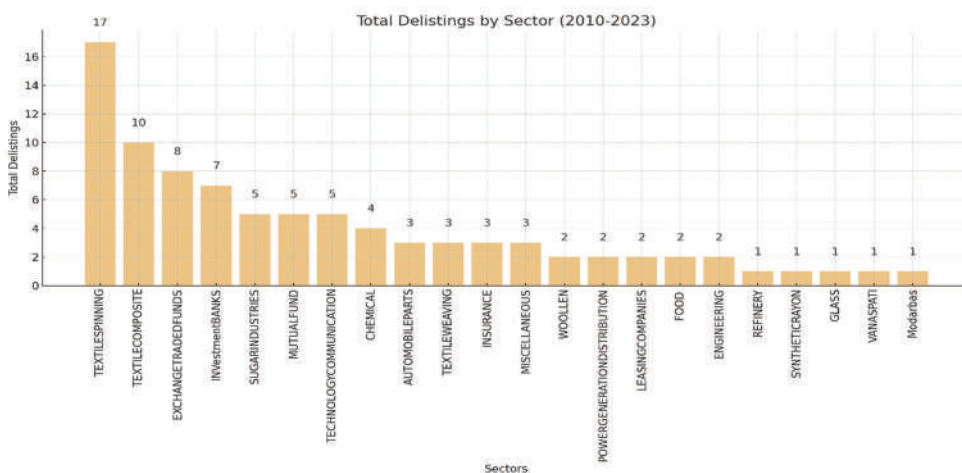
Industry	Index Weight	EPS Growth (%)	PEG %	Net Profit Margin (%)	Payout Ratio %
Commercial Banks	18.89	39.56	0.13	13.42	28.73
Oil & Gas Exploration Companies	10.56	21.74	-0.05	32.35	36.75
Fertilizer	9.00	29.75	0.15	12.99	43.50
Power Generation & Distribution	8.25	7.94	-1.00	21.34	39.71
Technology & Communication	7.81	21.40	-0.78	23.16	36.00

Source: Authors' computations.

Top Delisted Sectors

To identify the sector-specific factors that contribute to delisting, we selected the top four sectors that experienced the highest number of delistings, as shown in Figure 4.

Figure 4: Sector-wise Delisting Trend during 2010-2023



Source: Pakistan Stock Exchange.

When considering sector-specific factors, earnings per share (EPS) varied significantly, with a more pronounced difference in Textile Spinning and Exchange Traded Funds, but less so in Textile Composite. The price-earnings ratio was significant in Textile Spinning and Textile Composite but less

impactful for Exchange Traded Funds and Investment Banks. The influence of firm age was critical in the Textile Spinning Industry but less so for Exchange-Traded Funds. Firm size strongly protects against delisting, particularly in the Textile Composite. Both Textile Sectors (spinning and composite) exhibited characteristics that increased the likelihood of firms going private. Exchange-traded funds were less influenced by traditional financial metrics and more by market-based metrics, while Investment Banks displayed variability in how market conditions and financial structures impacted their delisting risk.

Table 8: Sectoral Determinants of Delisting at PSX

Variables	Textile Spinning		Textile Composite		Exchange Traded Funds		Investment Banks	
EPS	0.68**	(0.123)	0.60	(0.151)	0.73**	(0.159)	0.77*	(0.136)
Price Earnings Ratio	0.50***	(0.191)	0.48***	(0.131)	0.42**	(0.157)	0.49**	(0.130)
Dividend Payout Ratio	0.42***	(0.066)	0.49***	(0.042)	0.47***	(0.010)	0.59***	(0.012)
Operating Profit Margin	0.36***	(0.078)	0.37***	(0.013)	0.68***	(0.055)	0.67***	(0.016)
Revenue Growth	0.63***	(0.098)	0.64***	(0.059)	0.60***	(0.073)	0.66***	(0.071)
Profit Growth	0.90**	(0.137)	0.82	(0.174)	0.68*	(0.178)	0.64*	(0.166)
Current Assets Ratio	1.24	(0.610)	1.17	(0.613)	1.11	(0.564)	1.10	(0.638)
Debt to Equity	1.40***	(0.109)	1.39***	(0.121)	1.19***	(0.123)	1.23***	(0.094)
Earning Power to Investment	1.37*	(0.436)	1.09	(0.372)	1.29**	(0.385)	1.11*	(0.370)
Earning Power to Debt	1.44**	(0.520)	1.24**	(0.477)	1.33**	(0.481)	1.16**	(0.499)
Fixed Assets Turnover	1.00	(0.534)	1.01	(0.546)	1.01	(0.576)	1.32	(0.520)
Total Assets Turnover	1.08*	(0.746)	1.09	(0.765)	0.92*	(0.717)	1.18	(0.699)
Retained Earnings to Total Assets	1.67**	(0.675)	1.52**	(0.618)	1.65**	(0.688)	1.36**	(0.680)
Firm Age	0.73**	(0.313)	0.82	(0.329)	0.95*	(0.334)	1.02**	(0.281)
Firm Size	0.13***	(0.133)	0.02***	(0.136)	0.23***	(0.113)	0.29***	(0.159)
Board Size	0.67***	(0.102)	0.63***	(0.169)	0.82***	(0.158)	0.72***	(0.105)
Insider Ownership (%)	1.44***	(0.423)	1.44***	(0.414)	1.62***	(0.405)	1.53***	(0.404)
Public Float (%)	1.41**	(0.444)	1.36	(0.470)	1.30	(0.513)	1.26	(0.471)
Number of Non-Executive Directors	1.06*	(0.376)	1.05**	(0.440)	0.94	(0.350)	1.06	(0.354)
CEO Duality	1.26	(0.191)	0.93	(0.150)	1.00	(0.156)	0.94	(0.230)
Market Volatility	1.17**	(0.501)	1.23	(0.445)	1.12**	(0.455)	1.33	(0.428)
Reporting and Audit Cost	1.16	(0.392)	1.03	(0.482)	0.99	(0.477)	1.26	(0.400)
Cost of Listing	1.03**	(0.309)	1.01	(0.285)	0.72	(0.273)	0.87*	(0.295)
Trading Volume	0.27	(0.264)	0.13	(0.210)	0.27	(0.201)	0.48	(0.252)

Note: From 2010 to 2023, four sectors exhibited notably high rates of delisting on the PSX. Specifically, the textile spinning sector saw 17 firms delisted, followed by the textile composite sector with 10 firms. Additionally, 8 firms from the exchange-traded funds sector and 7 from investment banks also withdrew from the listing during this period.

Source: Authors' computations.

Nexus between Governance and Financial Indicators

The analysis of the impact of governance variables on financial performance indicators reveals distinct patterns. For Earnings Per Share (EPS), the beta coefficients suggest positive influences from Board Size ($\beta = 0.020$), Insider Ownership ($\beta = 0.030$), and Public Float ($\beta = 0.010$), indicating that these factors contribute beneficially to earnings. However, CEO Duality shows a negative influence, although slight ($\beta = -0.010$), suggesting potential challenges with this governance structure.

For the Price Earnings Ratio, Insider Ownership emerges with a notably positive beta ($\beta = 0.050$), suggesting that higher insider stakes significantly enhance market expectations of future earnings. CEO Duality also appears beneficial, with a beta of 0.020, reinforcing the positive market perception when CEOs also hold the board chair. Conversely, Public Float exhibits a negative beta ($\beta = -0.020$), indicating potential market concerns when a larger proportion of shares are held by the public. The Dividend Payout Ratio is negatively influenced by Board Size ($\beta = -0.030$), which may reflect a strategic preference for reinvesting earnings into the company rather than distributing dividends. Nonetheless, both Insider Ownership and Public Float show positive but modest impacts ($\beta = 0.020$ and $\beta = 0.010$, respectively), suggesting a nuanced relationship between these variables and dividend strategies.

Lastly, Operating Profit Margin is positively affected by Board Size ($\beta = 0.040$) and Insider Ownership ($\beta = 0.040$), indicating that efficient governance can significantly enhance operational efficiency. In contrast, Public Float presents a negative beta ($\beta = -0.030$), which could imply operational challenges or strategic misalignments in companies with a wider public share distribution.

Table 9: Nexus between Governance Indicators and Financial Performance

Financial Indicator	Board Size (β , SE)	Insider Ownership (β , SE)	Public Float (β , SE)	CEO Duality (β , SE)
Earnings Per Share (EPS)	0.020 (0.010)*	0.030 (0.010)**	0.010 (0.005)*	-0.010 (0.005)
Price Earnings Ratio	0.010 (0.007)*	0.050 (0.015)**	-0.020 (0.010)	0.020 (0.007)**
Dividend Payout Ratio	-0.030 (0.015)**	0.020 (0.008)*	0.010 (0.005)*	0.000 (0.003)
Operating Profit Margin	0.040 (0.020)**	0.040 (0.020)*	-0.030 (0.015)**	0.010 (0.006)*

*Note: The table summarizes the impact of governance variables—Board Size, Insider Ownership, Public Float, and CEO Duality—on financial performance indicators: Earnings Per Share (EPS), Price Earnings Ratio, Dividend Payout Ratio, and Operating Profit Margin. Positive relationships are found for Insider Ownership and Board Size on several metrics, while Public Float and CEO Duality show mixed effects. Significance levels are indicated with * ($p < 0.05$) and ** ($p < 0.01$).*

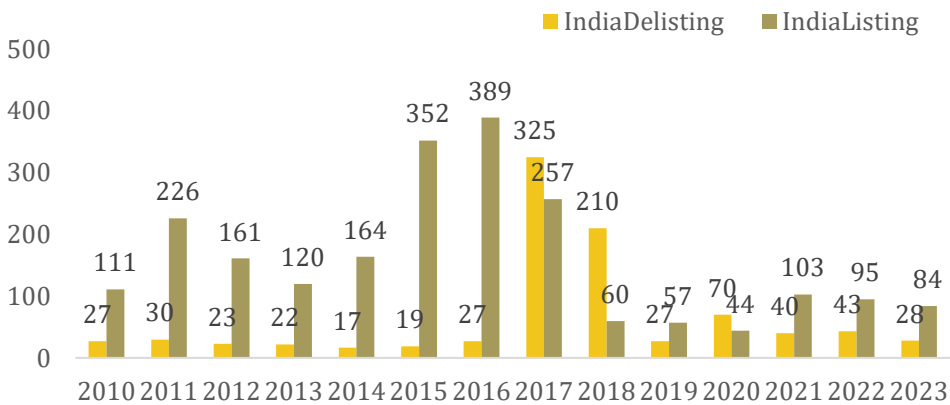
Source: Authors' computations.



Listing Gap in Indian Market

The Indian market saw a net increase of 1,315 companies during the same period, as depicted in Figure 5. The figure highlights the top 10 sectors with delisted firms, with the textile sector experiencing the highest number of delistings from the Pakistan Stock Exchange (PSX). The primary driver for these delistings is a cost-benefit analysis where the costs of remaining listed surpass the perceived benefits. Moreover, many firms have ceased operations or relocated to other countries or sectors, mainly due to the prevailing energy crisis.

Figure 5: Listing Gap in India during 2010-2023



Source: Mumbai Stock Exchange and National Stock Exchange

Determinants of Delisting Indian Market

To investigate the influential market factors contributing to delisting, we selected the Indian market. The results of the Cox Proportional Hazard Model are presented in Table 10. EPS (hazard ratio: 0.523, Z value: -4.89) and dividend payout ratio (hazard ratio: 0.398, Z value: -7.89) reveal that lower values in these metrics increase the risk of delisting. This underscores the importance of earnings per share and consistent dividend distribution in maintaining investor confidence.

Profit margin (hazard ratio: 0.479, Z value: -12.41), return on assets (hazard ratio: 0.512, Z value: -4.35), and revenue growth (hazard ratio: 0.584, Z value: -5.43) are also critical factors. Lower values in these indicators suggest decreased financial sustainability and a higher propensity for delisting. Additionally, the debt-to-equity ratio (hazard ratio: 1.270, Z value: 8.70) and

working capital turnover (hazard ratio: 0.715, Z value: -2.85) underscore the importance of a firm's liquidity. Higher values in these metrics point to both short-term and long-term liquidity risks.

Earning power to investment (hazard ratio: 1.227, Z value: 2.39) and retained earnings to total assets (hazard ratio: 1.471, Z value: 2.54) are crucial as well. Higher ratios in these areas mitigate the risk of delisting, emphasising the importance of robust earnings and asset retention. Lastly, firm age (hazard ratio: 0.827, Z value: -2.77) impacts delisting risk, with younger firms being more vulnerable, whereas larger firm size (hazard ratio: 0.203, Z value: -5.49) provides a protective effect against delisting.

Table 10: Determinants of Delisting in Indian Market

Variables	Haz. Ratio	Std. Err.	Z Value
Firm Financial Performance			
EPS	0.523	0.131	-4.89
Dividend Payout Ratio	0.398	0.051	-7.89
Operating Profit Margin	0.479	0.039	-12.41
Return on Assets	0.512	0.074	-4.35
Liquidity and Growth			
Revenue Growth	0.584	0.097	-5.43
Current Ratio	1.098	0.542	1.20
Debt to Equity	1.270	0.152	8.70
Working Capital Turnover	0.715	0.183	-2.85
Earning Power and Asset Utilization			
Earning Power to Investment	1.227	0.382	2.39
Retained Earnings to Total Assets	1.471	0.601	2.54
Asset Turnover Ratio	1.013	0.729	0.18
Firm Lifecycle			
Firm Age	0.827	0.261	-2.77
Firm Size	0.203	0.193	-5.49
Corporate Governance & Ownership			
Board Independence	0.613	0.126	-4.39
Insider Ownership (%)	1.541	0.394	3.79
Public Float (%)	1.297	0.491	2.33
CEO Tenure	0.951	0.392	-1.89
Market Dynamics & Compliances			
Market Volatility	1.387	0.481	2.67
Compliance Costs	1.195	0.437	2.77
Regulatory Environment	0.843	0.281	-1.56
Trading Frequency	0.314	0.205	-1.99

Source: Authors' computations.

Qualitative Analysis of Interview and FGDS

Interviews and discussions with SECP and PSX officials, brokers, investors, and firm management (both listed and delisted in the last three years) reveal a consensus that the regulatory burden increases the cost of listing and ongoing compliance. Firms' management highlights that compliance and document verification by auditors incur significant costs and time. This makes listing more expensive and lengthier. SECP and PSX officials argue that these measures ensure transparency, which is crucial for developing countries to maintain transparency in financial matters.

The financial position and performance of PSX-listed firms reveal important information. Firms with net profit and payout ratios higher than interest rates attract more investors. However, the management of the firms feels that high cost-push inflation and reduced consumer purchasing power limit earnings and revenue growth. Additionally, high rates on sukuk and sovereign bonds make shares of less visible, growing companies vulnerable. Only firms benefiting from subsidies, SOEs, large enterprises, and financial banks are surviving and attracting investors.

Market dynamics significantly impact less visible firms in the KSE 100 index. High volatility, favourable for index firms due to growth, increases the propensity for firms to delist. Governance issues are a significant factor causing delisting, with SECP and PSX officials particularly concerned about governance in the SOEs. Challenges arise when bureaucrats serve on multiple SOE boards as independent members while serving on the SECP's policy board, which is the regulatory body for the firms listed on the stock exchange. Similarly, family members rotating on boards of public limited companies create a fragile governance ecosystem influencing the market.

Table 11: Results of Interviews and FGDs with the Management of Firms, SECP and PSX Higher Officials

Themes	Subthemes	PSX and SECP Officials	Companies Higher Management /Board Members	Investors and Brokers	Consensus/ Divergence
Regulatory Environment	Compliance Costs	Increased compliance costs are burdensome for companies	High compliance costs are a significant factor in delisting	Compliance costs discourage investment	Consensus on high compliance costs being burdensome
Regulatory Environment	Regulatory Changes	Stringent regulations are necessary for market stability	Frequent regulatory changes create uncertainty	Unpredictable regulations affect market confidence	Divergence on the necessity and impact of changes
Financial Performance	Profitability	Firms with poor financial performance are more likely to delist	Financial performance directly impacts listing status	Investors seek profitable firms; delisting indicates poor performance	Consensus on the impact of financial performance
Financial Performance	Cost-Benefit Analysis	Delisting occurs when costs outweigh benefits	Companies reassess listing when costs exceed benefits	Investors perceive delisted firms as less attractive	Consensus on cost-benefit analysis driving delisting
Market Dynamics	Market Volatility	High market volatility impacts investor confidence	Volatility creates challenges for maintaining listing status	Volatile markets discourage investment	Consensus on negative impact of market volatility
Market Dynamics	Liquidity	Low liquidity drives firms to delist	Maintaining liquidity is critical for listed firms	Liquidity is a key factor for investor decision-making	Consensus on the importance of liquidity
Corporate Governance	Board Composition	Effective governance is crucial for market confidence	Board composition affects compliance and strategic decisions	Good governance is essential for investment confidence	Divergence on the importance of effective governance

Themes	Subthemes	PSX and SECP Officials	Companies Higher Management /Board Members	Investors and Brokers	Consensus/ Divergence
Corporate Governance	Insider Ownership	High insider ownership can lead to delisting	Insider ownership influences delisting decisions	Investors prefer transparency over high insider ownership	Divergence on the negative impact of high insider ownership

Note: Frequency: Indicates how often the reason was cited by interviewees and focus group participants. Severity: Indicates the perceived impact of the reason on the decision to delist.

Source: Authors' computations.

5. CONCLUSION

In any economy, stock market activities serve as a barometer to gauge the country's overall market position. In a favourable environment, listed firms seek various benefits, including raising funds from the public. However, it is noteworthy that firms are increasingly delisting over time, creating a significant gap between listed and delisted firms. This study has identified the factors causing the delisting of firms from the Pakistan and Indian stock exchanges.

We analysed a sample of 240 firms, including delisted and surviving firms, employing the Cox proportional hazards model to evaluate the hazard ratios of various determinants. Our findings reveal significant insights into the delisting phenomenon in Pakistan and India. The analysis indicates that a satisfactory level of indicators, like Earnings Per Share (EPS), Price-Earnings (P/E) ratios, and dividend payout ratios, is crucial in reducing delisting risks. Conversely, high levels of indicators like debt-to-equity ratios, market volatility, and listing costs increase the likelihood of delisting in both markets.

Sectoral analysis highlights that textile spinning, textile composite, Exchange-Traded Funds (ETFs), and investment banking firms are particularly vulnerable to delisting due to financial and governance issues. Regulatory and economic factors also play a significant role in delisting decisions. Complicated and onerous regulatory requirements, high compliance costs, and unstable economic conditions are the primary drivers of delisting. Qualitative data from interviews and focus group discussions underscore the challenges firms face in maintaining their legal existence.

Additionally, the dominance of the banking, oil and gas, cement, and fertiliser sectors in the PSX is generally supported by government policies, highlighting disparities in stability and performance among firms. Targeted governmental actions are necessary to improve financial stability and visibility, particularly for investment banks, ETFs, and the textile industry.

Based on our findings, we conclude that a supportive regulatory and economic climate is essential for the long-term viability of listed firms. To reduce the probability of delisting, it is crucial to simplify the listing and regulatory processes, reduce compliance costs, provide equal opportunities for all firms across sectors, and monitor newly listed firms to facilitate their survival. Favourable market dynamics and firm confidence will boost market activities, enabling listed firms to raise finance and capture more market opportunities. In this regard, the Securities and Exchange Commission of Pakistan (SECP) should formulate a comprehensive listing and monitoring plan to ensure the survival and growth of listed firms, thereby fostering market confidence and encouraging firms to remain publicly traded.

6. RECOMMENDATIONS

To reduce the probability of delisting and promote the listing of firms, the recommendations of this study are based on a three-pronged strategy covering regulatory process, risk–return dynamics and improved governance parameters:

Reduce Regulatory Sludge

1. Ease compliance requirements, reduce the costs and time associated with document verification by auditors.
2. Relax the regulatory mechanism for new firms (say, for five years) so they can breathe and comply with the procedural activities.
3. Simplify regulatory processes to encourage firms to list on the stock market.

Risk and Return Dynamics

1. Implement measures to support firms in improving net profit and payout ratios, making them more attractive to investors.
2. Assist firms facing high cost-push inflation and reduced consumer purchasing power to enhance earnings and revenue growth.
3. Monitor high rates on Sukuk and sovereign bonds to protect the interests of growing companies with lesser visibility.
4. Support market dynamics that would help the less visible firms in the KSE-100 index to manage high volatility and uncertainty.

Improved Governance

1. Strengthen governance practices in state-owned enterprises (SOEs) by addressing board composition and bureaucratic involvement issues.
2. Devise a mechanism ensuring that independent members of boards do not serve on multiple boards, which will improve governance and reduce conflicts of interest.
3. The governance ecosystem can be improved by formulating policy-making processes that are more robust and less influenced by family or bureaucratic interests.

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THE ART OF EXPORTING HALAL BEEF: A CASE STUDY OF PAKISTAN

Shahzad Kouser¹ and Abedullah²

ABSTRACT

Beef is Pakistan's largest meat export sector, contributing US\$332 million. Despite having the 8th largest herd of cattle globally, Pakistan's share in the global halal beef market, valued at US\$202 billion, is only 0.2%. The country's beef industry has immense potential to benefit economically from the growing global demand for halal beef and beef products. This study forecasts the potential of beef exports from Pakistan and explore the initiatives for controlling FMD., The study also investigates the features of halal beef demanded in the international market and explores the current practices, challenges, and opportunities at the exporting node in the halal beef export supply chain of Pakistan. Forecasting analysis of beef exports using secondary data indicates that Pakistan's monthly exports of chilled and frozen beef are projected to grow by 11% and 12%, respectively, through 2025 compared to the export levels in May 2024. Qualitative interviews with FMD-related institutes reveal that while the country's production of FMD vaccines is currently insufficient, efforts are underway, in collaboration with international partners, to establish FMD-free zones and compartments. We also conducted an exporter survey in Karachi, Lahore and Islamabad during 2023-2024. The findings of this survey indicate that consumers and regulatory bodies of GCC countries demand compliance with religious (halal certification), quality (certificate from AQD), origin (certificate from Chamber of Commerce and Industry) and safety standards (through licensing and monitoring the slaughterhouse) from our exporters. We have also undertaken a profitability analysis of chilled beef exports from Pakistan to GCC countries. The results show that on average, exporters earn a profit margin of Rs. 6,693 per animal and Rs 84 per kg, demonstrating modest profit. This analysis also

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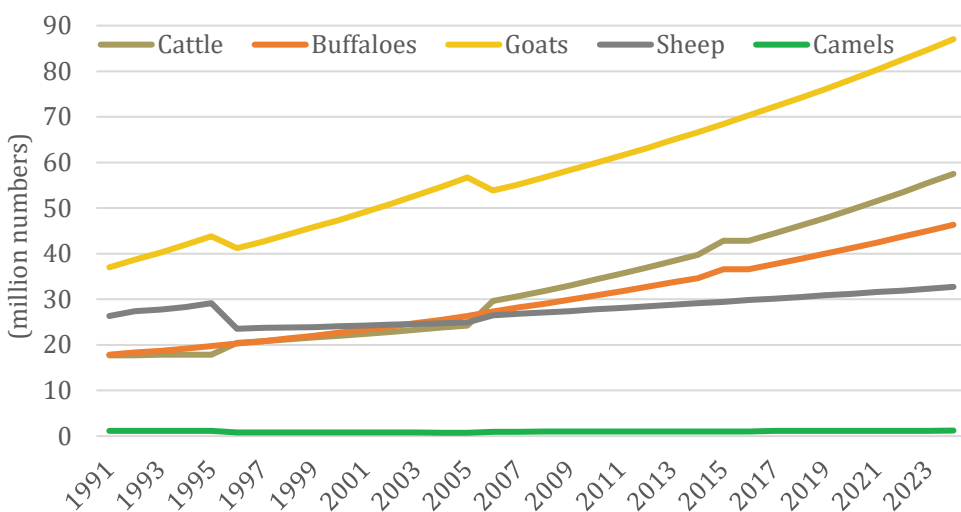
reveals that animal buying cost, air freight and compliance with international health standards are significant cost factors. At the same time, revenue from skin and offal contributes substantially to overall profitability. The study also identifies several challenges faced by the industry during the exporter's survey, including regulatory, logistical, quality, and infrastructure issues. Regulatory challenges include meat price regulation, illegal slaughtering and smuggling, as well as high production costs. Logistic challenges include a lack of cold chain facilities and limited cattle fattening farms. Infrastructure issues include limited airspace for exports and inadequate cold storage and transportation facilities. Quality challenges are related to unnecessary inspections, expensive health certifications, and a lack of animal traceability. Addressing these challenges through targeted interventions such as deregulating meat prices, enforcing the Animal Slaughter Control Act, reducing smuggling, lowering electricity tariffs, and implementing an FMD control programme could enhance productivity and competitiveness. Additionally, establishing cold storage facilities at airports, building capacity for farmers, and implementing streamlined certification processes are crucial for improving the quality and volume of beef exports. The study's findings aim to provide policy recommendations that will bolster Pakistan's beef export industry, thereby contributing to increased export earnings and a larger market share in the global halal beef market.

1. INTRODUCTION

Background of the Study

Livestock is a crucial sector in Pakistan's agro-based economy. It contributes 14.6% to the national GDP, accounts for 60.8% of the agricultural value addition through products like milk and meat, and makes up 1.6% of total exports (GOP, 2024c). Over 8 million rural households are engaged in animal husbandry and receive 35-40% of their livelihoods from this sector. The national herd comprises 57.5 million cattle, 46.3 million buffaloes, 87 million goats, 32.7 million sheep, 1.2 million camels, 5.9 million asses, 0.4 million horses and 0.2 million mules (GOP, 2024c). Among meat-producing animals, cattle have shown the highest compound annual growth rate (CAGR) of 3.5% from 1991 to 2024, followed by buffaloes (2.9%), goats (2.6%), sheep (0.6%) and camels (0.3%) (see Figure 1) (GOP, 2024c). However, the average carcass weight for cattle/buffalo in the country is 196 kg per animal, significantly lower than the 297 kg per animal seen in leading producers (PBC, 2021). A significant factor is the regulated meat prices, which discourage producers from investing in fattening animals. To improve this, Pakistan must focus on healthy meat animals, modern husbandry practices, adequate feeding resources and proper feeding plans. By enhancing per animal meat productivity, Pakistan can position itself as a significant player in the international halal beef market (Aghwan et al., 2016).

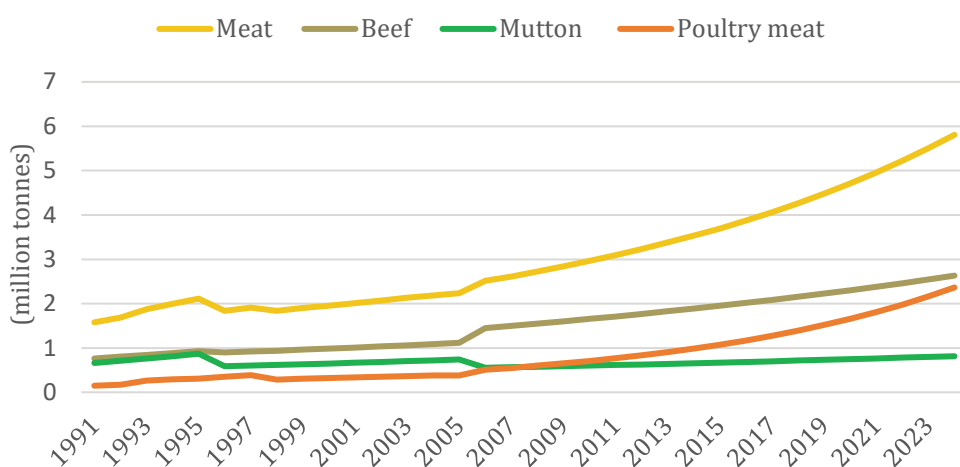
Figure 1: Trends in the Population of Livestock



Source: GOP (2024c).

Pakistan's halal meat industry is expanding with rapid growth. In 2024, the total production of halal meat, including beef, mutton and poultry meat, reached 5.8 million tonnes, with a CAGR of 3.9% (see Figure 2) (GOP, 2024c). However, the country's meat consumption in 2022 was 3.5 million tonnes, with a CAGR of 0.8% (GOP, 2023; ReportLinker, n.d). This significant disparity between the growth rates of meat production and consumption indicates a substantial surplus, presenting a significant opportunity for Pakistan to increase its foreign exchange earnings through meat exports. Failure to capitalise on this potential could lead to reduced profitability or drive the illegal sale of live animals across Pakistan's borders.

Figure 2: Trends in the Production of Halal Meat and Its Type

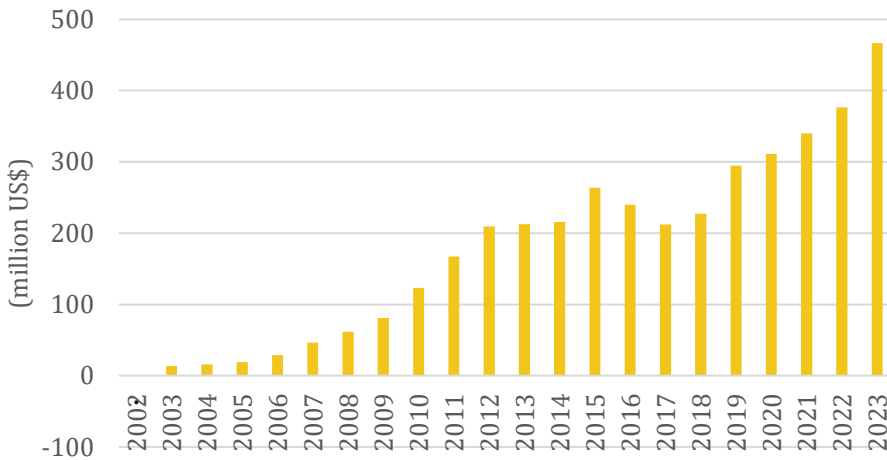


Source: GOP (2024c).

Nonetheless, the government of Pakistan did not permit meat export until the 1998 Annual Trade Policy (PCB, 2021). Consequently, the country's meat exports were negligible until 2003. According to the State Bank of Pakistan, exports of meat and edible meat offal increased dramatically from US\$14 million in 2003 to US\$467 million in 2023, growing at a CAGR of 18% (see Figure 3) (GOP, 2024b). Among meat types, beef ranks as the largest meat export sector in Pakistan, contributing US\$332 million, followed by mutton with US\$42 million, offal from all animals with US\$18 million, poultry with US\$0.03 million, and others with US\$74 million in 2023 (GOP, 2024b). Despite being the 15th largest meat producer globally, Pakistan ranks 57th in meat exports, highlighting the underperformance of its meat export industry (FAO, 2018; Trading Economics, n.d.). This underlines the necessity to investigate and address the constraints hindering the expansion of Pakistan's meat exports.



Figure 3: Pakistan's Exports of Meat and Edible Meat Offal



Source: GOP (2024b).

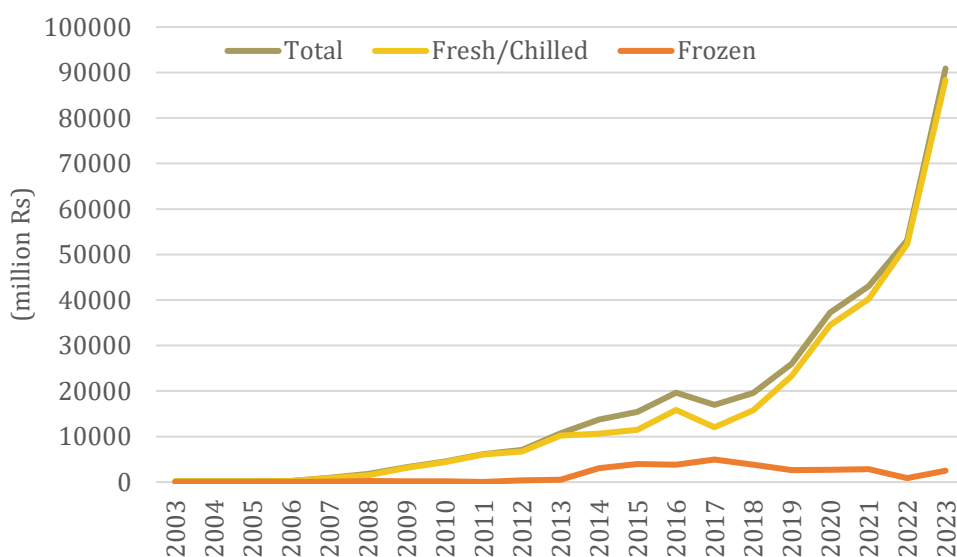
Beef Exports of Pakistan: Challenges and Potentials

The global beef industry has experienced exponential growth over the past two decades. The market value for beef (cattle meat) production has doubled from US\$166 billion in 2002 to US\$332 billion in 2022 and is projected to reach US\$422 billion by 2028, with a CAGR of 4% from 2022 to 2028 (Renub Markets, 2023). Moreover, the global imports of bovine meat reached US\$54 billion in 2020, experiencing a strong average annual growth rate of 6.3% between 2016 and 2020 (UN, 2021). This growth is driven by an increased reliance on beef as a primary protein source due to factors such as the spread of swine flu, a growing global population and rising income levels. This highlights a significant potential for Pakistan's beef industry. The global market may be potentially affected by measures to mitigate climate change, but current demand for beef remains strongly driven by the factors cited. Potential climate-change-related developments in the global market are not addressed further in this study.

Pakistan has substantial potential to export halal beef. Country's exports of bovine (cattle and buffalo) meat were negligible till 2023 but then surged from US\$0.747 million (Rs 0.1 billion) in 2003 to, as noted above, US\$332.271 million (RS 91 billion) in 2023, with a CAGR of 37% (see Figure 4) (GOP, 2024b). However, this share is just 0.1% of the global bovine meat trade. Figure 5 shows that the export volume of bovine meat has gradually improved from 1.4 thousand tonnes in 2003 to 87 thousand tonnes in 2023, with a CAGR of 21%. Despite this growth, the export quantity represents only 3.3% of the

country's beef production (2.630 million tonnes). According to the Food and Agriculture Organization (FAO), Pakistan exports less than 3% of the 2.2 million tons of cattle meat produced to international markets (FAO, 2019). However, Pakistan has potential to export surplus (production minus consumption) beef of 0.6 to 0.8 million tonnes per annum as shown in Figure 6 (Per capita beef consumption is reported in the Appendix I) Both Figures 5 and 6 illustrate that 71%-99% of Pakistan's bovine meat exports are in the fresh/chilled category, revealing a significant consumer preference and high demand for Pakistani chilled/fresh bovine meat, particularly in high value markets like the Middle East (ITC, 2022; GOP, 2024a). Moreover, the gap in export prices in recent years, as given in Figure 7, indicates the premium associated with fresh/chilled bovine meats, due to their superior quality and consumer preferences. Nonetheless, exports of frozen bovine meat show a slight growth starting in 2013, but show a notable fall after 2017. While higher prices for frozen beef than for fresh/chilled beef in 2012 and 2013 might have prompted this increase, it subsides when price trends reverse, overall indicating its poor market expansion compared to fresh/chilled bovine meat. The decline in frozen bovine meat exports highlights challenges such as inefficiency in the Indian frozen beef market, infrastructure limitations, high energy costs, and market access issues. Despite having the 8th largest herd of cattle globally, Pakistan's share of the global beef market remains just 0.08%, which is not only minuscule but also very unstable (ITC, 2022; Khan, 2022).

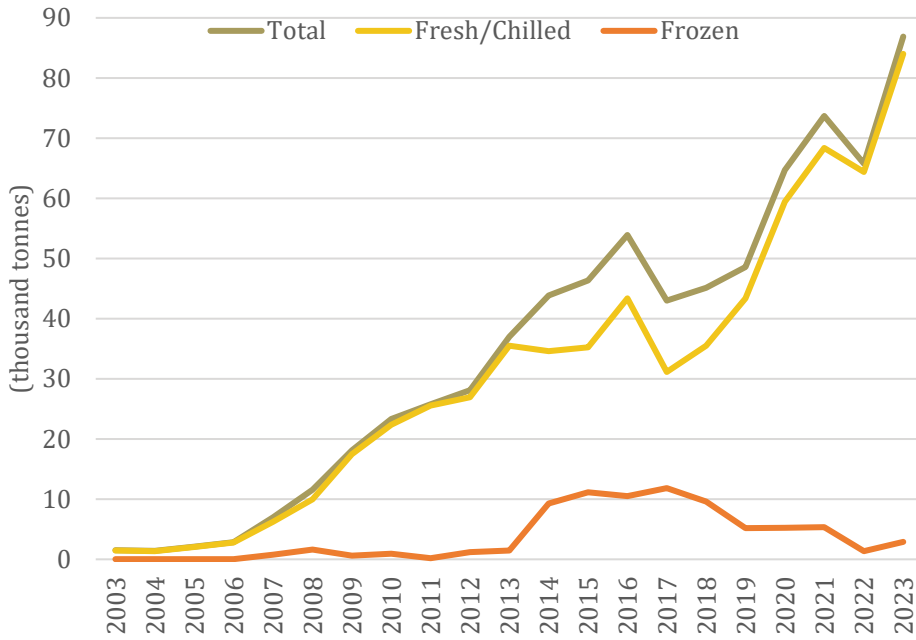
Figure 4: Pakistan's Export Values of Fresh Or Chilled and Frozen Bovine Meat



Source: GOP 2024a.

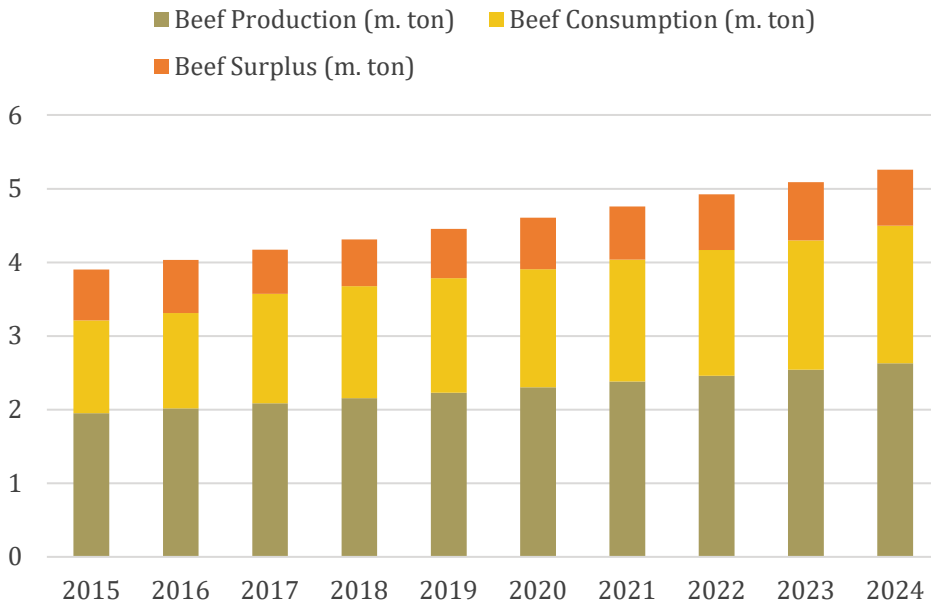


Figure 5: Pakistan's Export Quantities of Fresh Or Chilled and Frozen Bovine Meat



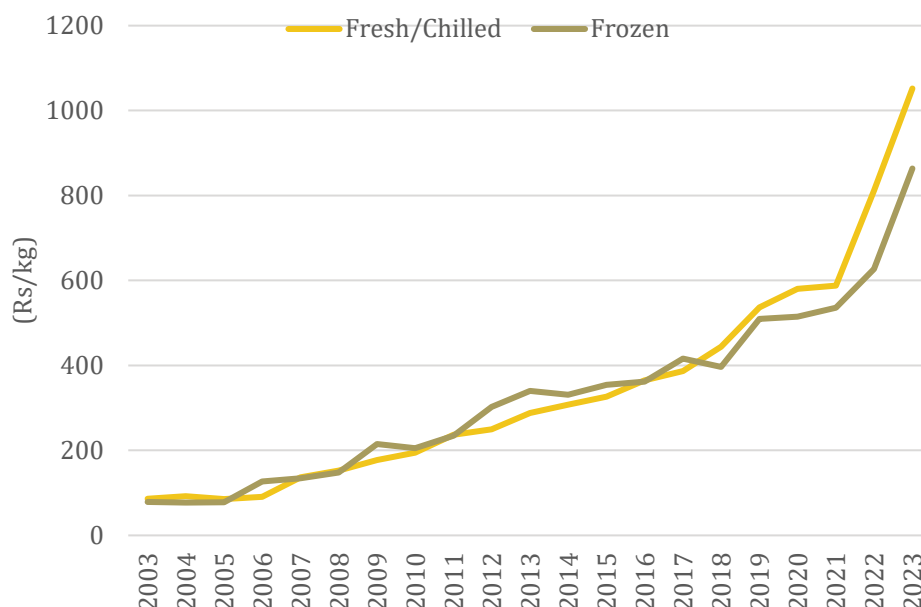
Source: GOP 2024a.

Figure 6: Pakistan's Potential of Beef Exports



Source: GOP (2024c) and STATISTA (2024).

Figure 7: Pakistan's Export Prices of Fresh or Chilled and Frozen Bovine Meat



Source: GOP 2024a.

Table 1 presents Pakistan's bovine meat exports across various countries in total and for chilled/fresh and frozen for 2023. In more detail, the country's bovine meat exports are categorised into three types: carcass, cut with bone and boneless (see Appendix II for disaggregation). Pakistan exported approximately 86,889 tonnes of bovine meat to six Gulf Cooperation Council (GCC) countries—United Arab Emirates (UAE) (51%), Saudi Arabia (16%), Kuwait (12%), Qatar (9%), Bahrain (5.4%) and Oman (3.3%)—which collectively account for 95.7% of its total bovine meat exports (GOP, 2024b), highlighting that these are higher value markets willing to accept Pakistani beef. Pakistan is the fourth-largest meat exporter to GCC countries, with its bovine meat exports accounting for 24% of total sales (353.3 thousand tonnes; see Appendix III) (Wang, 2024). Other export destinations include Uzbekistan (3.5%), Kazakhstan (0.4%) and others (0.4%). Just like Figures 4 and 5, Table 1 also highlights that most Pakistan's bovine meat exports are in the fresh/chilled category, reflecting a strong preference for Pakistani fresh/chilled beef in the Middle East markets. Due to its geographical location, Pakistani exporters can meet orders for fresh/chilled meat in just 24 hours. Despite remarkable expansion in fresh/chilled beef, the market share of frozen beef from Pakistan remains minuscule in the Middle East, due to high competition from Indian frozen beef. However, this table indicates that emerging markets such as Jordan, Malaysia, Uzbekistan, Thailand, the

Maldives, and Iraq have potential for increased exports, particularly in the frozen beef category. The lower prices and smaller quantities in certain markets suggest a need for further investigation to identify issues related to infrastructure, quality, logistics and regulatory compliance in Pakistan's beef export industry. Addressing these issues could help Pakistan capitalise on its large cattle herd and increase its share in the global halal meat market.

Table 1: Pakistan's Bovine Meat Exports across Countries in 2023

Countries	Total			Chilled/Fresh			Frozen		
	Quantity (tonnes)	Value (m Rs)	Price (Rs/kg)	Quantity (tonnes)	Value (m Rs)	Rate (Rs/kg)	Quantity (tonnes)	Value (m Rs)	Rate (Rs/kg)
Bahrain	4,708	4,652	988	4,708	4,652	988	...	...	...
Egypt	1	2	1494	1	2	1494	...	...	...
Hong Kong	2	1	767	2	1	767	...	...	...
Iraq	28	23	824	5	5	1,049	23	18	775
Jordan	23	26	1,117	19	18	986	4	7	1,699
Kazakastan	346	196	567	346	196	567	...	...	...
Kuwait	10,144	13,076	1,289	10,085	13,031	1,292	59	45	761
Malaysia	29	40	1,394	0.14	0.20	1,511	28	40	1,393
Maldives	141	121	857	28	27	940	113	94	836
Oman	2,870	2,667	929	2,796	2,615	935	74	51	695
Qatar	7,578	7,739	1,021	7,535	7,707	1,023	43	32	749
Saudi Arabia	13,985	15,142	1,083	13,478	14,713	1,092	507	429	846
Thailand	82	73	891	...	...	...	82	73	891
UAE	43,901	44,551	1,015	43,817	44,483	1,015	84	68	809
Uzbekistan	2,995	2,535	846	1,167	906	776	1,828	1,629	891
Vietnam	56	19	337	...	...	...	56	19	337
Total	86,889	90,864	1,046	83,988	88,358	1,052	2,902	2,506	864

Source: GOP 2024a.

Turning back to a broader overview, the international market for trade in frozen beef is expanding rapidly, reaching US\$38.5 billion in 2022 (OEC, n.d.). The world's four largest exporters—Brazil with US\$11 billion, the USA with US\$5.7 billion, Australia with US\$4.5 billion and India with US\$2.9 billion—dominate the frozen beef sector. China is the largest importer of frozen, particularly boiled beef, with imports valued at US\$16.6 billion (OEC, n.d.). The growing demand for frozen beef is attributed to its prolonged shelf life and the capability to be transported to distant markets via sea routes, making it a more commercially viable and cost-effective option compared to chilled beef. However, producing frozen beef necessitates advanced processing capabilities and robust cold chain maintenance during transportation, which requires significant investment in Pakistan's beef supply chain.

In addition to the frozen category, the global demand for halal meat is increasing rapidly due to its superior quality, stringent hygiene standards, and nutritional benefits. The global halal meat market was valued at US\$202 billion in 2021 and is projected to reach US\$375.1 billion by 2030 with a CAGR of 7.1% (Straits Research, 2022). Brazil dominates the global halal meat export market, with exports valued at US\$16.2 billion, followed by India at US\$14.4 billion and the USA at US\$13.8 billion (Ahmed, 2022). In contrast, Pakistan's contribution to the global halal meat market is a mere 0.2%, ranking 33rd among halal meat exporters (Asfia et al., 2021). The global halal beef (chilled and frozen) market, a key segment within the global halal meat industry, was valued at US\$162.3 billion in 2022 and is expected to reach US\$296 billion by 2031, with a CAGR of 7.8% during the 2023-2031 forecast period (Astute Analytica, 2023). The global trade in halal beef is climbing annually by 10.4% in the Middle East and 18.2% in Southeast Asia (FAO, 2018). The significant potential for Pakistani beef, due to its organic and distinct flavour, underscores the urgent need for focused research and policy interventions.

Foot and Mouth Disease in Pakistan

Pakistan's beef industry holds substantial potential for export growth. However, the industry must adhere to quality, sanitary and Phyto-sanitary (SPS), safety, halal, and global technical standards set by importing countries. A significant barrier to accessing high-value markets, including China, is the prevalence of Foot and Mouth Disease (FMD) (Jamal et al., 2010). The aphthovirus of the Picornaviridae family causes the FMD. This virus has seven global strains: A, O, C, SAT1, SAT2, SAT3, and Asia1. FMD virus strains of A, O and Asia 1 are prevalent in Pakistan (FAO, 2016). These strains infect cloven-hoofed small ruminants (goats and sheep) and large ruminants (cattle and buffaloes). The disease symptoms include acute fever, lameness, and development of vesicular lesions on the mouth, tongue, feet, snout and teats of infected animals (Chepkwony et al., 2021). Besides poor animal productivity, the disease results in abortion of pregnant ruminants and causes mortality of young cattle and buffaloes. In Pakistan, this preventable disease results in economic losses of over US\$300/infected animal, amounting to a total of US\$692 million annually (FAO, 2022). Internationally, there are two main strategies to achieve FMD-free status: (1) government-funded FMD vaccination programmes, (2) enforcing the requirement of FMD vaccination certificates during animal mobility or sales. In the current country context, controlling this disease presents significant challenges due to the large population of susceptible livestock, about 224 million, the lack of systematic vaccination programs and the unregulated movement of animals between provinces.

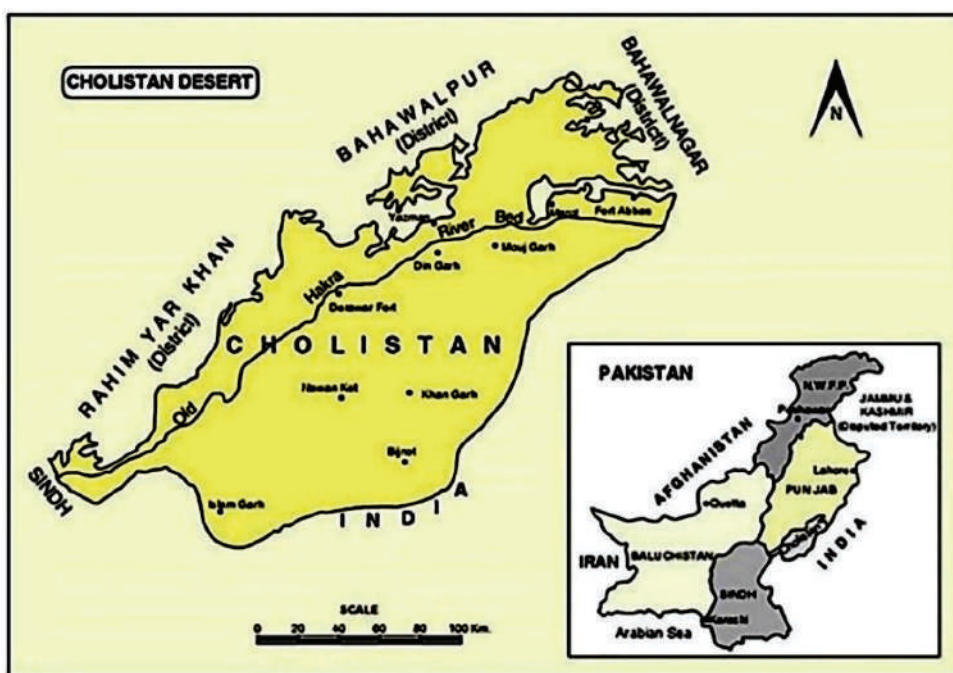
The Government of Pakistan (GOP) has entered a Memorandum of Understanding (MoU) with the Chinese government to establish an FMD-free zone with vaccination under the China-Pakistan Economic Corridor (CPEC) initiative (Ali, 2021). However, its implementation was delayed. Current discussions between the Pakistani and Chinese governments, under Phase II (the Agricultural Phase) of CPEC, are renewing this MoU. These efforts aim to advance Pakistan from Stage 2 to Stage 3 in the World Organization for Animal Health (WOAH) Progressive Control Pathway for FMD (PCP-FMD) (see Appendix IV, (GOP, 2022)), thereby enabling the country to export frozen beef to distant and high-value markets, particularly China (PBC, 2021). In 2023, the Chinese government expressed keen interest in Pakistani cooked (i.e., boiled) beef, which has a negligible risk of transmitting FMD. The two countries have 55on these opportunities. The Chinese government has approved the import of Pakistani heat-treated beef made from the boneless skeletal muscle of cattle under 30 months old. Beef is pre-boned, fat-removed, and then heated to an internal core temperature exceeding 70°C for at least 30 minutes. Additionally, the government of Punjab and the Chinese Royal Group are in the process of establishing an FMD control compartment in Sheikhpura. This compartment aims to ensure that livestock within the region are free from FMD through regular vaccination, stringent biosecurity measures and continuous surveillance. This initiative also includes the establishment of an animal quarantine zone. By achieving and maintaining an FMD-free status in this compartment, Pakistan can enhance the health of its livestock, improve productivity and gain access to high-value international markets that require strict compliance with animal health standards. This initiative also helps in boosting confidence among trading partners regarding the quality and safety of Pakistani beef exports.

In Pakistan, the Food and Agriculture Organization (FAO) of the United Nations (FAO-Pakistan) has executed a project “Progressive Control of Foot and Mouth Disease in Pakistan” from 2015-2017 (FAO, 2015). Under this project, a comprehensive national FMD control program (CP) was designed for Pakistan, focusing on enhancing the capabilities of veterinary personnel in both the public and private sectors through specialised training in FMD outbreak management and sample collection techniques. Veterinary diagnostic laboratories were upgraded to improve their diagnostic accuracy and capacity. All reported outbreaks were effectively controlled by implementing animal movement restrictions, treating affected animals, and employing ring vaccination strategies. The program emphasised the use of high-quality vaccines to prevent FMD outbreaks in high-risk areas, such as dairy colonies and milk sheds. Dairy farmers received vaccines, and no clinical

cases of FMD were observed in vaccinated animals, following the administration of booster doses. The strenuous efforts of this project enabled Pakistan to upgrade its FMD status from Stage 1 to Stage 2 (GOP, 2022). However, according to WOA, to advance to stage 3, there is a need to implement a national official programme for restricting the virus circulation, which is not being implemented due to resource constraints and lack of coordination among provinces.

In 2017, the Government of Pakistan signed an MoU with the FAO to implement an FMD vaccination program in the Cholistan region (FAO, 2022). This region is chosen to establish an animal quarantine zone due to its geographical location, as it has two natural boundaries: the Indian frontier from the back side and the river Sindh border from the front side (see Figure 8). The FAO supported this program by providing vaccines, training staff, and establishing veterinary diagnostic labs. All cattle and buffalo are vaccinated free of charge twice a year. The region has reported zero FMD cases during 2022 and 2023, highlighting the program's success.

Figure 8: Setting up of FMD Free Zone in Cholistan



Source: Wariss et al. (2013)

FMD Control Programme of India

India has the world's largest population of cattle, i.e., 307.5 million, followed by Brazil and China (Cook, 2024). However, FMD is endemic in the country, causing significant economic losses. Severe outbreaks result in annual losses of US\$2.8 billion, moderate outbreaks cause losses of US\$0.2 billion per annum, and mild outbreaks also lead to losses of US\$0.1 billion per annum (Singh et al., 2019; Govindaraj et al., 2021). Therefore, the Government of India (GOI) initiated FMD-CP in 54 districts in 2004 and expanded it to 221 districts in 2010 (Audarya, 2020; Subramaniam et al., 2022). Under FMD-CP, initially, only bovine animals were vaccinated. GOI has adopted WOA's five-year nationwide comprehensive approach to control FMD in all susceptible small and large ruminants, with an estimated cost of US\$1.8 billion (Bhagal & Beillard, 2023). This approach encompasses extensive vaccination campaigns, as well as surveillance and monitoring measures. The biannual FMD vaccination uses an inactivated trivalent vaccine containing FMD serotypes of O, A and Asia-1 under the National Animal Disease Control Programme (NADCP) of the Department of Animal Husbandry and Dairying to ensure immunity across the livestock population (Gunasekera, 2022). To monitor the FMD programme, the GOI established diagnostic laboratories and a surveillance network nationwide (Subramaniam et al., 2022). This network investigates FMD antibodies in ruminants through collecting and testing blood samples, which helps to detect areas with low immunity and high outbreak risks. The swift response system, in particular quarantine the infected animal, helps to prevent FMD outbreak. Lastly, the regulated movement of livestock between regions further enables the country to control the spread of FMD. Under the NADCP, GOI aims to control FMD with vaccinations by 2025 and without vaccinations by 2030. The effectiveness of the NADCP is evident from a decline in FMD incidence and improved animal health. Moreover, India's exports of beef have reached US\$3.5 billion in 2023 (Bhagal & Beillard, 2023), making it one of the world's largest beef exporters, driven by its thriving buffalo meat industry (Subramaniam et al., 2022).

Objectives of the Study

Given the foregoing context, the specific objectives of this study are:

1. To forecast the short-run potential for fresh/chilled and frozen beef exports from Pakistan,
2. To explore the initiatives for controlling Foot and Mouth Disease in Pakistan,

3. To investigate features of halal beef demanded in international markets,
4. To assess the current practices in the halal beef exports in Pakistan, including the processes of sourcing, transportation, processing, and storage,
5. To identify the major challenges faced by the exporters in the halal beef exports in Pakistan, including regulatory issues, infrastructure, logistics, and quality control,
6. To explore the opportunities for enhancing halal beef exports from Pakistan in the long run.

2. LITERATURE REVIEW: SUPPLY CHAIN ISSUES

As described above, beef is considered an important source of energy for human beings. It constitutes a significant portion of the diet and provides essential nutrients, including proteins, lipids, vitamins, and minerals. Beef is the largest meat sector in Pakistan. Rehman et al. (2019) have observed that beef production has a positive effect on the agricultural gross domestic product of Pakistan over the long term, while mutton and poultry meat production exhibited an insignificant impact. However, beef from traditional abattoirs in Pakistan does not meet international standards, which negatively impacts Pakistan's standing in the global beef market. Therefore, export of live animals to Afghanistan, Iran, and the Gulf States is a common practice in the country (Tariq et al., 2023). Despite having the 8th largest cattle population in the world, the nation rarely had the opportunity to export meat or meat products to earn foreign currency until 2003. Some Middle Eastern nations ceased importing beef from Europe due to the prevalence of mad cow disease during the 1980s and '90s; this presented an excellent opportunity for Pakistan to reach nearby halal beef markets by improving the quality and safety of its beef exports to meet international standards and regulations. Over the last decade, the industry has undergone significant developments as both the government and the private sector have focused on long-term policies and developed projects to enhance meat production and processing facilities, thereby meeting the increasing local and global demand for safe and high-quality produce (Sohaib & Jamil, 2017). Considering this background, this section highlights several challenges, including regulatory issues, infrastructure, logistics, and quality control in the beef export of Pakistan:

Infrastructure and logistics are critical components of any supply chain, and this is particularly true in the beef export industry. Several studies have highlighted the challenges faced by the beef industry in Pakistan, including the lack of infrastructure for transporting live animals and meat products. For example, Hassan et al. (2016) and Warriach et al. (2020) found that the transportation of live animals was a major challenge for the beef industry in Pakistan due to the poor condition of roads and inadequate transportation facilities.

Quality control is another critical component of the beef export supply chain, as it ensures that the products meet the standards required by the importing countries. Several studies have highlighted that a significant challenge faced by the beef industry in Pakistan is regarding quality control. For example, a study by Khan et al. (2019) identified the lack of a quality control system, poor sanitation practices, and the use of unauthorised veterinary drugs as significant challenges for the beef industry in Pakistan. Similarly, studies by Javid et al. (2019b) and Tariq et al. (2022) identified inadequate basic sanitation facilities (like light, adequate water supply, space for slaughtering and animal keeping, meat refrigeration, and disposal of offal) and a lack of proper packaging and labelling as significant challenges for the beef industry in Pakistan. Another study by Javid et al. (2019a) found that the lack of standardisation in grading and certification systems for meat products was a significant challenge for the beef industry in Pakistan.

Regulatory issues also play a significant role in the beef export supply chain in Pakistan. Several studies have identified the lack of coordination among regulatory bodies as a significant challenge for the beef industry in Pakistan. For example, a study by Khalid et al. (2019) found that the lack of coordination among regulatory bodies, including the Ministry of National Food Security and Research, the Ministry of Commerce, and the Pakistan Standards and Quality Control Authority, was a significant challenge for the beef industry in Pakistan.

Pakistan's meat export strategy is part of the National Priority Sectors Export Strategy (NPSES) and aligns with the Strategic Trade Policy Framework (STPF) 2020-2025 (GOP, 2022). This strategy aims to boost economic growth by increasing trade opportunities, with a focus on the meat sector as a priority area for export diversification. This report emphasises supply, processing and marketing constraints in meat export. Moreover, the report highlights that deregulation and improved FMD control can open new markets. Similarly, investing in cold storage can enhance export quality. Lastly, capacity building and better farm practices can improve carcass weight and profitability. In short, Pakistan's beef export strategy highlights the need for structural

improvements across the meat value chain, from farm level to market access, to unlock Pakistan's meat industry's export potential, enhance competitiveness and secure a more significant share in the global market.

In brief, the supply chains of beef export in Pakistan face several challenges, including infrastructure and logistics, quality control, and regulatory issues. These challenges not only hinder the efficiency and sustainability of the supply chain but also limit the potential for growth in the beef export market. However, several studies have also identified opportunities for improving the supply chain, including investments in infrastructure and cold storage facilities, the development of a quality control system, and better coordination among regulatory bodies. Addressing these challenges and capitalising on these opportunities can help the Pakistani beef industry to achieve its full potential in the global market.

3. RESEARCH METHODOLOGY

Time-Series Model of Pakistan's Beef Exports

Forecasting Method of Beef Exports from Pakistan

Before conducting the interviews to assess the challenges and opportunities, we undertook a time-series econometric analysis to forecast Pakistan's beef exports in the short term, based on historical growth under prevailing investments and regulations since 2003. Monthly time series data of exports of fresh/chilled and frozen bovine meat were available from January 2003 to May 2024; therefore, we attempted to forecast monthly exports of fresh/chilled and frozen bovine meat till December 2025. In this regard, we used the Autoregressive Integrated Moving Average (ARIMA) method.

ARIMA is introduced by Box-Jenkins (Box et al., 2015), which is a widely used time series forecasting technique. It is particularly effective for analysing and forecasting data that exhibit patterns, trends and seasonality (Gibson et al., 2019).

ARIMA models combine three components: autoregression (AR), differencing (I), and moving average (MA).



1. Autoregression (AR): Autoregressive models consider the relationship between an observation and a certain number of lagged observations (previous values in the series). The AR component of the ARIMA model uses these lagged values to predict future values.
2. Differencing (I): Differencing involves transforming a time series to make it stationary. Stationarity implies that the statistical properties of the series, such as mean and variance, do not change over time. Differencing eliminates the stochastic trends or seasonality present in the data by subtracting the previous observation from the current observation.
3. Moving Average (MA): Moving average models use the dependency between an observation and a residual error from a moving average applied to lagged observations. This component helps to capture the impact of previous forecast errors on the current forecast.

The ARIMA method combines these three components to create a model that can capture the patterns and trends in a time series dataset. More specifically, their approach involved considering univariate Y at time point t and adding/subtracting based on the Y values at previous time points (e.g., $t-1$, $t-2$, etc.), and adding/subtracting error terms (e) from previous time points as follows:

$$Y_t = c + \phi_1 Y_{t-1} + \phi_p Y_{t-p} + \dots + \theta_1 e_{t-1} + \theta_q e_{t-q} + e_t \quad (1)$$

Three parameters typically define this model: p , d , and q .

- p represents the order of the autoregressive component (AR).
- d represents the degree of differencing required to achieve stationarity.
- q represents the order of the moving average component (MA).

Y_t is a differenced series, applied to achieve stationarity in the data.

The ARIMA method is helpful for short-term and medium-term forecasting. It has been applied to various fields, including finance, economics, meteorology, and demand forecasting. To implement the ARIMA method, monthly data of exports of fresh/chilled and frozen bovine meat (Y) are analysed to estimate the model parameters, and then future values are forecasted based on these estimates.

Interviews related to FMD Control Program

To explore the initiatives taken to control FMD in the country, we employed a qualitative approach to interview key stakeholders from institutions involved in FMD vaccine development, institutions administering and monitoring FMD vaccination in Cholistan, cattle growers who received vaccinations in Cholistan, and institutions managing the FMD control compartment in Sheikhpura.

Study Area and Data Collection for Exporter Interviews

To gain insights into the features of halal beef demanded in the international markets, as well as the practices, challenges and potentials of halal beef exports, we employed a quantitative approach to conduct interviews with beef exporters. The exporters primarily operating in the Karachi, Lahore and Islamabad markets are key players in Pakistan's beef export industry.

Primary Data Collection

We collected primary data from beef exporters related to our objectives by following these steps:

- After consulting with domain and field experts, we have identified the population of interest that is beef exporters involved in the export business of beef in Pakistan. We compiled a list of 24 beef exporters in Pakistan, situated in Karachi, Lahore and Islamabad export markets; out of which, 10 exporters are located in Karachi, 13 in Lahore and 1 in Islamabad (see Appendix V).
- We designed a questionnaire for face-to-face interviews of beef exporters in the Karachi, Lahore and Islamabad export markets (see Appendix VI). This questionnaire has five sections: demographic characteristics of exporter and company details, features, costs and benefits of halal beef exports under nine bovine meat categories (their Harmonized System (HS) codes are given in Appendix VII), current practices in the supply chain of halal beef exports, challenges faced by exporters in halal beef exports (including regulatory, infrastructure, logistics and quality control issues) and opportunities for enhancing halal beef exports from Pakistan. The questionnaire was finalised after two rigorous reviews from the assigned international and national mentors by the RASTA.

- We piloted the questionnaire through telephonic interviews with one beef exporter from Lahore and one from Karachi to check for any errors or omissions in the questionnaire.
- We conducted face-to-face interviews with four beef exporters located in Lahore during December 2023, one beef exporter in Islamabad during January 2024 and four beef exporters in Karachi during March 2024 after obtaining their written consents (see glimpses of interviews in appendices 5, 6 and 7). We also tried to conduct telephonic interviews with ten exporters. However, five exporters did not respond to us.
- We digitised the collected data into Excel files and checked them for completeness, accuracy, and discrepancies before initiating the analysis. We ensured that ethical considerations, such as data confidentiality and participant anonymity, were maintained in the collected data.
- Lastly, we described the collected data and conducted the profitability analysis of beef exports to draw policy-related conclusions.

4. FINDINGS AND DISCUSSION

Forecasting of Beef Exports from Pakistan

Descriptive Analysis

We have used monthly time series data from January 2003 to May 2024 for fresh/chilled and frozen bovine meat exports, measured in millions of US dollars. Table 2 presents the descriptive statistics of fresh/chilled (CHILLED) and frozen (FROZEN) bovine meat exports. The average monthly exports of fresh/chilled and frozen bovine meat are US\$9.2 million and US\$1.6 million, respectively. Fresh/chilled bovine meat exports are approximately six times higher than the frozen beef exports due to higher prices of chilled beef in the Middle East, as discussed in the 1.2 subsection. The values of standard deviation show significant variation in the exports of chilled bovine meat. The probability values from the Jarque-Bera test reject the null hypothesis of normality for both series, suggesting that neither series follows a normal distribution. This non-normality implies that the export data for both

fresh/chilled and frozen bovine meat exhibit irregular patterns, likely influenced by market dynamics, seasonal demand fluctuations, and varying international trade conditions over the analysed period.

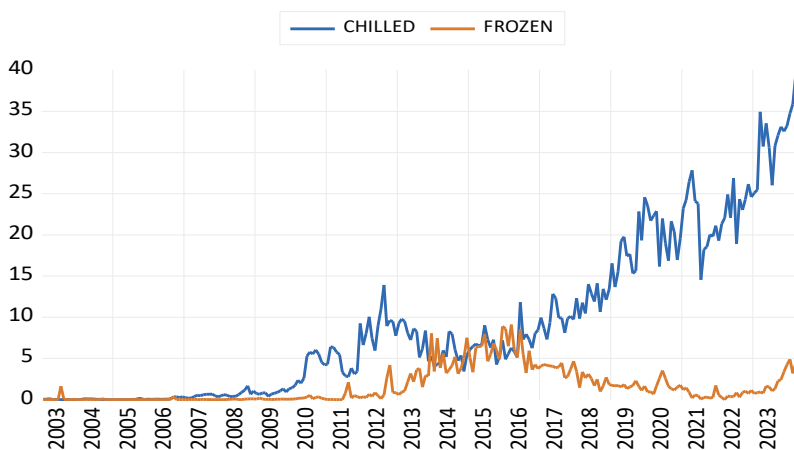
Table 2: Descriptive Statistics

Statistics	Chilled	Frozen
Mean	9.226	1.643
Median	6.279	0.669
Maximum	39.573	9.106
Minimum	0.000	0.000
Std. Dev.	9.746	2.122
Skewness	1.075	1.448
Kurtosis	3.232	4.487
Jarque-Bera	50.061	113.438
Probability	0.000	0.000
Sum	2371.185	422.321
Sum Sq. Dev.	24314.110	1152.296
Observations	257	257

Source: Authors' computations.

Both series show huge monthly variations across two decades in Figure 9. Fresh/chilled bovine meat export series are showing a positive trend and are growing at a CMGR of 2.5%, while frozen bovine meat export is showing an inverted U-shaped pattern, except in 2023 and 2024. Frozen bovine export started in April 2003, reached its highest value in March 2016 (US\$9.106 million) and then started declining.

Figure 9: Trends in Monthly Exports of Fresh/Chilled and Frozen Bovine Meat (million US\$)



Source: (GOP 2024b).

Unit Root Test

For checking stationarity in the study variables, the unit root tests of Augmented Dickey-Fuller (ADF) proposed by Dickey & Fuller (1979) are applied, and the results are given in Table 3. The ADF unit root test demonstrates that both variables are non-stationary at the level or zero order of integration [I(0)]. This finding is consistent with the descriptive analysis presented in Table 2, which shows patterns in the exports of fresh/chilled and bovine meat, suggesting a non-stationary series. However, both series are stationary at the first difference or level 1 or order of integration 1 [I(1)]. Therefore, we proceeded with the forecasting analysis using the ARIMA method on the first differences of the series.

Table 3: Unit Root Test Outcomes

Variables	ADF test	
	I(0)	I(1)
Chilled bovine meat	1.873	-4.199***
Frozen bovine meat	-1.902	-17.953***

Source: Authors' computations.

Selection of Best Models for Bovine Meat Exports

The study estimated 20 different versions of ARIMA models for fresh/chilled and frozen bovine meat exports, as illustrated in the Figures given in Appendix VIII. For the selection of the best ARIMA model for forecasting, we applied the most commonly used Akaike Information Criterion (AIC). AIC is used to compare different possible models and determine which one is the best fit for the data. Lower AIC scores indicate better-fit models. Hence, according to the lowest values of AIC, the ARIMA (2, 1, 3) model is the best for forecasting fresh/chilled bovine meat exports. At the same time, ARIMA (0, 1, 1) is the best model for forecasting frozen bovine meat export.

ARIMA Analysis for Bovine Meat Exports

Table 4 presents the results of the best ARIMA models for fresh/chilled and frozen bovine meat exports in columns 1 and 2, respectively. For fresh/chilled bovine meat exports, the coefficients of AR and MA terms are significant, indicating the importance of including both components in the model. In contrast, for frozen bovine meat exports, only the coefficient of the first

moving average (MA) term is significant. Consequently, these findings guide us in retaining the significant terms in the respective ARIMA models for accurate forecasting of the export series, ensuring robust and reliable predictions for both fresh/chilled and frozen bovine meat exports.

Table 4: Results of ARIMA Model

Variables	CHILLED	FROZEN
AR (1)	0.456*** (0.074)	-
AR (2)	-0.713*** (0.067)	-
MA (1)	-0.975*** (0.074)	-0.628*** (0.036)
MA (2)	1.132*** (0.046)	-
MA (3)	-0.596*** (0.051)	-
Sigma Square	3.309*** (0.154)	0.822*** (0.039)
Intercept	0.139** (0.057)	0.014 (0.024)
R ²	0.272	0.298
Adjusted R ²	0.255	0.293
Observations	256	256

*Note: Standard errors are given in parentheses. *** and ** represent statistical significance at 1 and 5% level of significance.*

Source: Authors' computations.

Forecasting of Bovine Meat Exports

Next, we used the estimates of ARIMA models to forecast future time points in the export series of fresh/chilled and frozen bovine meat. We forecast export values for the next 19 months (i.e., from June 2024 to December 2025). Figures 10 and 11 show the actual and forecasted export values of fresh/chilled and frozen bovine meat, respectively. The forecasted exports for fresh/chilled bovine meat show a smooth and upward trend, projecting that exports would reach US\$37.9 million by December 2025, marking an 11% increase from May 2024 but below peak exports of US\$39.6 million in March 2024. This short-term rise, based on industry's past and current circumstances, is encouraging for exporters and other supply chain actors, indicating a continuation of the recent growth trend. Similarly, as illustrated in Figures 9 and 10, there has been a significant increase in the exports of frozen

bovine meat since early 2023, with projections indicating that exports would reach US\$ 4.0 million by December 2025, representing a 12% rise compared to May 2024, but again below first peak exports of US\$ 9.1 million in March 2016 and second peak exports of US\$ 4.9 million in January 2024. This short-term increase in forecasted frozen bovine meat exports is also encouraging for exporters and other actors involved in the supply chains, reflecting a recent upturn in the market.

Figure 10: Forecast of Pakistan's Exports of Fresh/Chilled Bovine Meat (million US\$)

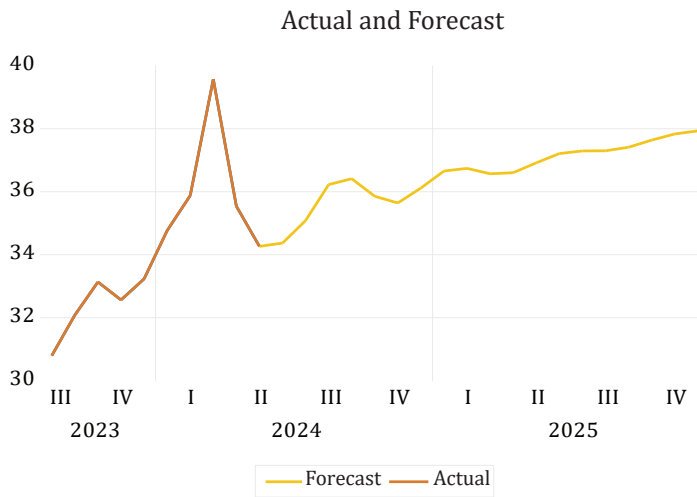
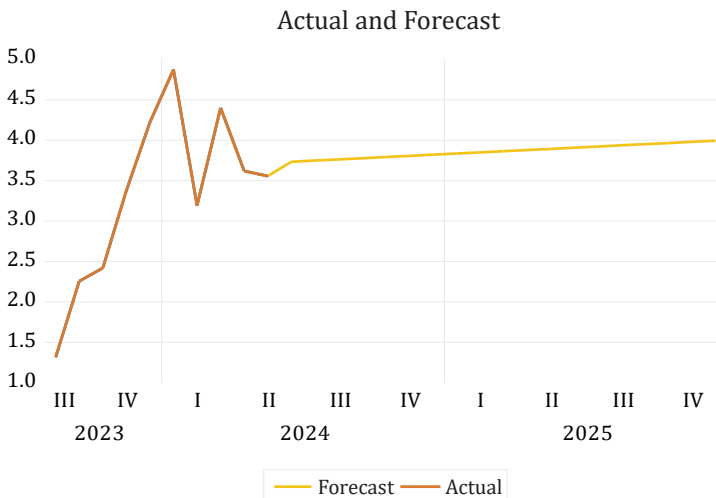


Figure 11: Forecast of Pakistan's Exports of Frozen Bovine Meat (million US\$)



Field Visits on FMD Control Programmes

To understand the status of FMD vaccine development in Pakistan, we visited the Additional Director (AD), Foot and Mouth Disease Research Centre, Lahore, on 29th December 2023. The AD told us that the centre's resource constraints, including inadequate funding and outdated technology, limit its capacity to conduct advanced research and development. The technological limitations are compounded by the frequent genetic mutations and multiple serotypes of the FMD virus, making it challenging to develop universally effective vaccines. However, the centre can produce 1 million doses of FMD vaccines. He recommended increasing the operational budget of the centre to ensure the smooth functioning of the FMD Research Centre and providing training to the technical staff in modern vaccine production techniques.

To learn about the required dosage and marginal costing of a nationwide FMD control program, we interviewed the FAO Pakistan coordinator on 05th January 2024. He stated that this would require just two doses of vaccination per ruminant annually, at a cost of Rs. 500 per ruminant per year. The nationwide cost for FMD vaccination is estimated at US\$0.4 billion per year (Rs 112 billion/year=Rs. 500*224 million small and large ruminants), according to calculations by the authors in collaboration with FAO-Pakistan experts. The marginal cost of the vaccination programme could be easily offset by the increased export of surplus beef, estimated at 0.8 million tonnes at an average price of US\$5,200 per tonne, potentially reaching US\$4.2 billion in exports to China and other high-value markets. However, it is important to note that this vaccination cost is only marginal as it does not account for additional expenses related to administering, testing and monitoring the vaccination process.

To explore the progress of an FMD-free region in Cholistan through the collaboration of GOP and FAO, we interviewed the Director General (DG) of the Livestock & Dairy Development Department (LDDD) in Bahawalpur, which is primarily responsible for FMD monitoring and vaccination efforts in the region, on 22 November 2023. The DG told us that all cattle and buffalo are vaccinated free of charge twice a year. Since its inception, he informed that 12 inoculation cycles have been completed, administering 800 million doses of vaccine in the Bahawalpur division (Government of Punjab, n.d.). Additionally, we interviewed several cattle growers in Cholistan to assess the efficacy of the FMD vaccination programme on their livestock. Both the DG and farmers reported zero incidence of FMD in the region during the current year, highlighting the success of the vaccination programme and its positive impacts on animal health and the local meat industry. The programme has

expanded to the Bahawalpur division, covering the districts of Bahawalpur, Bahawalnagar and Rahim Yar Khan. This accomplishment not only signifies a major milestone in FMD control on PCP but also sets a precedent for similar initiatives in other regions, ultimately contributing to the national goal of eradicating FMD and enhancing the overall productivity and profitability of the livestock sector. Additionally, we visited the DG Extension of the Livestock Department, Punjab Government, in Lahore to learn about the recent developments regarding the Pakistan Animal Identification and Traceability System (PAITS) and FMD compartments on 29th December 2023. He informed us that, in collaboration with FAO, the Punjab Information Technology Board (PITB) has developed a national livestock database integrating a web portal and a mobile application. Through PAITS, animals were tagged with a 16-digit identification code on their ears, allowing for the registration, identification, tracing and health monitoring of each animal. This code contains comprehensive details about animals, including species, breed, colour, age, lactation history, and current location. He also emphasised that this robust animal traceability system helps in the early detection and management of FMD, building trust among international consumers. He told us that 70,000 animals have been tagged till now.

Regarding the FMD-free compartment, the DG extension has shared that the Punjab government has allocated 70 acres of land in Mouza Kaliseyan Bhattian, tehsil Safdarabad, District Sheikhpura, for establishing an FMD-free compartment in Sheikhpura in collaboration with the Chinese company, Royal JW Buffalo. Achieving this status depends on obtaining health certificates for animal movement and conducting regular checks at entry and exit points. Another Chinese company, Royal Cell, established Pakistan's first buffalo embryo production and research laboratory in May 2023 (Aziz, 2023). The Royal Cell creates the in-vitro embryos, which are then implanted into the recipient buffaloes, thereby increasing the population of high-quality milk and meat breeds in Pakistan. As a joint venture with the Royal Cell, the Royal JW Buffalo aims to export Pakistani buffalo embryos (ova and frozen semen) to China. In the next phase, the Royal JW Buffalo group plans to register this compartment as FMD-free, subsequently enabling the export of milk and meat products to China. The development of such compartments will pave the way for farmers, exporters and foreign investors to establish similar compartments in Pakistan. These compartments will serve as a critical safeguard for the local agricultural industry, ultimately ensuring the health and well-being of livestock.

These visits provided valuable insights into the advancements and challenges in controlling FMD, further emphasising the importance of continued collaboration and innovation in combating this disease.

Findings of Survey of Beef Exporters

Descriptive Analysis of Beef Exporters

Descriptive statistics of socio-economic characteristics of halal beef exporters across three exporting cities of Pakistan are reported in Table 5. The average age of beef exporters is highest in Lahore (55.7 years), followed by Karachi (50.3 years), and the single exporter interviewed in Islamabad (48 years). Similarly, beef exporters in Lahore have the highest beef export experience (18.3 years) compared to those in Karachi (13.5 years) and Islamabad (8 years). The higher age and export experience of beef exporters in Lahore reveal that they are more expert and stable in their business. The average years of schooling of beef exporters are consistent across three cities. However, we observe a notable difference in the ownership of slaughterhouses: about 33% of beef exporters in Lahore own slaughterhouses, whereas in Karachi and Islamabad, the ownership proportions are 75% and 100%, respectively. This implies that most beef exporters in Karachi and Islamabad can have more integrated supply chains, enabling exporters to better control the quality and activities. Exporters in Lahore have more penetration in international beef markets and exported the highest volume (2,951 tonnes) of chilled and frozen beef during the last six months, followed by Karachi (2,275 tonnes) and Islamabad (100 tonnes). The low volume of Islamabad's exports is because this exporter is relatively new to the market and has diverse business interests.

Table 5: Descriptive Stats Of Halal Beef Exporters in Pakistan

Characteristics	Total (n=19)	Lahore (n ₁ =9)	Karachi (n ₂ =9)	Islamabad (n ₃ =1)
Age (years)	52.2	55.7	50.3	48
Experience (years)	15.3	18.3	13.5	8.0
Education (years)	14.1	14.0	14.5	16
Own slaughterhouse (%)	63.2	33.3	75.0	100
Export volume during last 6 months (tonne)	2033	2,951	2,275	100
Beef export types (%) ^a	1.8	1.3	2.3	2.0
Beef export destinations (No.)	4.3	3.3	5.8	2.0
Beef supply markets (%) ^b	1.4	1.3	1.3	2.0

Notes: Fresh=1, Fresh and Frozen or Fresh and Boiled=2, Fresh, Frozen and Boiled=3, Fresh, Frozen, Boiled and Marinated=4. b: Foreign=1, Foreign and Local Markets=2

Source: Authors' computations.

Although the exporters in Karachi supplied a more diverse range of beef (2.3 types) in the forms of fresh, unboiled frozen, and boiled frozen. In contrast, the single exporters interviewed in Islamabad supplied beef in two forms (fresh and frozen), while exporters in Lahore mainly supplied beef in fresh and/or frozen forms (1.3 types). The HS code of different beef types is reported in Appendix VII. However, it is important to note that while all beef exporters can export frozen beef, the volume of fresh beef exports is relatively higher due to greater demand and the premium prices paid by consumers in GCC countries. During a survey in Karachi in 2024, exporters reported additional beef exports, specifically boiled beef. In early 2024, there were four beef export companies, including Halal Meat Processing and PK Livestock & Meat. TATA Best Foods, Which Processes Organic Meat and Halal meat, has started exporting semi-processed beef, i.e., boiled, boneless, and frozen, to China (Pakistan Today, 2024). The TATA Best Foods has also established a fattening farm of 5000 cattle at Muzaffargarh, following the protocols of the FMD-free compartment. The CEO mentioned that efforts are underway to officially declare it as an FMD-free compartment soon. Moreover, export destination suggests that exporters in Karachi have broader (5.8 destinations i.e., UAE, Saudi Arabia, Qatar, Kuwait, Bahrain, Iran, Maldives, China) international reach due to its strong strategic position and access to both air and sea routes, compared to their counterparts in Lahore (3.3 i.e., UAE, Qatar, Saudi Arabia, Bahrain, Oman, Kuwait) and Islamabad (2 i.e., UAE and China). Beef supply markets show slight variations. Islamabad exporters are focusing on both local and foreign markets, while Lahore and Karachi exporters have a mixed trend, with a stronger focus on the foreign market.

Regulations and Preferred Features of Halal Beef Exports

The regulatory requirements of halal beef demanded by importers in Pakistan vary. For instance, three certifications are demanded by importers of Qatar, Kuwait and Oman: Halal Certificate to ensure bovine animal is slaughtered and processed according to Islamic laws issued by Halal International or Punjab Halal Department; Animal Health Certificate to assure high standards of quality compliance issued by Animal Quarantine Department (AQD) in Lahore and Karachi, and Certificate of Origin issued by Chamber of Commerce and Industry. The UAE, Saudi Arab, Egypt, Iran, Indonesia, and Malaysia demand an additional Self-Certification of Slaughterhouses (issued to those slaughterhouses that adhere to strict hygiene and safety standards).

Table 6 presents the ratings and rankings of the key features demanded in the international halal beef market, as identified by the exporters during the survey. These ratings and rankings are based on their responses for each feature (see Question 10 in Appendix VI). Approximately 88% of exporters indicated that importers in the Middle East markets prioritise the price of halal beef, and overall, the exporters ranked this as the most important feature, highlighting their price sensitivity.

Table 6: Ranking of Halal Beef Features Demanded in the International Market

Features of halal beef	Rated by respondents	Average ranking of the features (%)
Price	1	88
Age of animal	2	75
Breed of animal	3	63
Pink colour	4	63
Fat layer	5	75
Heavy animal/lean meat	6	63
Tenderness	7	50
Smell	8	50
Packaging	9	63
Gender of the animal	10	75

Source: Authors' computations.

The survey also identified other features that influence demand for beef exports from Pakistan. Notably, exporters rated the following features highly: meat from younger animal (1.5-3 years) for better taste, desi breed in particular, the Sahiwal cow, pink colour of the meat for freshness and quality (also an indicator to differentiate between culled and young stock), a fat layer to protect meat quality and enhance taste, lean meat from heavier animal for fewer bones and fat, tenderness, smell, cloth packaging having a shelf life of 22 days for air travel, vacuum-sealed packaging having a shelf life of 90 days for sea travel, and meat of male cow. Among other features, an optimal temperature range of 18-25°C for fresh/chilled beef and -18°C for frozen beef and cuttings of two or four pieces of carcasses, besides deboned or bone-in cuts, is demanded.

These features suggest that halal beef importers in the Middle East are demanding low-priced yet high-quality beef from Pakistani exporters to meet their national food security needs. However, exporters did not identify the

importers as currently prioritising beef for food safety, beyond the required certifications. As incomes rise, a shift towards greater emphasis on food safety is likely to occur. Pakistani exporters will need to adapt to maintain their market position.

Practices in Halal Beef Exports from Pakistan

Table 7 illustrates the sources of live animals utilised by beef exporters, as reported in the survey. Most beef exporters (60%) secure live animals from livestock markets, followed by contract farmers (15%), own farms (10%), fattening farms (10%) and middlemen (5%). Exporters have engaged technical experts to procure animals from livestock markets, compensating them with a fixed commission of Rs 500 per animal, making the supply chain longer and more expensive. While the government charges fees for various services within these markets, the quality and availability of these services are often inadequate or poor. Enhancing these services could improve market efficiency. Moreover, most exporters exporting beef to Kuwait are purchasing animals predominantly from fattening farms due to demand for lean meat. There is considerable variation in daily weight gain across fattening farms, indicating that the efficiency of certain farms could be improved through enhanced delivery of extension services.

Table 7: Sources of Live Animals for Beef Exports

Practices in sourcing live animals	Sources of live animals (%)
Own farm	10
Contract farming	15
Middleman	5
Livestock market	60
Fattening farms	10

Source: Authors' computations.

After this, the bovine animals are transported to slaughterhouses, where they are provided with sweet water and feed and allowed to rest for 24-48 hours before slaughtering. Then, the animals are slaughtered by trained personnel and are given a rest of about 5-7 minutes according to Islamic law. After removing the skin and cutting the animal from the centre, a veterinary doctor at the slaughterhouse inspects the liver, spleen and heart of slaughtered animals and prepares an antemortem inspection report, which is then sent to AQD for obtaining an animal health certificate. However, this certification process is both costly and cumbersome. To expedite the process, exporters are

required to pay an additional Rs. 200 per animal on top of the standard certificate fee of Rs. 240 per animal. This inefficiency in the certification process should be addressed by making the service available online and accessible 24/7, streamlining the procedure for exporters and reducing delays. Meanwhile, the animals are processed into two or four pieces of carcasses or bone-in cut or boneless, after removing offal. After cutting, meat is chilled or frozen in the chiller or freezer of the slaughterhouses, according to the export order. After this, beef is subsequently packed in cloth or vacuum packaging, depending on the mode of travel or type of meat. Finally, fresh/chilled beef packed in cloth packaging is transported in reefer containers via chiller vans from slaughterhouses to the airport, while vacuum-packed frozen beef is exported using refrigerated containers via sea routes. For the boiled category, boneless beef is boiled at temperatures above 70°C for 30 minutes, then cooled, vacuum-packed, frozen, and exported to China via sea.

Profitability Analysis of Halal Beef Exports

To evaluate halal beef exports from Pakistan, it is essential to conduct a profitability analysis and examine the level of profits within this industry. The profitability of exporting fresh/chilled halal beef from Pakistan to GCC countries is detailed in Table 8. These estimates are based on survey responses on costs and secondary data on air freight charges, and to our knowledge, are the only profitability estimates publicly available. The animal price buying cost is the most significant component of costs, which hampers Pakistan's exporters' ability to compete with the Indian frozen beef products in the Middle East. The second most significant cost component is the air freight charges, which are crucial for the rapid transportation of this perishable product. Among the minor costs are transportation costs of animals from the livestock market to the slaughterhouse and from the slaughterhouse to the airport, animal handling costs, slaughtering costs, the costs of an animal health certificate (which is one of the most important international export regulations to ensure beef quality satisfies health standards) and export development charges. In short, 90% of the costs are attributed to animal sourcing, transporting and processing.



Table 8: Profitability Analysis of Chilled Halal Beef Export

Items	Value (Rs/animal)	Value (Rs/kg)
Animal buying cost	78,000	975
Livestock market charges	340	4
Transport cost from the market to the slaughterhouse	1,000	13
One-day feeding + deworming costs	400	5
Slaughtering + packaging + chilling costs	1,000	13
Animal health certificate cost	240+200=440	6
Transport cost from the slaughterhouse to the airport	500	6
Air freight charges	$326.5 \times 80 = 26,120$	327
Export Development Charges (0.25%)	287	4
Total cost	108,087	1,351
Revenue from beef	$1,316 \times 80 = 105,280$	1,316
Skin	1,500	19
Offal earnings	8,000	100
Total Revenue	114,780	1,435
Profit	6,693	84

Note: we assume that an average animal has 80 kg of meat production. We used average air freight charges as given in Appendix IX.

Source: Authors' computations.

The revenue from beef export is calculated by multiplying the average meat weight per animal with the average per kg beef price in GCC. A sizeable revenue comes from offal earnings, which highlights how crucial it is to use every part of the animal to maximise profitability. The profit per animal is Rs 6,693, while the profit per kg of beef is Rs 84, a rate of 5.8% of revenue. This analysis suggests that exporting chilled halal beef from Pakistan to GCC countries is both viable and profitable. At current export levels, the beef export industry in Pakistan has an average profitability of Rs 28.5 million per month (per kg profit * average export volume during the last six months = Rs 84 per kg * (2,033,238 kg / 6 months)). However, exporters encounter greater financial risks due to the extended supply chain and on-credit export procedures. Additionally, despite the government charging high export development fees, there is little support provided to exporters in promoting their products or securing timely payments. In summary, the profit margins highlight the potential for further expansion of this export industry, while also emphasising the need to investigate the challenges to boosting profitability.

Challenges and Opportunities in Halal Beef Exports from Pakistan

Despite promising projections and potential profitability, Pakistan's chilled and frozen beef industry continues to underperform, and the country has yet to fully capitalise on the rapidly growing global halal beef market (Randhawa et al., 2018). The exporter's survey also enables us to identify the challenges faced by Pakistan's halal beef export industry that hinder its expansion. Table 9 categorises these challenges into four major areas: regulatory, logistical, infrastructural, and quality issues. The survey highlights the consequences of these challenges, proposes potential interventions, and identifies outcomes/opportunities for improving the sector, as reported by the exporters. The intent of investigating challenges and opportunities for the beef exports would be to shift the trajectory to a higher level in the medium and long-run compared to the short-term forecasts, given in section 4.1.

Regulatory Challenges

Exporters reported that meat price regulation is the first significant barrier in sourcing healthy animals. It disincentivises producers, leading to reduced meat quality and lower carcass weight. Exporters suggested deregulating meat prices to incentivise local investments in improving meat breeds and fattening animals, which could enhance meat productivity. The second significant regulatory challenge prioritised by exporters is the illegal slaughtering of valuable livestock, such as female and young animals, due to weak enforcement of the 1963 Animal Slaughter Control Act (Government of Punjab, 1963). This practice hinders the expansion of the meat-producing animal population. Strict enforcement of this act would help preserve the breeding population and promote the fattening of young calves. Other challenges include live animal smuggling, high electricity tariffs, and the absence of a FMD-CP.

However, under the profitability framework, we consider the lack of implementation of the national FMD-CP as the first critical barrier, limiting access to high-value international markets that are currently restricted due to trade barriers imposed under importers' animal health SPS measures. If the government prioritises addressing this barrier, then the advantages of entering new markets far outweigh the costs associated with establishing FMD-free zones or compartments and developing vaccination programs. The next priority for the government should be to curb illegal slaughtering and smuggling to increase the availability of healthy livestock for both domestic consumption and exports. Although enforcing stricter regulations may pose challenges, it has the potential to significantly boost formal export volumes

and retain valuable resources such as skin, offal, and bones within the country for the domestic industry. Furthermore, the government should deregulate meat prices to stimulate sectoral investment and encourage producers to improve meat quality. However, this approach carries the risk of domestic inflation, which would require careful management. We do not encourage subsidised electricity tariffs on meat processing due to the potential distortion of market competition, the misallocation of resources, and the reduced incentive for energy efficiency and innovation within industry. While the long-term benefits to the export industry are evident, further research is needed to assess the potential short-term impacts on the domestic market.

Logistical Challenges

Exporters in Lahore face logistical challenges, notably the limited cargo space in passenger flights, forcing them to rely on alternative airports, increasing costs and the risk of rejection for perishable products. Their suggestion on fixing flight space is impractical, as their primary focus is on passengers and their luggage; however, collaboration between industry and cargo services could lead to reducing logistical challenges and increasing export volumes. The lack of cold vans significantly impacts the quality of chilled beef exports. Exporters proposed subsidies for cold van imports, though loans to the service providers might offer a more feasible solution.

Table 9: Challenges and Opportunities in Halal Beef Export from Pakistan

Challenges	Consequences	Interventions	Opportunities
Regulatory Challenges			
i. Regulation of meat prices	a. Disincentivise the producers	• Deregulation of meat prices	- Pull factor for productivity enhancement
	b. Lower the quality of meat		- Attract investment
ii. Illegal slaughtering of female and young animals	a. Decrease horizontal growth	• Strict enforcement of the Animal Slaughter Control Act	- Preservation of the female population for breeding
			- Encourage fattening of young calves

Challenges	Consequences	Interventions	Opportunities
Regulatory Challenges			
iii. Smuggling of live animals to Iran and Afghanistan	a. Difficulty in finding healthy animals for beef exports	• Cut on the smuggling of live animals	- Potential to increase formal exports
	b. Damages the local industry of byproducts (casing, bones, gelatin, etc.)		
iv. High electricity tariff and energy crises	a. Expensive fodder and transport	• Reduce agri-energy tariff on fodder production, livestock farming and meat processing for export	- Enhance international competitiveness
	b. High cost of boneless beef production		- Shift from chilled to frozen beef export
	c. Reduce international competitiveness in boneless frozen beef		- Compete in boneless meat
v. No National FMD-CP	a. Huge production losses and trade barriers to high-end markets	• Implementation of National FMD-CP	- Access to new high-value markets
	b. Delay in FMD approval of the zone from WOA	• Development of more FMD Control compartments and zones	
Logistical Challenges			
i. Limited space in passenger flights for exports	a. Increase the costs of exports	• Fix space in passenger flights or provide cargo flights	- Enhance export volume
	b. Risk of rejection of consignment		
ii. Limited availability of cold vans	a. Reduce export volume	• Subsidise import of cold vans	- Improve export quality



Challenges	Consequences	Interventions	Opportunities
Infrastructural Challenges			
i. Unavailability of cold storehouse at airports/seaports	a. Reduce beef quality and increase the cost of export	• APMEPA needs space from the government. to build a cold store house at the airport	- Increase international competitiveness
ii. Few breeding farms	a. Difficulty in finding healthy animals	• Encourage breeding farms through subsidy or credit	- Increase beef exports
iii. Few fattening farms	a. Low carcass weight: 196 kg per animal	• Effective awareness and capacity building of farmers	- Export at a high international price
Quality Challenges			
i. Unnecessary inspection at airport	a. Compromise product quality and safety	• Efficient and streamlined monitoring	- Increase competitiveness of exporters in the global marketplace
ii. Expensive and cumbersome process to get animal health certificate	a. Delay in consignment	• Online and 24/7 certification from AQD	- Timely delivery of export order
iii. Lack of animal traceability	a. Cannot track disease or breed	• Increase the scale of the Pakistan Animal Identification and Traceability System (PAITS)	- Gain trust of importers

Source: Authors' computations.

Infrastructural Challenges

A major infrastructure issue, as ranked by exporters, is the lack of cold storage facilities at airports and seaports, which forces exporters to keep their cold vans operational until departure to prevent product spoilage. While the majority of beef exporters are willing to invest in cold storage at Lahore airport through their association (APMEPA), government security concerns hinder such initiatives. However, establishing cold storage by the private sector near the airport could offer a more viable solution. Additionally, addressing the lack of breeding and fattening farms is crucial for increasing carcass weight and overall production quality. Government incentives, such as credit schemes and training for farmers on fattening practices, could encourage private sector participation, leading to higher yields and enhanced export potential.

Quality Challenges

Exporters consider excessive airport inspections as the primary quality challenge because they affect product quality and safety. The second most important challenge is the costly and time-consuming process of obtaining animal health certificates from AQD, which delays the shipments. Lastly, scaling up the PAITS is suggested to increase trust in international markets by ensuring product quality and safety. Streamlining the certification process by offering online 24/7 services and coordinating with airport inspections would reduce delays and costs, thereby improving export efficiency.

The investigation of these challenges and potential interventions aims to elevate Pakistan's halal beef export industry in the medium and long term. Regulatory, logistical, infrastructural, and quality-related barriers have been well-documented in previous studies, as discussed in Section 2. For example, Tariq et al. (2022) identified the negative impact of regulatory barriers like price controls, illegal smuggling of live animals to Iran and Afghanistan and the absence of a National FMD-CP. Logistic challenges, including inadequate transportation infrastructure, resonate with findings by Hassan et al. (2016) and Warriach et al. (2020), who emphasise the critical need for better cold storage and transportation solutions. High costs of sourcing animals and low meat yields, coupled with a lack of meat breeds, mirror the STPF's concerns about infrastructure deficits, including limited breeding and fattening farms in the country (GOP, 2022). The NPSES emphasises that FMD and the lack of animal traceability are significant barriers to the country's access to high-value markets (GOP, 2022). Additionally, quality control issues like the absence of standardisation and traceability systems align with Khan et al.'s

(2019) observations, underscoring the necessity for streamlined processes and improved monitoring. Table 9 also highlights, based on our interviews with exporters in 2023, the consequences of these challenges in the beef export industry. The exporters' proposed interventions in Table 9, such as deregulating meat prices, enforcement of Animal Slaughter Control Act, reduced agri-tariff on fodder, livestock and meat production, implementation of FMD-CP, support on cold storage facilities, encouragement in breeding and fattening farms, efficient and streamlined monitoring and promotion of PAITS, provide actionable solutions that could substantially improve the quality, productivity and competitiveness of halal beef export industry. By implementing these focused interventions—such as process simplification, infrastructure development, skill training, and policy reforms—Pakistan can enhance its position in the international halal beef market, promoting sustainable growth and expanding access to high-value markets.

5. RECOMMENDATIONS & POLICY IMPLICATIONS

Pakistan has the potential to increase its halal beef exports sevenfold from around 0.1 million tons to 0.8 million tons. However, to achieve this growth, the study recommends the following policy measures, based on the stakeholders' survey of the export sector, to address regulatory, logistical, infrastructural, and quality challenges, while ensuring the efficient allocation of resources. The discussion below outlines these recommendations, ties them back to the earlier sections of the report, and takes care of the benefit-cost perspective in prioritising them.

1. **Implement an integrated and coordinated regulatory framework:** To exploit the potential of beef exports from Pakistan to high-value markets like China, a critical first step is the implementation of a national FMD-CP to gain FMD-free status for the country. Besides, strict enforcement of the Animal Slaughter Control Act to preserve breeding females and fattening calves is essential. Additionally, more vigorous enforcement of bans on live animal smuggling is very significant. These measures will not only increase the number of animals available for beef exports but also improve the health and quality of exports, ultimately enabling Pakistan to meet international standards. These measures may help ensure long-term sustainability in the beef supply chain.



2. **Promote animal traceability:** Expanding PAITS to ensure traceability of breeds and disease history is key to capturing high-value markets that prioritise food safety and traceability. This recommendation is based on earlier discussions on the need for traceability in global markets. The initial cost of PAITS may be high, but it is essential to implement it for the long-term benefits in terms of market access and to earn the premium price.
3. **Encourage investment in cold storage and transportation facilities:** Soft loans to establish cold storage near the airports and purchase of cold vans for transportation are vital for maintaining the quality of chilled beef exports. The role and engagement of the private sector is crucial, with government incentives to develop infrastructure and logistics. Similarly, the availability of cargo flights could alleviate logistical bottlenecks related to limited space in passenger flights. Considering the high initial cost, public-private partnerships can be instrumental in sharing the financial burden. However, the role of the public sector should be reduced in the long term for the sustainability of the halal beef export industry.
4. **Establish a robust quality control system:** Implementing stringent but efficient quality control systems at slaughterhouses, AQD, and airports is essential to meet the rigorous requirements of international markets. While this might be more of a public sector initiative, the private sector should collaborate closely to ensure compliance with global health and safety standards. The benefits of improving quality control far outweigh the costs, as it opens doors to premium markets.
5. **Capacity building of farmers:** Training programs focused on feedlot management and animal health care will help to increase the productivity and competitiveness of Pakistani beef in international markets. Being an ongoing process, capacity building should be an integral part of the basic agenda for extension workers. Both the public and private sectors should invest to strengthen the extension services to maximise returns in terms of both quality and quantity of exports.
6. **Deregulate meat prices:** Deregulating meat prices may lead to enhanced incentives for producers by increasing their profitability. However, it should be done cautiously to avoid concerns about domestic food security. This step should be evaluated through further

research to understand the trade-offs between export incentives and the local community's forgoing incentives. However, it is important to take care of the stability of the local beef market.

7. **Promote halal aspects of Pakistani beef:** The halal aspect of Pakistani beef is a unique selling point, particularly for markets in the Middle East and Southeast Asia. A targeted marketing campaign that emphasises the halal certification process will enhance Pakistan's competitiveness in these regions. This can be led by private companies, with government support in terms of certification and regulatory facilitation.
8. **Priority and Further Research:** In terms of prioritisation, addressing FMD control, enhancing traceability, and investing in cold chain infrastructure should be the immediate focus to increase access to high-value markets and thus exporters' profitability. Further research is needed to determine the most cost-effective approaches to identify the potential areas for public-private partnership. Moreover, research should identify which activities are the best handled by the private sector (such as marketing and logistics) and which should involve government oversight (such as regulatory frameworks and disease control). This will ensure efficient allocation of limited resources for maximum return.

6. CONCLUSION

This study offers a comprehensive understanding of the dynamics of halal beef exports from Pakistan. Over the past decade, Pakistan has emerged as one of the fastest-growing beef exporters, yet exports constitute only 3.3% of the country's total beef production. Notably, 96.7% of these exports are directed to the GCC countries, leveraging our proximity to supply affordable and fresh beef. Consequently, 71%-99% of Pakistan's bovine meat exports are in the fresh/chilled category, typically in two or four-piece carcasses. Although Pakistan has recently begun exporting boneless, boiled, and frozen beef to China, this segment remains minimal. To access distant and high-value markets, the country must urgently implement a nationwide FMD-CP, encourage the establishment of FMD control compartments, and expand the scale of animal traceability. Recent developments by a Chinese company in establishing an FMD control compartment in Sheikhpura are encouraging

exporters to adopt such practices to ensure beef safety and traceability. During our visit to the FMD Research Centre in Lahore, we observed that Pakistan lacks modern facilities for FMD vaccination. Additionally, our calculation with the FAO expert suggests that an imported FMD vaccination strategy could be an economical approach to controlling the disease. Pakistan can learn from India's success in managing FMD. India addressed FMD by developing vaccines tailored to various viral strains across its diverse agro-climatic zones and conducting extensive vaccination campaigns in areas prone to FMD. This approach has helped India to become one of the world's largest beef exporters, driven by its thriving buffalo meat industry.

The study provides short-term forecasts of the potential for halal beef exports, offering valuable insights for stakeholders. Using secondary time series data, the forecasting model reveals that Pakistan has significant potential to expand its exports of chilled/fresh bovine meat under past and current industry conditions. Despite this potential, Pakistan's chilled and frozen beef industry remains underperforming, failing to capitalise on the rapidly growing global halal beef market. To address this gap, the study surveyed exporters, specifically assessing the key features of halal beef demanded by international importers, examining current export practices, and identifying the significant challenges and opportunities in the halal beef export industry. The survey results have highlighted major challenges, including infrastructure, logistic issues, and regulatory and quality concerns that hinder the country from realising its full export potential. Key regulatory challenges include regulated meat prices, illegal slaughtering and smuggling of live animals, high electricity tariffs, and the lack of implementation of FMD-CP. Logistic challenges comprise the lack of cold storage facilities at airports and the limited space available in passenger flights. Additionally, significant obstacles exist within the infrastructure and quality control environment. These challenges complicate the export process, whether due to inadequate regulation in cases of illegal slaughtering and smuggling, FMD control, or inefficient regulation that fails to ensure animal health, meat quality, and fair meat prices, as well as high export development fees, without supporting exporters in promoting exports or obtaining timely payments. Furthermore, exporters face greater financial risks due to the extended supply chain and on-credit export procedures. These challenges lead to increased expenses and decreased competitiveness in the global market. Accessing high-value markets such as Europe and China is further complicated by the lack of a robust animal traceability system and the incidence of FMD.

Despite these challenges, the study finds positive but modest profit margins in the exports of chilled halal beef to Gulf nations, which can support the forecasted short-term increases in exports. A coordinated regulatory framework is essential, particularly in achieving FMD-free status and enforcing the Animal Slaughter Control Act. Promoting animal traceability through PAITS will help access high-value markets. Investment in cold storage and transportation infrastructure, supported by public-private partnerships, is crucial for maintaining the export quality of products. Additionally, capacity building for farmers, deregulating meat prices cautiously, and emphasising the halal aspects of beef will further boost Pakistan's global competitiveness.

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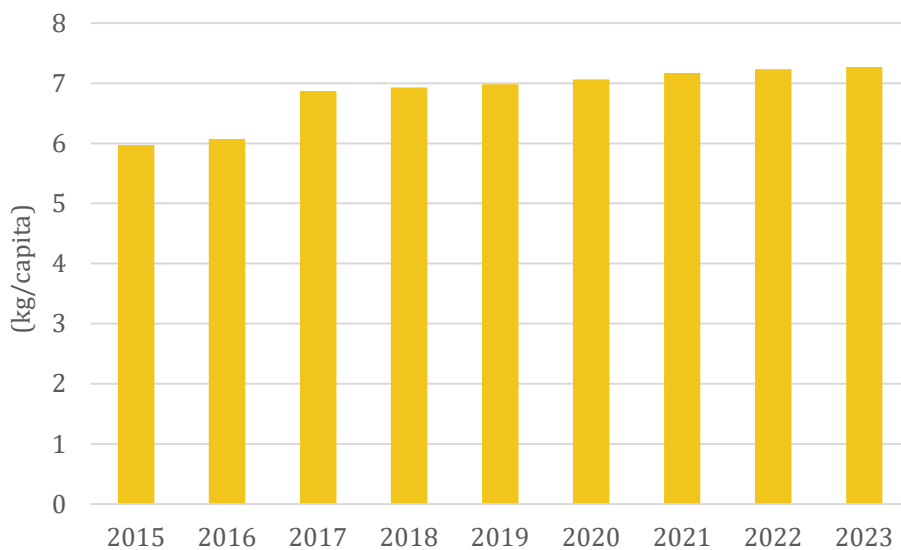
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APPENDICES

Appendix I: Pakistan's Beef Consumption (kg/capita)



Source: STATISTA (2024).

Appendix II: Pakistan's Bovine Meat Exports by Types and Countries in 2023

Countries	Fresh/Chilled bovine meat						Frozen bovine meat					
	Carcasses			Cut with bone			Boneless			Carcasses		
	Quantity (tonne)	Value (m. Rs)	Price (Rs/kg)	Quantity (tonne)	Value (m. Rs)	Price (Rs/kg)	Quantity (tonne)	Value (m. Rs)	Price (Rs/kg)	Quantity (tonne)	Value (m. Rs)	Price (Rs/kg)
Bahrain	4,315	4,232	981	393	420	1,068	0.03	0.02	800	-	-	-
Egypt	1	2	1,494	-	-	-	-	-	-	-	-	-
Hong Kong	2	1	767	-	-	-	-	-	-	-	-	-
Iraq	-	-	-	5	5	1,049	-	-	-	-	-	-
Jordan	12	13	1,017	-	-	-	6	6	925	-	-	-
Kazakhstan	-	-	-	346	196	567	-	-	-	-	-	-
Kuwait	9,629	12,518	1,300	456	513	1,125	-	-	-	-	-	-
Malaysia	0.14	0.2	1,511,111	-	-	-	-	-	-	-	-	-
Maldives	-	-	-	28	27	-	-	-	-	-	-	-
Oman	2,790	2,609	935	4	4	1,008	2	2	1,315	11	8	699
Qatar	7,528	7,699	1,023	6	6	991	1	1	1,340	-	-	-
Saudi Arabia	12,864	14,164	1,101	536	471	879	78	79	1,013	-	-	-
Thailand	-	-	-	-	-	-	-	-	-	-	-	-
UAE	43,123	43,795	1,016	681	671	986	13	17	1,252	1	0.48	422
Uzbekistan	1,116	851	762	21	23	1,118	31	32	1,049	1,664	1,465	880
Vietnam	-	-	-	-	-	-	-	-	-	-	-	-
Total	81,380	85,884	1,055	2,477	2,338	944	130	137	1,048	1,677	1,473	879

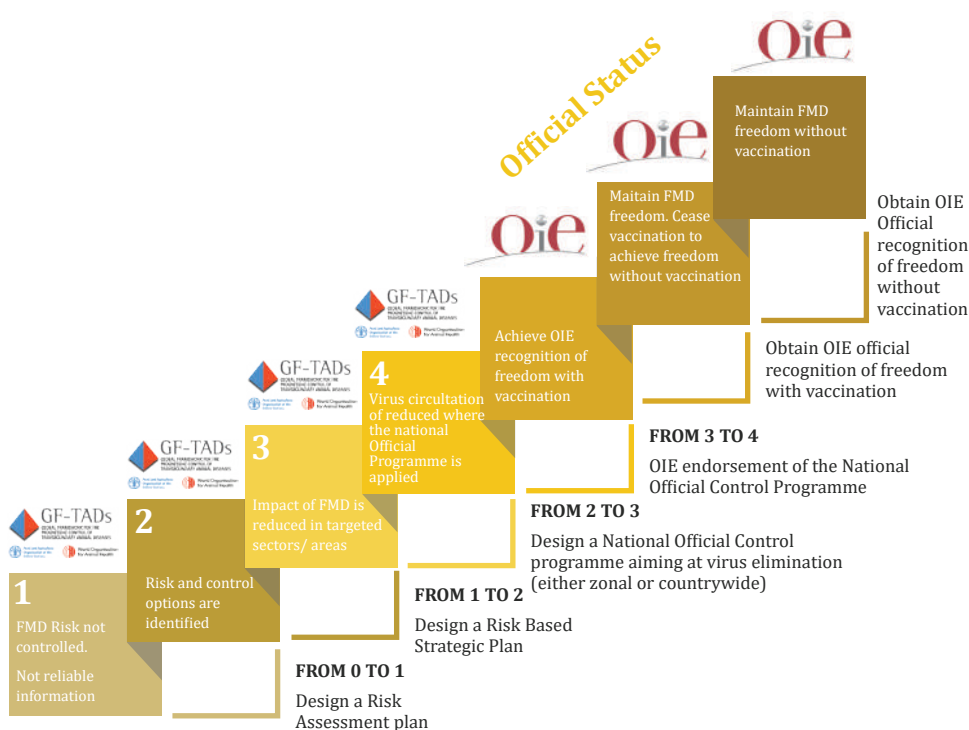
Source: GOP (2024a).

Appendix III: Total Sales of Beef and Veal Meat in GCC Countries in 2023

GCC Countries	Sales of beef and veal meat (000 tonnes)
Saudi Arabia	145.6
UAE	53.9
Oman	94.2
Kuwait	16.8
Qatar	6.7
Bahrain	36.1
Total	353.3

Source: Euromonitor International (2023).

Appendix IV: Stages of Progressive Control Pathway for FMD



Source: FAO et al., (2018)



Appendix V: List of Beef Exporters in Pakistan

Sr. No.	Name	Address
1	Mr. Nawaz	Abedin International (PVT) LTD. 670 A-II, Sector 4, Township, Lahore
2	Mr. Mehar Asghar	Al-Shaiza House No. 1, Street No. 4, Shadab Colony Road 18 Km Ferozpur Road Lahore
3	Mr. Abdul Hunnan	Managing Director Tazu Meat & Foods 3.5 Km Raiwind Manga Road Raiwind, Lahore
4	Mr. Arif	A & B Corporation 88-A Main Gulberg Lahore
5	Mr. Naeem Jandran	Al Mairaj International 4 Manga Road Near Nishat Chonian, Lahore.
6	Mr. Muhammad Akmal	Akmal Traders 633-G, Gulshan-e- Ravi, Lahore
7	Mr. Syed Hassan Raza	Syed Traders 177-B, Johar Town, Lahore
8	Mr. Asif Gias (Director) Mr. Tariq Gias (Director)	Zenith Associates 3.5 Km Manga Road Off Raiwind Road Lahore
9	Mr. Saith Mehmood Ahmed	Al Iman Trading Co. 231 Small Industrial Estate Kot Lakhpath Lahore
10	Mr. Muhammad Arif	Karigar Collection 88-A Main Boulevard Gulberg Lahore
11	Mr. Siddique	Green Meadows H No.201, Q Block DHA, Lahore
12	Mr. Mubarak	Kashif Traders H. No. 180 54/II Rifle Range Road Iqbal Park main Boulevard DHA, Lahore
13	Mr. Malik Fateh Sher	Abdali Traders 444-A Zeenat Block Allama Iqbal Town Lahore
14	Mr. Irfan Haider	Halal Meat Processing (PVT) LTD. Plot 1, CTC, Street 09, G-8/2, Islamabad
15	Mr. Tariq Butt	PK Livestock & Meat Co. (PVT) LTD. Musa Goth Razaqabad, National Highway, Karachi
16	MR. Bilal Tata	Tata Best Foods LTD. HX – 1, Landhi Industrial Area, Karachi, Pakistan Head Office: 6 th Floor, Textile Plaza, M.A. Jinnah Road, Karachi - 74000, Pakistan.
17	Syed Mahmood Alam	The Organic Meat Company (PVT.) LTD. First Floor, 66 C -68 C, 25 th Street, Tauheed Commercial, PHASE 5, DHA, Karachi. Pakistan

Sr. No.	Name	Address
18	Mr. Ghulam Sarwar Sheikh	Pakistan Food Export 29/3-D, Raja Manzil Nursery P.E.C.H.S, Karachi
19	Mr. Asif Khannani	FOODEX 259-H, BLOCK 6, P.E.C.H.S., KARACHI, PAKISTAN
20	Mr. Arfeen	Al-Aien Group 43/1, Khayaban-e-Halal, DHA Phase 6, Karachi
21	Mr. Faheem Anwar	Zainaib Enterprises Off 205, 2 nd Floor Mashriq Centre Gulshan-e- Iqbal Karachi.
22	Mr. Raja Faisal	Al-Barka Traders 29/3-D, Raja Manzil Nursery Commercial Area, P.E.C.H.S Karachi
23	Mr. Ghous	G.M Trading Shop No. 2, Dawood Pota Road, Karachi
24	Lieutenant Colonel Amer Hassan (Retired)	Fauji Meat Limited Chak No. 1, Deh Kohistan, Tapo Gharo Mirpur Sakaro, Dist. Thatha, Pakistan

Source: Authors' compilations.

Appendix VI: Questionnaire Deigned to Interview Beef Exporters

Questionnaire

Questionnaire on the Art of Exporting Halal Beef from Pakistan

I, Shahzad Kouser, am inviting you to take a survey for a research project entitled "The Art of Exporting Halal Beef: A Case Study of Pakistan" funded by PIDE-RASTA Grant 5.0. This questionnaire is designed to understand the features of and current practices in the Halal beef export of Pakistan, along with major bottlenecks and opportunities for boosting the Halal beef exports. Later, we may share our findings in publications or presentations. This survey is entirely voluntary. There are no negative consequences if you don't want to take it. If you start the survey, you can always change your mind and stop at any time. We will not disclose your personal information to anyone. This survey will take a maximum of 30 minutes. Here, I would like to take your written consent to start a face-to-face interview.

Signature of respondent: _____

**A. Exporter's profile:**

1. Name of exporter _____
2. Age of exporter _____ (years)
3. Education of exporter _____ (years)
4. Address of exporter _____
5. Contact of exporter _____
6. Name of company _____
7. Number of years in the export business (please tick the appropriate answer)
 - a) Less than 5 years
 - b) 6-10 years
 - c) 11-15 years
 - d) above 15 years
8. Do you own the slaughterhouse? _____ (Yes/No)

B. Features and Profitability Analysis of Halal Beef Export:

9. Features of Halal beef and beef products exported during the last 6 months:

No.	Product name	Sourced from (name of area/slaughter house)	Destination country	Quantity exported (tonne)	Value of export (PKR lakh)	Cost of export (PKR lakh)	Carcass (full/half) or cuttings	Bone or deboned meat	Chilled, frozen or fresh	Which quality/safety certificate do you require?
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

10. What precise features are demanded by importers for Halal beef and beef products in your destination market?

No.	Features of beef demanded in your destination market	Ranking of the features of beef demanded by importers in your destination market (1-10)	Do you fulfil those features? (Yes/No)	Constraints in meeting the demanded features
1	Colour			
2	Freshness			
3	Tenderness			
4	Smell			
5	Age of animal			
6	Gender of the animal			
7	Deboning			
8	Frozen			
9	Chilled			
10	Halal certificate			
11	SPS certificate			
12	Healthy animal certificate			
13	Packaging			
14	Hygiene			
15	FMD free			
16	Animal traceability			
17	Others			
18				
19				

11. What kind of expenditures do you bear to export 1 tonne of beef?

No.	Items	Cost (PKR/tonne)
1	Animal	
2	Feed	
3	Beef	
4	Slaughtering	
5	Cutting	
6	Chilling/freezing	
7	Packaging	
8	Transportation	
9	Air cargo/sea cargo	

No.	Items	Cost (PKR/tonne)
10	Animal health certificate	
11	Halal certificate	
12	Livestock market charges	
13	Export Development Surcharge (EDS) (0.25%)	
14	Others	
15	Others	

C. Current practices in the supply chain of live animals or beef and beef products for export:

12. Do you buy live animal or beef or both? _____

13. Sources of supply

No.	Sources of live animals (tick)	Sources of beef or beef products (tick)
1	Own farm	Middleman
2	Farmers without keeping records of animals	Butcher
3	Farmers keeping records of progeny	Own slaughterhouse
4	Contract farming	Other slaughterhouse
5	Middleman	Retail market
6	Livestock market	Others
7	Aggregators at village level	
8	Others	
9		
10		

14. Rank the top five major problems in the supply chain of live animals if you buy live animals.

No.	Problems	Ranking on 1-5 scale
1	Low weight animal	
2	High prices	
3	Slaughtering of female cow	
4	FMD	
5	Animal traceability	
6	Others, _____	
7		

15. Do you also supply beef or beef products in the domestic market?
___ (Yes/No)
16. If yes, then what proportion of total supply do you sell in domestic market? _____
17. Which method of payments is commonly used for procuring live animal or beef and _____ beef products for exports?
 - a) Advance payment (i) Full _____ (ii) Partial _____
 - b) Payment after delivery of the product (i) Full _____
(ii) Partial _____
18. Rank the top five major factors you consider in supplier's selection to procure live animal or beef or beef products for export

No.	Factors	Ranking on 1-5 scale
1	Quality of product	
2	Capacity to provide in bulk	
3	Proximity to cargo handling facility/port location	
4	Timely delivery	
5	Flexibility in different arrangements	
6	Affordable price	
7	Ability to provide different products	
8	Capacity to meet urgency	
9	Others (specify) _____	
10	Others (specify) _____	

D. Challenges faced by Exporters in the Halal Beef Export:

19. Ask if the exporter purchased live animals for beef export, then from where they avail the following services, and what are the most important challenges in the service delivery?

No.	Services	Source of services	Challenges in service delivery
1	Slaughtering		
2	Mechanical cutting		
3	Deboning		
4	Freezing		
5	Halal certification		
6	SPS certification		
7	Healthy animal certificate		
8	Testing of lean and fat		

No.	Services	Source of services	Challenges in service delivery
9	Packaging		
10	Cold storage		
11	Cold transportation		
12	Assurance on FMD-free beef or beef products		
13			
14			

20. Ask if the exporter purchased beef or beef products from the slaughterhouse, does slaughterhouse provide the following services and what the most important challenges in the service delivery?

No.	Services	Source of services (S=Slaughterhouse, otherwise mention the name)	Challenges in service delivery
1	Mechanical cutting		
2	Deboning		
3	Freezing		
4	Halal certification		
5	SPS certification		
6	Healthy animal certificate		
7	Testing of lean and fat		
8	Packaging		
9	Cold storage		
10	Cold transportation		
11	Assurance on FMD free beef or beef products		
12			
13			

21. Rank the top five major problems in obtaining various licenses for export of beef or beef products?

No.	Problems	Ranking on 1-5 scale
1	High license fees	
2	Lots of unnecessary documentation	
3	Difficulty in understanding requirements	
4	Large number of permission required	
5	Others, specify	
6		

22. Rank the top five major regulatory issues you face in export of beef and beef products?

Ranking on 1-5 scale	Regulatory issues	Consequences	Suggested policy measures
1			
2			
3			
4			
5			

23. Rank the top five major factors you consider in selecting a target market for the export of beef and beef products.

No.	Factors	Ranking (1-5)
1	Profit margin	
2	Relaxation in FMD-free beef or beef products	
3	Relaxation in SPS measures	
4	Relaxation on animal traceability	
5	Export assistance/subsidy available from the government	
6	Proximity of destination	
7	Ease in market access	
8	Existing Halal beef market potential	
9	Preferential treatment (friendly nations)	
10	Others (please specify)_____	
11	Others (please specify)_____	

24. Rank the top five primary channels you use to locate overseas buyers for the export of beef or beef products?

No.	Problems	Ranking on 1-5 scale
1	Private sources	
2	Direct contact	
3	Directories of importers	
4	All Pakistan Meat Exporters & Processors Association (APMEPA)	
5	Export Promotion Bureau (EPB)	
6	Online tenders	
7	International food conferences	
8	Others (specify)_____	
9	Others (specify)_____	



25. How much time generally do you take in the clearance of your shipment and the realisation of payment by overseas buyers during the last 6 months? (Please specify destination-wise)

No.	Destination	Clearance of shipment	Realisation of payment
1			
2			
3			
4			
5			

26. Rank the top five major bottlenecks/constraints/challenges in Halal beef or beef product export from Pakistan

Ranking on 1-5 scale	Challenges	Consequences
1		
2		
3		
4		
5		

E. Opportunities for enhancing Halal Beef Export:

27. Rank the top five major possible opportunities/suggestions/interventions for increasing Halal beef or beef product exports from Pakistan

Ranking on 1-5 scale	Opportunities/Suggestions/Interventions
1	
2	
3	
4	
5	

F. Do you know GoP efforts on the development of an FMD-free zone in Cholistan and Sheikhpura? _____ Yes/No

G. Do you see the development of the FMD zone in Pakistan as a great opportunity for reaching distant beef export markets? _____ Yes/No

H. Information on Beef Importers in the Middle East

No.	Name	Country	Contact
1			
2			
3			
4			
5			

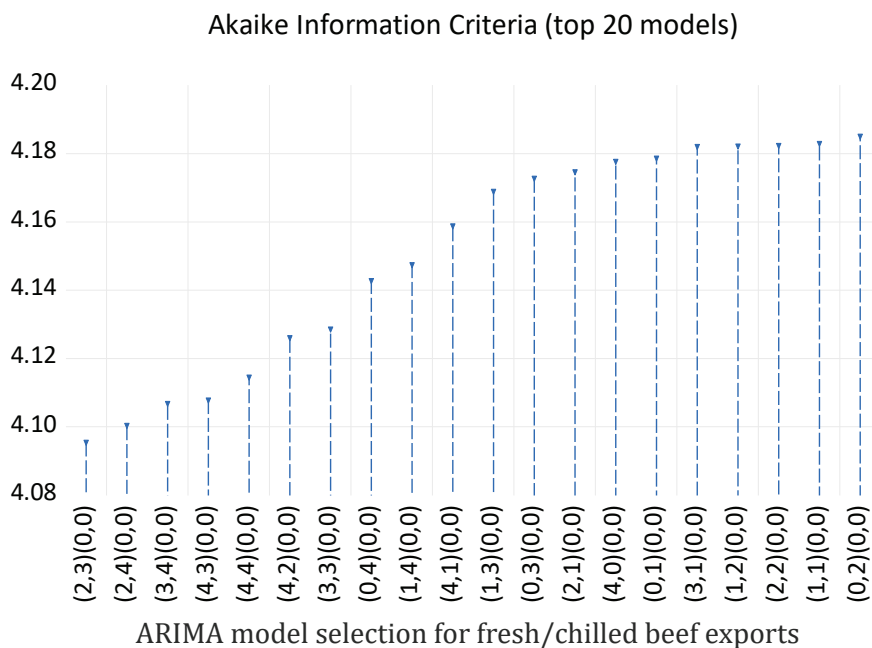
Thank you

Appendix VII: HS Codes for Meat Categories

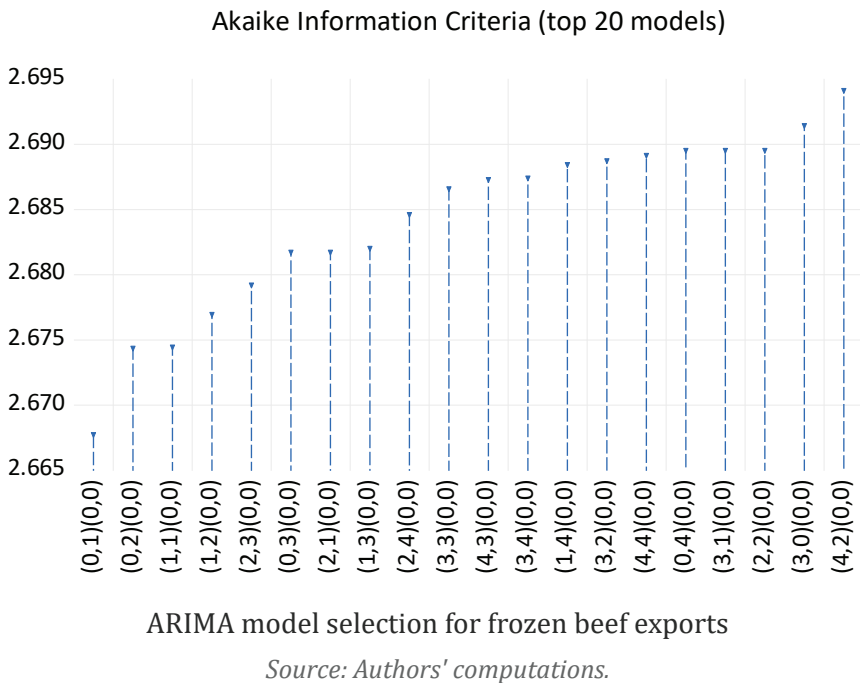
Sr. No.	HS Codes	Meat categories
1	020110	Meat of bovine animals, carcasses and half-carcasses, fresh or chilled
2	020120	Meat of bovine animals, cuts with bone in (excluding carcasses and half-carcasses), fresh or chilled
3	020130	Meat of bovine animals, boneless cuts, fresh or chilled
4	020210	Meat of bovine animals, carcasses and half-carcasses, frozen
5	020220	Meat of bovine animals, cuts with bone in (excluding carcasses and half-carcasses), frozen
6	020230	Meat of bovine animals, boneless cuts, frozen
7	867	Meat of cattle
8	947	Buffalo meat
9	1602509090102	Heat-treated beef

Source: GOP (2024a).

Appendix VIII: Akaike Information Criteria (AIC) for Best ARIMA Model Selection



Source: Authors' computations.



Appendix IX: Air Freight Charges on 2nd January, 2024

Sr. #	Country	Average Air Freight Rate
1	Dubai (Emirates)	358
2	Dubai (RKT)	325
3	Sharja	351
4	Jeddah	192
5	Masqat	287
6	Dammam	336
7	Riyadh	329
8	Bahrain	321
9	Kuwait	409
10	Qatar	357
Total Destination Avg.		326.50

Source: Authors' computations.

UNLEASHING THE POTENTIAL OF PAKISTAN'S IT INDUSTRY: BUILDING FOR MASSIVE SOFTWARE EXPORT GROWTH

Naveed Arshad,¹ Waqar Ahmad,² and Kashif Manzoor³

ABSTRACT

In the current industrial revolution, often referred to as Industry 4.0, the IT sector is the backbone of any country's economy. It drives innovation, efficiency, and growth by enabling seamless communication, data management, and fostering new business models and digital services. This study examines the potential of Pakistan's IT industry, focusing on strategies to enhance software export growth significantly. In the first stage, extensive interviews and expert opinions are gathered from industry representatives of various reputable IT companies in Pakistan. In the second stage, articles and reports related to the topic compiled by credible sources are analysed. In the third stage, a comparative matrix based on 16 key parameters is developed to assess the country's current standing. In the fourth stage, detailed challenges are identified, and comprehensive policy recommendations are designed to monetise our IT export potential fully. The study identifies multifaceted challenges, including inadequate infrastructure, skill gaps, and complex regulatory frameworks, that have hindered the industry's ability to compete globally. The results reveal that while Pakistan's software exports have shown growth in recent years, they remain below par compared to most countries with comparable dynamics. The analysis underscores the need for strategic interventions to unlock the industry's full potential. Based on strategic recommendations, a comprehensive framework has been proposed that addresses multifaceted key measures at both government and industry levels. It emphasises the importance of government support in creating a conducive environment for IT growth. By addressing these challenges and implementing the proposed mechanism of strategic recommendations, Pakistan can significantly enhance its software exports.

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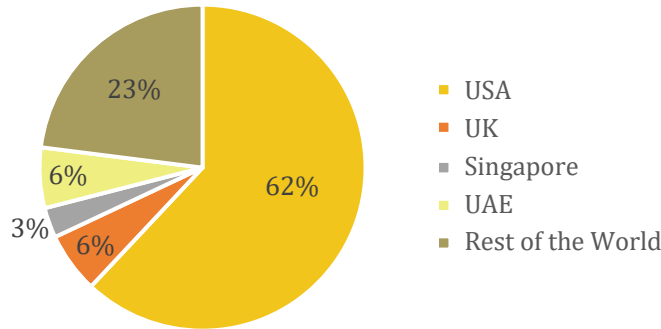
1. INTRODUCTION

The digital age has transformed the way businesses operate, resulting in a surge in demand for software solutions, IT services, and technological innovations. In the current industrial revolution, IT exports are the backbone of any country's economy. Countries that invest in and prioritise their IT sectors can harness significant economic benefits, including job creation, increased foreign exchange earnings, and improved global competitiveness (Chen et al., 2023), (Paschek et al., 2017). Moreover, a robust IT export industry fosters innovation, enhances productivity across various sectors, and drives sustainable economic growth. (OECD, 2019). As technology continues to evolve, the strategic development of IT exports will be crucial for nations aiming to secure a strong position in the global market (McKinsey, 2021).

Pakistan is ranked the 2nd most financially attractive location worldwide for IT-related offshore services (GOP, 2022a). The IT industry in Pakistan has experienced significant growth, characterised by an increasing recognition of outsourcing opportunities and a thriving startup ecosystem. The government's multipronged efforts and encouraging policies have contributed somewhat to the industry's growth. The IT sector is now the second-largest sector in Pakistan's economy after trading (GOP, 2020). However, the industry faces challenges that are common to emerging IT markets. Issues such as inadequate infrastructure and internet connectivity, a skills gap, complex regulatory frameworks, and cybersecurity concerns persist. Additionally, access to finance remains a hurdle for many startups, and the global perception of Pakistan can impact international collaborations. Despite these challenges, the IT sector in Pakistan has demonstrated resilience, and concerted efforts to address these issues could contribute to its sustained growth and development. Bridging the skills gap, improving infrastructure, simplifying regulations, enhancing cybersecurity measures, and promoting a positive global image are crucial for the continued success of the IT industry in Pakistan.

In 2022, Pakistan exported \$2.6 billion worth of software services and products. However, when compared to similar economies such as Argentina (\$9 billion), Egypt (\$5 billion), Vietnam (\$9 billion), and the Philippines (\$26.9 billion), Pakistan's software exports appear less remarkable. The overall export of IT in terms of percentage around the world is shown in Figure 1. From a global trade standpoint, Pakistan's contribution to global exports of Computer Services remains modest, but it has shown growth, rising from 0.17% in 2017 to 0.3% by 2021 (SBP, 2023). However, assessments of Pakistan's export markets and individual firm exports indicate significant potential for enhancement.

Figure 1: Pakistan Software's Services Export (Country-wise)



Source: SBP (2023).

This study seeks to examine the factors influencing the growth and competitiveness of Pakistan's software export industry and outlines strategies for enhancing its global market position in anticipation of the upcoming fifth industrial revolution. The primary objectives of this study are to identify key contributors to the software industry's growth and competitiveness. These factors encompass governmental policies, educational and training initiatives, innovation, research and development (R&D) efforts, and market dynamics. Additionally, the study aims to explore potential strategies for advancing the industry, incorporating technologies such as artificial intelligence (AI), smart contracts, augmented and virtual reality, big data and cloud computing, robotics, cybersecurity, blockchain, and other relevant advancements. Ultimately, the research endeavours to offer recommendations that can guide policies and practices aimed at fortifying Pakistan's software export industry, fostering economic growth in the context of the fifth industrial revolution.

2. LITERATURE REVIEW

In the short term, Pakistan's export growth is highly dependent on the expansion of software exports. The government of Pakistan is taking concrete steps to adopt the latest IT tools for the improvement of the national IT infrastructure, which can raise the growth and productivity of the nation. To boost software exports, the Ministry of Commerce has developed a software development export strategy for 2023-27 (GOP, 2022b). To achieve the development of the software services sector in Pakistan, this strategy provides a roadmap and plan of action geared to accomplish the objectives including strengthening Pakistan's software sector's global market

positioning and international competitiveness, improving the talent availability for growth and competitiveness, improve business climate for software firms to compete and grow, and strengthen innovation and upgrading in the software sector.

The IT industry in Pakistan has faced its share of challenges, hindering the nation's progress toward becoming a regional IT hub. One major obstacle stems from geopolitical issues, contributing to a negative image that dissuades major international IT companies from establishing their development and production offices in the country. While some Pakistani software companies have successfully collaborated internationally, the lack of direct foreign investment has impeded the realisation of the country's full potential. This has led to a phenomenon known as "brain drain," where qualified IT professionals have migrated to the Middle East and North America in search of better technical opportunities and higher salaries.

Pakistan's entry into the global software development sector is relatively recent, presenting numerous challenges in competing with established global markets. Despite these hurdles, Pakistan's emerging software industry holds significant opportunities for growth and advancement. The study tried to provide an accurate portrayal of the country's software sector, highlighting its untapped potential (Shamsi & Nasir, 2016). In the short term, Pakistan's export growth is highly dependent on the expansion of software exports. The government of Pakistan is taking concrete steps to adopt the latest IT tools for the improvement of the national IT infrastructure, which can enhance growth and productivity. To boost software exports, the Ministry of Commerce has developed a software development export strategy for 2023-27 (GOP, 2022b). To develop the software services sector in Pakistan, this strategy provides a roadmap and plan of action geared towards accomplishing specific objectives. These include strengthening Pakistan's software sector's global market positioning and international competitiveness, enhancing talent availability for growth and competitiveness, improving the business climate for software firms to compete and thrive, and fostering innovation in the software sector.

According to a report by the Pakistan Software Export Board (PSEB), the software industry in Pakistan has seen a compound annual growth rate (CAGR) of 26% over the past decade. This growth has been driven by several factors, including the availability of a large pool of skilled IT professionals, government support for the industry, and the low cost of doing business (GOP, 2020). Considering that the Pakistani freelance market is the fastest growing market in the world, online freelancing has had a significant impact on Pakistan's economic growth. It has created thousands of jobs, particularly for

women. Online freelancers can now earn foreign currency, which ultimately benefits the country's economy (Ahsan et al., 2022). The growth in online freelancing has significantly improved the technology infrastructure, i.e., the availability of high-speed internet to far-flung areas of Pakistan (Malik et al., 2018).

However, while minimal infrastructure and institutional support are required for freelance work, freelancers still need to ensure they have the necessary skills, knowledge, and experience to provide high-quality services to their clients. They also need to be self-motivated and disciplined to manage their time and workload effectively (Qadir et al., 2019).

International Experiences

India

India is the leading offshoring destination for IT companies worldwide. The Indian IT & services industry's exponential growth over the last few decades has changed the world's perception of India's IT knowledge and skills. The Indian government is spending around USD 144 billion on information technology to boost the economy (Mathur, n.d.). Technology adoption and encouraging policies, such as reducing trade barriers and import duties on high-tech products, are key aspects in the evolution of the IT industry. Moreover, various initiatives, including special economic zones, export-oriented units, software technology parks, and foreign direct investment, have contributed to India's IT industry achieving a leading global position. The Indian IT sector has contributed around 9.3% of the country's GDP in 2021 compared to 1.2% in 2000. According to the National Association of Software and Service Companies (NASSCOM), the export of IT services (including hardware) stood at USD 75 billion in FY21 (IBEF, 2024).

China

The Chinese IT industry has experienced impressive growth over the last two decades. The IT industry is one of the seven strategic industries that help the country become a world-class high-tech society. The IT industry in China is huge and complex and covers a range of subsectors, companies, and products. China has the largest number of internet users, reaching 900 million in 2023, compared to 22 million in 2000 (Ning, 2009). China's IT market is the 4th largest market in the world after the USA, Japan, and Germany. The Chinese government has invested a total of USD 104.5 billion in the IT industry.

China is the 2nd largest software outsourcing destination after India (China kpmgcom, 2016). The E-commerce and live-streaming industry in the IT sector is the largest in the world. The e-commerce industry grew by 10.4% in 2022 because of the rapid transition from traditional retail to online shopping. With this transition, the e-commerce industry is expected to reach USD 3.3 trillion between 2021 to 2025. The software sector achieves revenue growth of 14% in 2022 and is expected to grow at 28% in 2023 (Interesse 2023).

Bangladesh

Currently, the software industry is one of the most favourable industries in Bangladesh. With the government's support and young, talented professionals, the software industry has seen sharp growth during the last few decades (Shinkai & Hossain, 2011). The software industry not only contributes to Bangladesh's national economy but also creates job opportunities for graduates. There are 4500 software and ICT-based companies registered in Bangladesh, employing over 300,000 software developers and exporting services of around USD 1.18 billion annually (UNCTAD, 2019). The Bangladesh government aims to create a 'Digital Bangladesh' movement that supports digitisation in various ways, like building research centres and waiving taxes for software developing organisations (Mazumdar & Alharahsheh, 2020). Due to these initiatives, software companies in the Netherlands have been collaborating closely with those in Bangladesh for software development and IT services for over two decades. The reduction in cost through cheap labour and the availability of IT professionals make Bangladesh a suitable destination for software outsourcing (Paul, 2022).

Bangladesh has recognised that the software industry is the 'thrust sector' for the economy. Several strategic plans have been developed to enable Bangladesh to adopt the information age and become a significant player in the global software market. For the development of the software industry, technology parks are being established around the country to foster a knowledge-based economy. These parks provide a range of services to companies and investors. The primary aim of these parks is to attract foreign companies to set up operations and to transfer the technology to the local industries (Tjia, 2003).

Argentina

It is indeed impressive to see Argentina's software industry achieving remarkable growth over the last two decades. Although it may be smaller than some of the largest software industries in the world, it has successfully carved out a niche for itself and established a competitive advantage in certain areas (Stamm et al., 2001). One of the primary factors driving this growth is the time zone compatibility with the US and Europe. This enables companies in Argentina to collaborate closely with clients in these regions and deliver responsive, agile software development services. The use of agile methodologies has been particularly successful in this context, as it emphasises close collaboration between developers and stakeholders and requires frequent communication and interaction. Argentina has a robust educational system and a substantial pool of talented and skilled software engineers, which has helped attract foreign clients seeking high-quality software development services at competitive prices (Arora & Gambardella, 2005).

Active policies from local governments have also played a role in supporting the growth of the software industry. In recent years, the government and IT chambers of commerce and associations have worked together to promote the industry and create a favourable business environment for software companies (Barletta et al., 2013). The IT sector offers developing economies a chance to advance rapidly due to its transformative nature and lower entry barriers. It plays a crucial role in enhancing efficiency and productivity across both public and private sectors, potentially impacting various aspects of socio-economic life. However, the success of IT-led advancement depends on factors such as the absorptive capacities of individuals, businesses, and governments, effective coordination among stakeholders, and the availability and accessibility of IT infrastructure.

Scope and Objectives

We identified the essential elements required to enhance the growth of Pakistan's software industry, enabling it to capitalise on the opportunities presented by the fifth industrial revolution. The objective is not only to embrace emerging technologies but also to position the country as a leader in specific niche technologies, establishing itself as the preferred destination for those advancements.

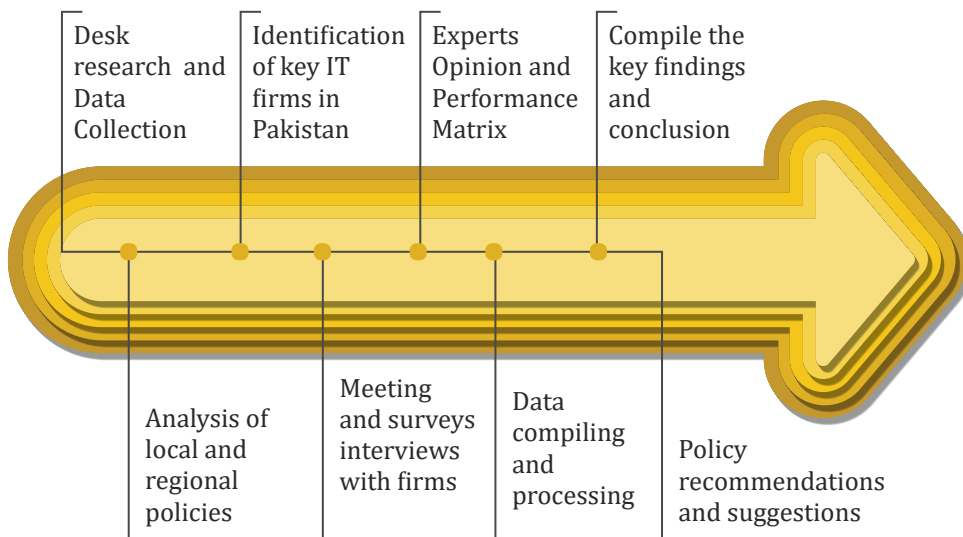
Our research question centres on understanding the factors that influence the expansion and competitiveness of Pakistan's software export industry. We aim to explore ways to further develop the industry, enhancing its global market presence in the fifth industrial wave. This research addresses the challenges faced by Pakistan's software export industry, which, despite some promising growth, has not yet maximised its potential. Despite favourable conditions such as no income tax, minimal regulation, and no mandatory registration, the industry faces challenges that hinder its growth compared to other 'hard' exports. The study aims to pinpoint the factors contributing to the industry's growth and competitiveness, including government policies, education and training initiatives, innovation and R&D activities, and market dynamics. Additionally, we aim to investigate potential strategies for industry development, utilising technologies such as AI, smart contracts, blockchain, augmented and virtual reality, big data and cloud, robotics, cybersecurity, and cyber safety to cultivate specialised expertise in software markets. The goal is to provide insights and recommendations that can guide policies and practices to strengthen Pakistan's software export industry and drive economic growth in the era of the fifth industrial revolution.

Despite consistent software exports, we contend that Pakistan's IT sector has not reached its full potential. While it may be a standout performer among other export sectors domestically, on the international stage, Pakistan ranks 45th in terms of software exports, despite possessing several strengths (GOP, 2022b). Unlike export sectors such as textiles and sports goods, which are tied to the physical flow of inputs and outputs, the software industry faces minimal physical limitations. However, it has struggled to scale up. For instance, Systems Ltd. in Pakistan, Tata, and Wipro in India all began in the late 1970s. However, Systems Ltd is a USD 189 million annual revenue company, whereas Tata Consulting Services (TCS) and Wipro have annual revenues of USD 26 billion and USD 11 billion, respectively, as of 2023. Furthermore, software exports appear resilient to geopolitical issues; for instance, despite ongoing conflict and political instability in Ukraine, its IT industry has experienced steady growth, exporting software services worth approximately USD 4 billion in 2021. To gauge the near-term potential of software exports, Pakistan should ideally be exporting at least USD10 billion, especially when compared to India, which exports USD 156 billion in software services.

3. RESEARCH METHODOLOGY

Analysing software exports from Pakistan and recommending future courses of action to increase software exports requires a combination of quantitative and qualitative research methods. The methodology for the project is divided into various milestones, as illustrated in Figure 2. The study started with comprehensive desk research into published materials on the software industry in Pakistan and globally. This was followed by an analysis of local and regional policies, particularly those impacting the IT sector in South Asia. Key IT-related industries in Pakistan were identified and analyzed to gather relevant data. Subsequently, formal meetings and expert opinions were conducted to administer surveys, involving representatives from various reputable companies in Pakistan, including Confiz Limited, Systems Limited, NetSol Technologies, and others. A performance matrix will be developed based on 16 key parameters to analyse the current standings of Pakistan with respect to other countries. The collected data underwent thorough processing and validation. Based on the findings from this analysis and performance matrix, a key challenge was identified, and then detailed policy recommendations were formulated for both government and industry that can provide a comprehensive understanding to develop a roadmap to enhance IT exports.

Figure 2: Description of the Project and Proposed Methodology



Source: Authors' computations.

Data Research: Data on the software industry in Pakistan, including information on the number of software firms, types of software exported, target markets, and revenue generated, has been gathered. This data was sourced from government reports provided by PSEB, industry associations such as P@SHA, and other key sources relevant to the topic.

Analysis of Local and Regional Policies: Local government policies are evaluated to identify the potential understanding of the challenges and operation of the IT industry. Based on these policies, an interview-survey-based questionnaire has been developed, which is used to gather insights from key IT companies. Moreover, case studies have been utilised to examine the individual software exporters in depth. More than 15 companies of varying sizes are selected to identify the strategies and best practices, as well as the challenges and barriers they face. An oversight has been conducted, and also looked at how they will be looking at being competitive in the fifth industrial revolution.

Identification of Key IT Companies and Training Institutions: In Pakistan, prominent IT companies include Systems Limited, NetSol Technologies, and Arbisoft, known for their software development and IT solutions. The burgeoning IT sector in Pakistan is witnessing growth, with a focus on innovation and talent development, positioning the country as a hub for technological advancement. In this study, 5 top-tier companies and 12 SMEs were selected from different cities across the country, including Islamabad, Lahore, Peshawar, and Karachi, to conduct surveys and interviews. In the top-tier category, companies like Confiz Limited, System Limited, NetSol, and DataPilot are selected while in medium-tier categories, different SMEs like Rapidev, Amazon Seller Society, The Creative Street, and others are selected.

Surveys and Interviews: Surveys and interviews have been used to gather information from software exporters, including top-tier companies, SMEs and experts from different top-tier IT organizations. Quantitative data on software exports from PSEB, PBS, SBP, and others have been gathered, while interviews are used to gather qualitative insights on the experiences and perspectives of software companies. This approach is expected to gain insight into the perspectives of current international and national software customers to assess their current and future inclinations in software development.

Experts Opinion and Performance Matrix: An expert opinion from Systems Limited and Confiz Limited is utilised to develop a comparative performance matrix based on 16 key parameters critical to enhancing the IT industry in developing countries, particularly Pakistan. These parameters are taken to identify the current standings of the country in IT exports. Based on experts' opinions, this matrix helped identify potential areas and challenges that can be addressed in the short term and those that require long-term effort. Based on this matrix, the significant challenges are identified, which later helped to develop strategic recommendations for both government and industry.

Key Challenges Identification: Based on the performance matrix and a comparative analysis of Pakistan with other countries of a similar scale, key challenges have been identified, which have assisted in developing strategic key recommendations. The challenges are identified at both governmental and industry levels. Moreover, the challenges are divided based on the time span, including those that can be addressed in the short term and those that require a longer time and effort.

Compilation of Key Findings: In the second-last stage, the results and findings are compiled along with the concluding remarks. At this stage, again, some statistics related to human resources and the capability of the current infrastructure, as well as the operational nature of foreign organisations, including TATA from India, are collected to draw a thoughtful comparison of this study's findings, and based on these comprehensive discussions, the findings are presented.

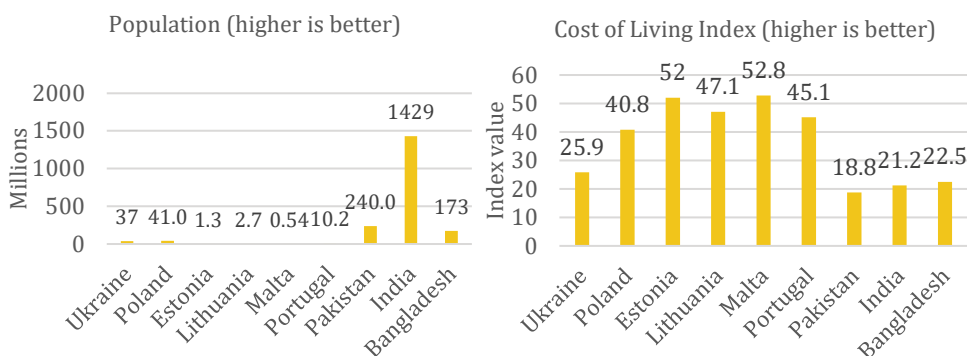
Policy Recommendations: Finally, policy recommendations are developed that can help create a roadmap to enhance the IT sector's infrastructure. These recommendations are organised into two separate categories. In the first category, national-level recommendations have been developed that purely focus on suggestions and recommendations for government-related stakeholders. In the second category, strategic recommendations are developed for the industry as a whole. Based on these recommendations, both the government and the industry can work together to mutually uplift Pakistan's IT sector.

4. COMPARATIVE MATRICES OF EVALUATING COUNTRIES BASED ON MACRO-INDICATORS

A thorough analysis was conducted by developing comparative matrices to evaluate countries based on different macro indicators. These indicators play a vital role for IT companies when deciding where to outsource their work. The comparative analysis, with a complete description of Pakistan's current standings with respect to different indicators, is summarised below in Subsections 4.1 to 4.9. These countries include Ukraine, Poland, Estonia, Lithuania, Malta, Portugal, India, and Bangladesh. They were selected to develop a performance matrix because they share many common scenarios with Pakistan. For example, like Pakistan, Ukraine is also facing challenges such as the war on terror and poor economic conditions over the past few decades. Similarly, Bangladesh shares geographical and socio-economic backgrounds with Pakistan.

Population and Cost of Living: As shown in Figure 3, with a population of almost 240 million, Pakistan offers a vast pool of talent and potential consumers for software products and services. On the other hand, managing and harnessing this demographic dividend effectively requires concerted efforts in education, training, and employment generation. Additionally, Pakistan's low cost of living can potentially offer a competitive advantage, making it an attractive destination for outsourcing and investment in the IT sector.

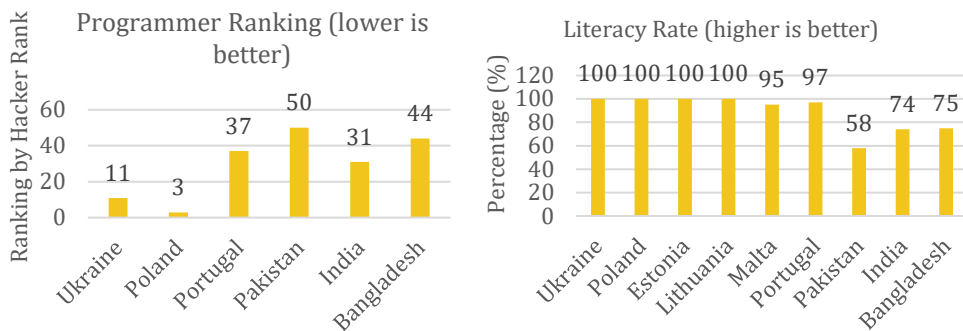
Figure 3: Performance Metrics Based on Population and Cost of Living in Evaluating Countries



Sources: Numbeo (n.d.) & Worldometers (n.d.).

Programmer Ranking and Literacy Rate: The low ranking of Pakistani programmers according to Hacker ranking highlights the need for significant improvements in technical skills and expertise within the workforce, as shown in Figure 4. This reinforces the importance of revamping the education system to prioritise STEM education and offer opportunities for ongoing learning and professional development.

Figure 4: Performance Metrics Based on Programmer Ranking and Literacy Rate in Evaluating Countries

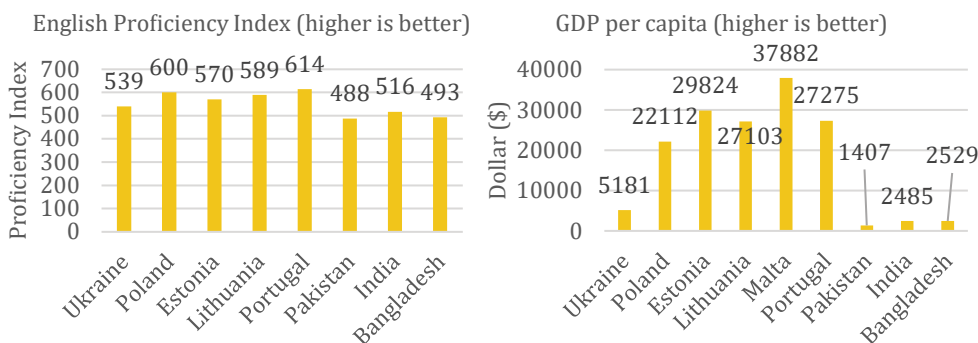


Sources: World Population Review (2024c) & Trikha (2016).

Moreover, addressing Pakistan's relatively low literacy rate is imperative for ensuring broader access to quality education and creating a skilled workforce capable of competing on a global scale. Despite its demographic advantage, Pakistan faces challenges in programmer ranking and literacy rates.

English Proficiency and GDP: Improving English proficiency is crucial for Pakistan's successful integration into the global IT market, where English serves as the predominant language of communication. As depicted in Figure 5, Pakistan's relatively low GDP per capita highlights disparities in wealth distribution across the population. Strengthening English language skills through targeted training programs and educational reforms can play a pivotal role in bridging this gap. As once every class of society has a reasonable command of the English language skills, the wealth distribution will be uniform. Proficient English communication facilitates better engagement with international clients and partners, fostering smoother collaboration and enhancing the country's competitiveness in the global economy. By equipping a larger portion of its workforce with strong English capabilities, Pakistan can foster inclusive economic growth, ensuring that all segments of society have access to and benefit from opportunities in the burgeoning IT sector and beyond.

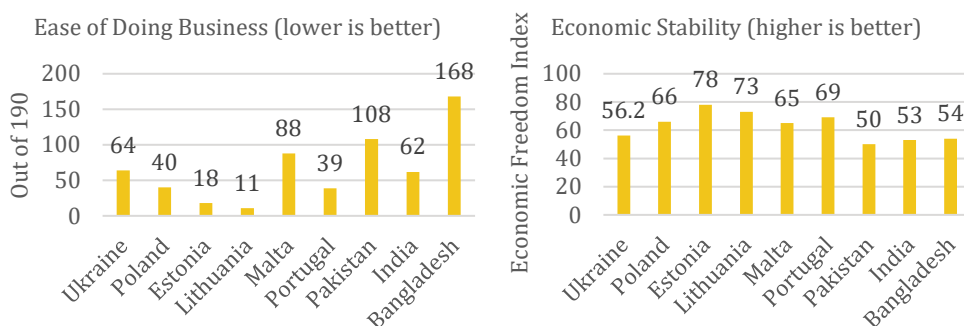
Figure 5: Performance Metrics Based on English Proficiency and GDP in Evaluating Countries



Sources: World Population Review (2024b) & World Bank (n.d.b).

Ease of Doing Business and Economic Stability: The comparative analysis based on ease of doing business and economic stability is shown in Figure 6. Improving Pakistan's ranking in ease of doing business requires reforms aimed at streamlining bureaucratic procedures, reducing red tape, and enhancing investor confidence. Creating a conducive business environment with clear regulatory frameworks and efficient dispute-resolution mechanisms is essential for attracting domestic and foreign investment in the IT sector. Moreover, ensuring economic stability through sound macroeconomic policies and fiscal discipline is crucial for fostering long-term sustainable growth.

Figure 6: Performance Metrics Based on the Ease of Doing Business and Economic Stability in Evaluating Countries

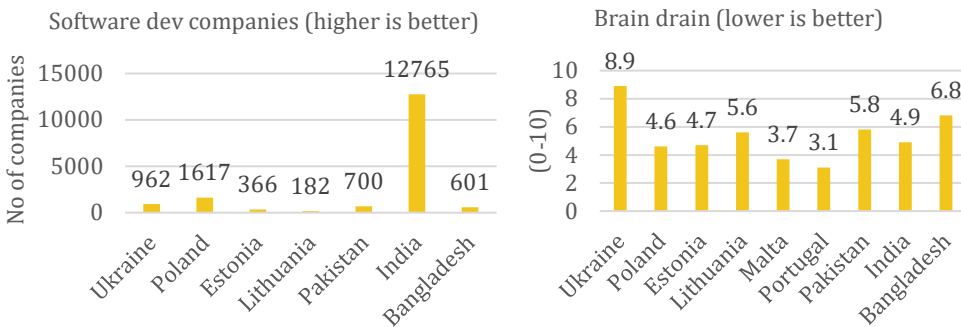


Sources: World Bank (n.d.a) & Heritage.org (n.d.).



Existing IT Infrastructure and Brain Drain: As shown in Figure 7, while Pakistan has seen a growth in the number of IT companies as compared to Estonia, Lithuania, and Bangladesh, there is a requirement to set up tier IT companies in Pakistan. The disparity between its IT ecosystem and those of neighbouring countries indicates room for improvement. Strengthening the IT infrastructure, fostering innovation and entrepreneurship, and providing incentives for technology startups are key to nurturing a vibrant IT ecosystem. Additionally, addressing the brain drain phenomenon requires measures to retain and incentivise talented individuals, such as offering competitive salaries, career advancement opportunities, and a conducive work environment.

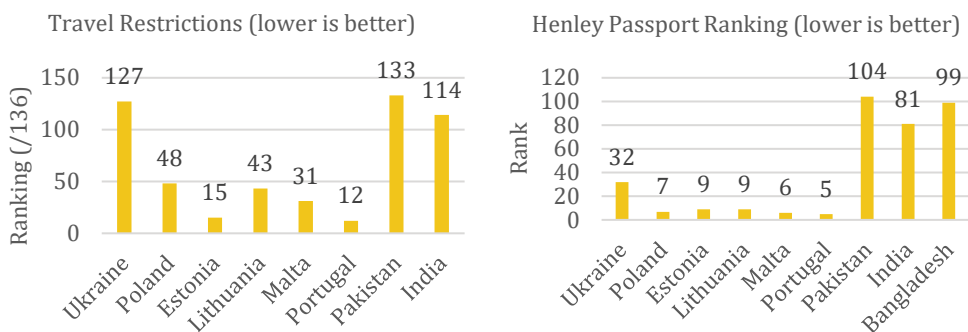
Figure 7: Performance Metrics Based on Existing Software Development Companies and Brain Drain in Evaluating Countries



Sources: World Population Review (2024a) & Lusha (n.d.).

Travel Restrictions and Passport Ranking: Excessive travel restrictions are shown in Figure 8, Pakistan's ability to engage in international business activities, attend conferences, and collaborate with global partners. Addressing these restrictions through diplomatic efforts, visa facilitation agreements, and improving border security measures can help enhance Pakistan's connectivity and integration into the global IT community. Moreover, improving Pakistan's passport ranking is essential for enhancing the mobility of its citizens and promoting cross-border exchanges of talent and ideas.

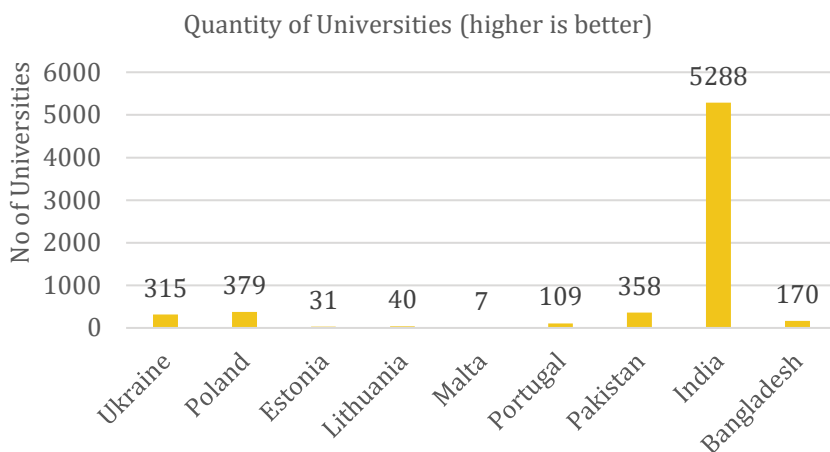
Figure 8: Performance Metrics Based on Travel Restrictions and Passport Ranking in Evaluating Countries



Source: Henley & Partners (n.d.).

Education Perspective: While Pakistan possesses a significant number of universities, as shown in Figure 9, ensuring the quality and relevance of education is crucial for producing skilled graduates who can meet the demands of the IT industry. Education plays a critical role in shaping societal values and governance. Educated populations provide a skilled workforce that is adept in technological innovation and adaptation, which is crucial for advancing the IT sector. Investing in modernising curricula, upgrading educational infrastructure, and promoting critical thinking and problem-solving skills are essential for fostering innovation and competitiveness.

Figure 9 Performance Metrics Based on the Number of Universities in Evaluating Countries

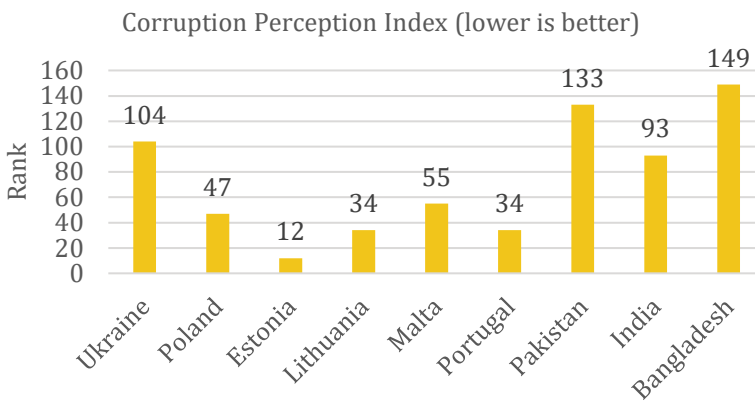


Source: Flag Pictures (n.d.).



Corruption Perception: Unfortunately, according to the statistics shown in Figure 11 Pakistan is suffering from the highest corruption index as compared to other countries. Combating corruption is paramount for creating a level playing field and instilling trust in the business environment, both domestically and internationally. Corruption often leads to higher costs for businesses due to bribes, kickbacks, and other forms of unofficial payments. These additional costs can hinder IT companies' ability to invest in growth. Corruption can create an uneven playing field where companies that engage in corrupt practices gain an unfair advantage over those that do not. This can discourage honest companies from entering or staying in the market, reducing overall industry competitiveness. Finally, on the whole, corruption damages the country's image, making it difficult for other countries and reputable IT organisations to collaborate, which consequently reduces opportunities for collaboration.

Figure 10: Performance Metrics Based on Corruption Perception Index in Evaluating Countries

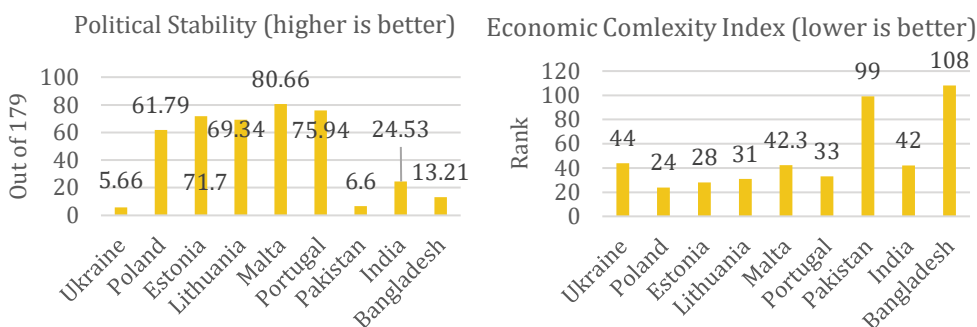


Source: Transparency International (n.d.).

Political and Economic Complexity: Based on the political and economic complexity index, as shown in Figure 11, Pakistan faces significant challenges in both domains compared to other countries. High political complexity, often characterised by unstable governance, frequent changes in political leadership, and policy uncertainty, can create an unpredictable business environment. This unpredictability can deter foreign investment and complicate long-term planning for both local and international IT firms, thereby hindering the growth of IT exports. Similarly, economic complexity, which includes factors such as regulatory burdens, inefficient infrastructure, and difficulties in accessing finance, can further inhibit the growth of the IT sector. These economic hurdles can increase operational costs, reduce

competitiveness, and limit the ability to scale up production and export activities. As seen from the above comparative matrices based on the top 16 critical parameters, Pakistan's image as a country is not up to the mark. However, a country has immense potential and holds some favourable standings with respect to certain parameters, such as the cost of living. To leverage the current potential of Pakistan, some key measures are necessary to address the above-discussed challenges in the IT sector.

Figure 11: Performance Metrics Based on Political Stability and Economic Complexity Index in Evaluating Countries



Sources: World Population Review (2024d) & Growth Lab (n.d.).

5. MAJOR CHALLENGES

The burgeoning IT industry in Pakistan faces numerous challenges that hinder its growth and global competitiveness. These challenges span government-related issues, industry-specific hurdles, and hybrid obstacles that intertwine various facets of the sector. These challenges are drawn from the findings and potential interviews with the companies as well as the performance matrix. Addressing these critical areas is essential for fostering a robust, innovative, and sustainable IT ecosystem that can drive substantial economic development.

National-level Challenges

Political and Economic Instability: Political and economic instability introduces uncertainty for investors, leading to reduced funding for startups and infrastructure. It also undermines market confidence, delaying IT investments and impacting overall demand. Moreover, when a government begins to outline constructive roadmaps and policies, non-democratic

elements may unlawfully attempt to destabilise it mid-tenure. Consequently, these policies often remain unfulfilled, creating a persistent gap in the IT sector when new governments take office and fail to continue their predecessors' initiatives. On the other hand, economic instability curtails government spending on essential digital infrastructure, which in turn affects competitiveness. Currency fluctuations and trade barriers during periods of political tension can further hinder export viability and profitability.

Poor Tracking and Operational Hygiene: Inadequate tracking mechanisms and poor operational hygiene are prevalent issues within the IT industry. These deficiencies result in inefficiencies, reduced competitiveness, and subpar service delivery. Implementing stringent governance policies, regular performance tracking, and maintaining operational hygiene are critical to ensuring consistent quality and operational efficiency.

Limited Focus on Building the IT Industry: There is a noticeable lack of concerted effort to build and promote the IT industry as a whole. A coordinated approach involving government support, industry alliances, and educational institutions is needed to create a vibrant ecosystem. This ecosystem should support innovation, growth, and global competitiveness, thereby fostering a robust and sustainable IT industry.

Industry-focused Challenges

Incoherent and Poorly Thought-Through Strategies: Many IT firms in Pakistan suffer from incoherent and poorly developed strategic frameworks. This incoherence is often due to insufficient market research, a lack of clear objectives, and a reactive rather than proactive approach to business planning. Without a coherent strategy, firms struggle to sustain growth and adapt to the dynamic nature of the global IT market, leading to missed opportunities and suboptimal performance.

Either a Sales-Heavy or an Engineering-Heavy Focus: There is a prevalent imbalance within IT firms between sales and engineering focus. Companies that prioritise sales may lack the technical robustness to deliver on promises, leading to customer dissatisfaction. Conversely, firms that are engineering-heavy may struggle to market their products and services effectively, missing out on revenue opportunities. Achieving a balanced focus that integrates strong sales strategies with robust engineering capabilities is essential for sustainable success.

Lack of Inorganic Growth: The IT sector in Pakistan has shown limited engagement in mergers, acquisitions, and strategic alliances, which are critical for rapid expansion and competitiveness. Inorganic growth through these means enables firms to scale their operations quickly, acquire new technologies, and enter new markets. The lack of such strategic initiatives limits the industry's ability to grow beyond organic means and capitalise on global opportunities.

Investing in Growth from Profits: Relying solely on profits for reinvestment significantly constrains growth potential. IT firms require substantial and timely investments to scale their operations, innovate, and compete on a global scale. Limited reinvestment from profits delays expansion efforts and prevents companies from seizing emerging market opportunities, thereby hindering their competitive edge. Any new technology or business opportunity provides a narrow window of opportunity in the IT sector. Therefore, if companies are not agile and do not have instant capital, they may miss the opportunity or be unable to take full advantage of it.

Non-Existent or Inefficient Board of Directors: Many IT firms operate without a robust governance structure and an efficient board of directors. The absence of a strategic and oversight-focused board leads to poor decision-making, a lack of accountability, and strategic misalignment. Establishing effective boards that provide strategic direction, ensure accountability, and drive operational excellence is crucial for sustainable growth.

Customer Churn: High customer churn rates often reflect dissatisfaction with service delivery, which is frequently attributed to inconsistent quality, inadequate customer service, or a lack of innovation. Retaining customers requires a strong focus on improving service quality, offering personalised solutions, and maintaining ongoing engagement. Reducing churn is crucial for establishing long-term client relationships and driving sustainable revenue growth.

Wealth Sharing Formula: Inequitable wealth-sharing models within IT firms create internal discontent and reduce employee motivation. Implementing fair and transparent profit-sharing mechanisms can incentivise employees, enhance productivity, and foster loyalty. Equitable wealth sharing is sustaining growth in the highly competitive IT sector.

Founder's Syndrome: Founder's syndrome, characterised by possessiveness and delegation/trust issues, is a significant barrier to growth in many IT firms. Founders who are unable or unwilling to delegate responsibilities and develop successors limit the firm's capacity to scale and attract high-potential leadership talent. Overcoming this syndrome requires building a strong leadership team and establishing a culture of trust and delegation, enabling the firm to grow beyond the founder's direct control.

Founders' Lack of Pressure to Grow: Many founders lack external pressure to aggressively pursue growth, often because they are satisfied with their current achievements. This complacency prevents firms from reaching their full potential. Establishing growth targets, promoting external accountability, and fostering a culture of continuous improvement can drive more ambitious growth agendas and enhance the firm's competitive position.

Inefficient, Non-Scalable Engineering Excellence and People Policies: Current engineering practices and people policies within many IT firms are inefficient and non-scalable. Implementing standardised best practices, continuous improvement frameworks, and scalable people management strategies is critical. These measures will drive engineering excellence, enhance productivity, and enable firms to scale operations effectively, supporting long-term growth and competitiveness in the global market.

Multidimensional Challenges

Dependency on the Growth of Limited Products: Pakistan's IT industry has primarily relied on a narrow range of commoditised products such as BPO and basic software development services, for the growth of the industry. While these sectors provided initial growth opportunities, they are prone to rapid saturation due to high competition and minimal differentiation. As global demand evolves towards more innovative and high-value IT services, this dependency on a limited range of products constrains the industry's potential for sustainable expansion and value creation.

Poor Engineering, Economics, and Network/Negotiation Skills: The industry's talent pool demonstrates an imbalanced mix of expertise in Engineering, Economics, and Network/Negotiation skills. This imbalance restricts the ability to innovate and effectively compete in international markets. Engineering prowess alone cannot drive growth without complementary economic strategies and strong negotiation skills to forge and maintain global partnerships. Enhancing this skill mix is crucial for the holistic development of the IT sector.

Talent Challenges: The IT industry in Pakistan faces considerable challenges in accessing the right kind of talent. These challenges include brain drain, skill gaps, and retention issues. The continuous migration of skilled professionals to other countries for better opportunities depletes the local talent pool. Addressing these challenges through robust talent development programs, upskilling initiatives, and creating attractive career prospects is essential to retaining and nurturing top talent within the country.

6. RESULTS AND FINDINGS

A comprehensive understanding, derived from top-level companies, SMEs, and expert opinions, indicates a strong demand for enhanced education and training programs to bridge the skill gap in Pakistan's IT sector. There is a clear call for academia-industry collaboration to align educational outcomes with market needs, alongside the necessity for government support in providing financial incentives and fostering a conducive environment for startups and emerging technology sectors.

A comparative analysis with other economies highlights Pakistan's competitive advantages and disadvantages. While Pakistan's IT sector is burgeoning, it lags in infrastructure, regulatory frameworks, and innovation ecosystems, emphasising the need for policy reforms and investment in digital infrastructure to enhance competitiveness. Despite these challenges, Pakistan holds immense potential and possesses several competitive advantages, including a low cost of living. Leveraging this potential requires addressing the issues discussed earlier in this study that impede the growth of Pakistan's IT sector, including reliance on a limited range of products, imbalanced skill sets, incoherent strategic frameworks, and financial constraints. Additionally, travel restrictions, corruption perception, and issues with education quality further complicate the landscape. Addressing these challenges requires a multifaceted approach that encompasses educational reform, regulatory improvements, investment promotion, talent retention, and anti-corruption measures.

Infrastructure challenges, such as poor internet connectivity and high operational costs, coupled with a significant skills gap in technical and professional areas, are also significant barriers. Recommendations include modernising curricula, enhancing practical training, and fostering industry-academia collaboration to ensure a steady supply of skilled graduates. The role of government support is crucial, with companies advocating for financial incentives, tax benefits, and initiatives to create a

supportive ecosystem for startups. Additionally, fostering international collaborations and staying aligned with global market trends is critical for maintaining competitiveness. Financial constraints, such as funding issues and increased operational costs, are common concerns among surveyed companies. Recommendations to mitigate these challenges include government subsidies, improved access to financing, and policy measures aimed at reducing operational costs. Strategic recommendations emphasise the importance of balancing sales and engineering efforts, promoting inorganic growth through mergers and acquisitions, and enhancing strategic planning within firms. These measures are crucial for fostering a resilient and competitive IT sector that can sustain growth and drive innovation.

Three main components underpin any IT industry: human capital, power/electricity provision, and hardware assets. Given the minimal operational costs associated with hardware assets, human capital becomes the primary component of the industry. According to the P@SHA report on the greater skills gap divide in 2022, Pakistan produces approximately 10,000 IT or tech graduates each year, but only 10% are deemed employable (P@SHA, 2023b). To achieve a target of \$10 billion in exports, requiring 280,000 engineers, it would take 110 years at the current rate. The primary issue is the insufficient supply of human resources, making it a supply-constrained industry. As a result, companies often secure contracts and sales but struggle to find the necessary human resources (engineers and other IT/CS/tech experts) in the local market. Consequently, these companies end up poaching talent from other firms. Fresh graduates join a company and, after six months of gaining expertise through company investment, receive job offers from other companies. This cycle continues, resulting in inefficiencies within the supply chain.

Additionally, various taxes on human capital reduce the cost, ultimately decreasing sales and making the industry less competitive. The brain drain further depletes the existing human capital, reducing the local IT industry's competitiveness compared to other countries. In contrast, companies in other countries, such as TATA and Infosys in India, can collaborate with major companies like Microsoft and Google. In Pakistan, the government's efforts to incentivise the freelance market while disincentivising major IT companies discourage large companies from establishing a presence in the country, resulting in a lack of significant partnerships with major companies like Microsoft. Moreover, the absence of taxes on freelancers leads many IT-related SMEs to establish holding companies in other countries, offering tax-free salaries to their employees. This approach keeps the complete profit in the banks of those countries, while only the costs are borne by Pakistan.

7. CONCLUSION

This study has highlighted the significant potential and challenges faced by Pakistan's IT industry in its pursuit of substantial growth in software exports. The key findings indicate that while Pakistan's IT sector has shown promising growth, it remains underutilised compared to its global peers. The country's software exports, although growing, are still dwarfed by those of countries like India, Vietnam, and the Philippines. It identifies significant issues, including political and economic instability, a limited government focus on building the IT industry, incoherent industry strategies, and a substantial skills gap between graduates and industry requirements. Despite these challenges, the IT sector in Pakistan has substantial potential for growth, provided targeted policy interventions and strategic industry practices are implemented. Strategic recommendations include diversifying IT services, fostering innovation, integrating multidisciplinary education and professional development, balancing engineering and sales efforts, and addressing the founder's syndrome. It also emphasises the importance of strong governance, effective boards, and workforce training to bridge the gap between low-skilled and high-skilled workers. Encouraging international companies to open offices in Pakistan and promoting companies to list themselves on the stock exchange is crucial for long-term growth. By addressing these challenges, the collaborative efforts of policymakers at the government level, industry leaders, and educational institutions are essential in building a robust and competitive IT ecosystem.

8. POLICY RECOMMENDATIONS

To propel Pakistan's IT industry into a robust era of sustainable growth and global competitiveness, strategic policy interventions are essential across both short-term and long-term horizons. By aligning these initiatives with international standards and fostering a conducive environment, Pakistan can leverage its IT potential to attract global investments, empower local talent, and establish itself as a significant player in the global technology landscape, thereby increasing its IT export level in the international market.

Policy Recommendations for Government

Diversifying IT Services and Fostering Innovation: It is imperative to diversify IT services and products in order to avoid reliance on a limited number of products for the growth of the IT industry. The value proposition of the sector can be significantly improved by promoting innovation in fields such as cloud computing, blockchain, artificial intelligence, and cybersecurity. It can be further improved by dedicating special effort to the IoT and Embedded Systems, as these are also the key areas in today's digital era. However, the import of heavy-duty hardware and embedded components is impeding development in this area. The government can boost this area by revising the heavy-duty policies and providing some relaxation on imports. To achieve this, a strong innovation environment will be fostered by offering tax exemptions, grants, and subsidies to IT companies that choose to enter specific high-growth, prospective areas. Additionally, creating innovation centres and technology parks with cutting-edge facilities and boosting industry-academia collaboration for research and development in emerging technologies can draw in both domestic and foreign tech companies, fostering value creation and sustained growth.

Integrating Multidisciplinary Education and Professional Development: Academic institutions should incorporate multidisciplinary curricula that blend technical, economic, and interpersonal skills. Together with incentives for effective implementation, government cooperation with educational institutions to develop curricula that integrate multiple subjects can ensure a consistent supply of graduates who are well-rounded in both technical and interpersonal perspectives. Professional development programs will also help today's IT professionals stay competitive in the global economy.

Balancing Engineering and Sales: Encouraging IT companies to prioritise engineering and sales equally is essential for long-term success. A comprehensive strategy can be promoted via management training programs that stress the value of both technical and sales skills, as well as case studies and seminars on the effective fusion of both endeavours. Government-funded training programs can help IT workers develop dual skills by highlighting best practices and providing IT companies with a forum to discuss tactics and share experiences.

Curriculum Alignment: The curriculum should be focused and aligned with both international standards and our local industry requirements. Apart from imparting fundamental knowledge, there is a need for agility in the Higher Education Commission's (HEC) curriculum revision process, enabling

universities to adapt their course offerings promptly. However, ensuring the availability of highly qualified instructors at every institution for core courses remains a challenge. To address this, a hybrid model of course delivery could be implemented, leveraging online courses from reputable platforms like LUMSx, Coursera, MITx, and others. Looking ahead, industry-specific knowledge will outweigh purely technical coding skills. Developing industry-relevant courses can be facilitated through closer collaboration with industry experts in curriculum design. Assessment methods should also evolve towards more comprehensive mechanisms, such as the testing protocols used by Confiz Limited, to accurately gauge the preparedness of graduates and align them with appropriate career paths. This approach will establish a benchmark to assess the proficiency of graduates from various universities.

Taxation on Human Capital: Various taxes on human capital reduce local cost competitiveness, ultimately decreasing sales and making the industry less competitive globally. The brain drain further depletes the existing human capital, diminishing the local IT industry's competitiveness compared to other nations. When compared with other countries, including Bangladesh, India, the UK, and the UAE, with respect to tax based on an individual salary of \$2,000, Pakistan has the highest personal income tax rate of 24% for average IT developers. A high taxation regime on salaries often leads local companies to consider establishing holding entities in other countries, contributing to brain drain or resorting to illicit channels for financial transactions. Currently, a tax rate as high as 40% is imposed on salaries of 800k PKR (P@SHA, 2023a), a level unimaginable in Scandinavian countries at this salary range. If the government aims to bolster the IT industry, it should protect its workforce and implement a more lenient taxation policy. Viewing IT services as part of the international market, rather than solely as a domestic market, can also enhance competitiveness.

Increase the Holding Capability of Dollar Account: To enhance the economic flexibility and stability of IT companies in Pakistan, it is essential to advocate for policies that support the expansion of dollar account capabilities within the country. Allowing IT companies to maintain dollar accounts domestically eliminates the need for opening accounts abroad, streamlining financial operations and reducing foreign exchange risks. By enhancing the holding capacity of these accounts, the government can empower IT firms to manage international transactions more efficiently, thereby fostering a conducive environment for business growth and investment.

Government Procurement: In many government procurement cases, Pakistani companies receive no significant advantages. Often, conditions are imposed that exclude Pakistani companies from participating in competition. For instance, consider the requirement to develop a wind forecasting system in Pakistan, a task purely within the realm of software services. The bidding conditions demand a company to have at least 10 years of experience, operations in at least 10 countries, and prior service to a 100 MW wind power plant. These stringent criteria effectively exclude Pakistani companies, even those with relevant experience in developing wind forecasting systems. Currently, Pakistani government procurement policies appear biased against local companies. The government must prioritise local companies, which would not only support their growth but also enable them to compete internationally.

Strong Governance and Effective Boards: The promotion of robust governance frameworks and effective boards of directors will drive operational excellence in IT companies. Accountability and strategic alignment can be improved by providing board members with training on best practices for governance and by providing government incentives to companies that adopt robust governance structures. Certification programs for board members, along with policies on corporate governance, strategic oversight, risk management, and ethical leadership, will ensure industry-wide high standards. It is imperative that IT organizations improve their governance, performance tracking, and operational hygiene.

Gap between Low-skilled and High-skilled Workers: The integration of AI has significantly impacted and reduced the number of entry-level jobs. High-skilled workers can enhance their productivity by up to tenfold through the effective use of AI, whereas low-skilled workers may not achieve comparable gains. In India, the IT industry experienced substantial growth driven by BPO (Couto et al., 2019), which involved low-complexity tasks requiring minimal technical skills and training. However, with the advent of AI, the relevance of BPO is diminishing, and its prominence in Pakistan is also declining. In the near future, AI is expected to increasingly replace tasks at higher skill levels. According to the CEO of NVIDIA, a leading global IT firm, the emphasis should shift towards problem-solving and critical thinking skills rather than solely focusing on coding abilities. This sentiment is echoed by the CEO of Arbisoftware, who highlights the skill gap among Pakistani fresh graduates. Furthermore, there should be an increased emphasis on cross-functional education to prepare graduates for the diverse challenges they will face. To mitigate brain drain and enhance the quality of local talent, there is a need for

a scalable, autonomous digital platform that can provide affordable university education to a broader audience of young learners. This scalability would reduce the cost of education and improve accessibility across the board.

Encourage International Companies to Open Offices in Pakistan: The government should encourage international companies to establish offices in Pakistan by creating a favourable business climate through regulatory reforms, tax incentives, and fostering relationships with global tech giants. Incentives are crucial in this regard. It is important to note that political and economic instability is not the primary reason hindering such initiatives. Many leading companies, such as Microsoft, have established offices in countries like Ukraine and Kenya, despite challenges to stability. To attract international companies, the government can adopt a strategy that favours companies that establish offices and invest in Pakistan. Furthermore, addressing the challenges faced by freelancers and SMEs operating abroad can be achieved by implementing balanced tax policies that encourage local operations while ensuring fair tax contributions.

Focus on Intrapreneurship vs. Entrepreneurship: Entrepreneurship is a highly sought-after concept worldwide, and our government has also initiated various initiatives to foster entrepreneurship. However, on the other hand, it creates many small start-ups with limited avenues for growth. Similar to entrepreneurship, the government should also focus on intrapreneurship, where employees can find avenues to pursue new ideas within the bounds of their current employers. The same resources that the government is investing in entrepreneurship may also be applied to intrapreneurship, which is likely to yield new ideas. In this way, existing companies do not have to invest all their financial resources, but in case the idea succeeds, the founders have an umbrella to grow the idea. In Europe, this type of intrapreneurship is facilitated through programs like Horizon Europe and has successfully contributed to the growth of IT companies.

Encourage the Companies to List Themselves in the Stock Exchange: The government should encourage companies to list themselves on the stock exchange and open up investment opportunities. To achieve this, rules and regulations should be streamlined and made more accommodating. Moreover, listing on the stock exchange enhances accountability and cultivates a culture of financial discipline among companies. This approach aligns with global best practices and appeals to institutional investors seeking diversified investment opportunities in Pakistan.

Define the IT Sector as a Niche: Pakistan should identify and prioritise the IT industry as a strategic niche for national development. By focusing on this industry, the country can leverage its expanding tech talent pool and establish a robust digital economy. To be more specific, the government should focus on a key segment of the IT industry, such as finance, cybersecurity, or software development, and allocate resources to its expansion.

Promote Local Development of Systems: Pakistan should stop depending on costly imports from international businesses and instead invest in building local capacity to produce computer systems and related technologies. Through the development of a domestic manufacturing sector, the country could reduce costs, generate employment, and boost GDP. The initiative would improve Pakistan's technological independence while also making technology more accessible and cheaper for local companies and consumers. A good niche in manufacturing is the IoT sector, which has heavy duties and taxation on its required components, such as ICs, capacitors, and resistors. It is strongly recommended to include the IoT industry as part of the IT industry with the same set of incentives as the IT industry.

Ease the Invest and Exits for Companies and Facilitate the Investors: Careem was co-founded by a Pakistani, but the company was incorporated in the UAE instead of Pakistan. This decision was made to facilitate investors, ensuring that when the company exits, they could easily recover their investment. However, this approach may not have been entirely successful if the company were incorporated in Pakistan, as it remains uncertain whether investors will recover their investment. This issue raises important questions. As a result, most product-based companies do not invest in Pakistan, while the majority of investment-focused companies are service-based. The government should facilitate exits and provide guarantees to investors, ensuring they can recover at least a portion of their investment if the company exits. Bringing start-up investments into Pakistan is an uphill journey, and rules on outward foreign currency flow make it impossible to exit.

Resolve the Internet and Connectivity Issues: In this era of the industrial revolution, Pakistan still lags in terms of quality internet and connectivity services. When compared based on internet speed, Pakistan ranks 101st out of 111 countries in mobile internet and 145th out of 160 in broadband internet. Only 45.7% of the overall population has access to good internet connectivity. While the world has moved on to 5G and even 6G, the country is still primarily relying on 3G and 4G networks. These statistics are alarming, and the government should take immediate measures to improve efficiency and provide quality internet access to every corner of the country.

Strategic Recommendations for Industry

Workforce Training: IT companies should be empowered to conduct their own training programs. The private industry should actively engage in talent development in Pakistan through investments aimed at balancing industry demand and workforce supply. However, this represents a significant financial commitment, which many companies may not be prepared to undertake alone. Only a few large organizations possess such capacity. To facilitate this process, the government could incentivise companies by offering free land, space, or other incentives. Existing technology zones or parks could be designated for companies that commit to establishing skill development centres alongside their operational activities. This approach would encourage private sector participation in skill enhancement while leveraging existing infrastructure.

Overcoming Founder's Syndrome: Growth requires addressing founder's syndrome by promoting a culture of trust and effective delegation. Robust leadership teams can be created by providing leadership development programs that emphasise delegation, trust-building, and business scalability; encouraging founders to mentor the next generation of leaders; and facilitating the transition of founders into advisory positions. Through these efforts, businesses will be able to expand beyond the founder's direct supervision and develop strong leadership teams. To achieve the industry's full potential, founders must feel pressure from the outside to pursue rapid expansion.

Leverage Emerging Technologies: The field of developing technologies, such as AI, is currently driving significant advancements in automation and analytics. Based on our conversations with companies, it seems like, along with AI, blockchain technology is the way of the future. It provides decentralised security and transparency that extends beyond banking and can be applied in industries such as supply chain management and healthcare. Businesses should diversify their efforts to incorporate blockchain and AI in order to navigate this transformation successfully. Companies can fully utilise emerging technology to improve operational effectiveness and promote long-term success in a competitive IT market by adopting these strategies.

Promote Research and Development: Leading companies should establish internal research and development hubs, particularly in areas where Pakistan can gain a competitive edge. The establishment of cutting-edge facilities, networking events, and funding for cooperation between company R&D centres and university institutions will facilitate knowledge transfer and

partnerships. Pakistan can establish a strong ecosystem that promotes innovation and establishes the nation as a leader in the global IT industry by concentrating on specialised fields like artificial intelligence, blockchain, and cybersecurity and cultivating connections with prominent global IT players.

Offer Internship Opportunities: Offering internships to recent graduates is a smart way for IT organizations to develop the skill sets of the next generation of workers. Every year, all major corporations, including medium-sized ones, ought to establish a policy on their summer internship programs. Companies may help students improve professionally and gain access to a pool of future employees who are already familiar with their organizational culture and processes by identifying and developing talent early on.

Focus on Product Development in Addition to Servicing: Companies should broaden their scope to incorporate both service and product development; successful companies, such as NetSol, which have persevered during difficult economic times, should serve as models. Companies can create new revenue streams, strengthen their market resilience, and reduce their dependence on external economic variables by investing in the development of innovative products.

Revaluation of Operations and Strategies in the Context of Generative AI: Companies should reassess their operations and strategies in light of developments in Generative AI. Companies can unleash new creative possibilities, optimise workflows, and significantly increase productivity by incorporating this state-of-the-art technology. Adopting generative AI can enhance decision-making skills, provide competitive advantages in the global market, and lead to the development of more personalised and effective services.

Assist in Enabling Startup Culture in Universities: Companies should aggressively encourage and assist university startups. Companies can provide aspiring entrepreneurs with invaluable resources, such as funding, market knowledge, and mentoring, by collaborating with academic institutions. Additionally, fostering a startup culture at the university level can help bridge the knowledge gap between industry and academia, preparing the next generation of talent to meet market demands.

Promote Internationalization: Internationalisation refers to opening offices in other countries. One major factor behind Systems Limited's growth is its internationalisation. They have offices in various countries, along with corresponding teams of developers and specialists, which allows clients to choose the location where they prefer to work. Other major IT companies in Pakistan should adopt this approach and promote internationalisation as much as possible. This will help them expand their footprint in the international market.

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APPENDICES

Appendix A

A 1. Meetings and Survey with IT-based Companies

The major companies like NetSol technologies, Systems Limited, Confiz Limited, and other SMEs are considered. For SMEs, we visited various technology zones in Pakistan, including the National Science and Technology Park (NSTP) located at NUST and the National Incubation Centre (NIC) in Lahore. Engaging in meetings and surveys with IT-based companies in Pakistan has provided valuable insights into the industry's dynamics. The survey was offered in three different modes, including in-person meetings with a company representative at the company's office, online meetings, and an online survey using Google Forms. The survey questionnaire is in Appendix B. Interactions with key players have unveiled trends in software development, cybersecurity, and digital innovation. These sessions also highlighted the industry's collaborative spirit, emphasising the importance of knowledge-sharing and partnerships. The survey outcomes will contribute to a comprehensive understanding of the challenges and opportunities shaping the IT landscape in Pakistan. The individual insights provided by each company representative are summarised below.

A.1.1 GlowLogix

Glowlogix, a small-sized IT company established in 2014 with a workforce of 30 employees from both the technical and non-technical domains, primarily focuses on website development and HR-related software. Presently, the company specialises in attendance modules, though it faces limitations by not extending its capabilities to check-in and check-out systems. Glowlogix has yet to introduce an AI-based recruitment system, such as CV-parsing.

Despite not receiving government incentives, Glowlogix reports satisfactory achievements in meeting its targets. Looking ahead, the company demonstrates a commitment to staying abreast of new trends and market perspectives, evident in its outlined 5-year plan. However, the company identifies a lack of skills in human resources and proposes revising academic programs to address this issue.

Glowlogix recommends making internships a mandatory component of degree programs and calls for government support to facilitate easy internships with stipends. Beyond education, the company envisions post-graduation platforms where fresh graduates can align themselves with market trends and actively implement theoretical concepts acquired during their academic journey.

A.1.2 Thermalog

Thermalog, a company established in 2021 with a workforce of 5 employees, specialises in temperature monitoring systems for food safety in the Australian market, encompassing both IT and hardware solutions. Financially, each hardware device costs \$ 4,000 AUD, and recent sales indicate the purchase of six devices over the last two months.

The company faces workforce challenges, including a lack of professional grooming among the workforce, minimal engagement with the industry, deficient basic coding skills, and a lack of work ethic and time management abilities. To address these issues, Thermalog recommends that the university professors and lab engineers should possess hands-on experience in the relevant industry.

Thermalog highlights government support as crucial, advocating for allowances to hire PEC-certified engineers, concessions for startups like NSTP, and tax benefits on hardware imports by exempting custom duties. The company suggests monitoring hiring practices in Pakistan and prioritizing professional experience over a Ph.D. degree in the hiring criteria.

The Thermalog under its 5-year plan, envisages strengthening its sales team to boost overall sales. The company emphasises the importance of professional grooming, advocating for business startup subsidies. Thermalog also proposes the inclusion of payment platforms like PayPal for international transactions to facilitate freelancers.

A.1.3 KytherTek

KytherTek, established three years ago with a team comprising three technical and two non-technical employees, specialises in smart hardware development for industrial and home automation, prioritising local products without a direct connection to dollar exports. The company faces economic challenges, including payment difficulties for importing components and a prolonged export cycle.

Furthermore, KytherTek encounters local and socio-political instability, compounded by concerns about an aggressive taxation regime. Advocating for the deregulation of the IT sector to spur significant economic growth, the company notes a medium-level skill set in the industry. Recognising the potential of new graduates as more aggressive and adept at self-learning, KytherTek emphasises the need for a supportive policy framework for the IT sector, urging companies to operate with a reasonable level of freedom. Despite setting targets three years ago, KytherTek acknowledges that these goals have not been achieved.

Current IT sector trends include inbound work and dollarized projects, with KytherTek recognized as a proficient hardware design house involved in assembling and manufacturing at least two projects from abroad. In terms of recommendations, the company suggests a strategic focus on in-depth studies over superficial measures. It encourages decision-makers to adopt second- or third-order thinking for more effective outcomes.

A.1.4 Zaheen Systems

Zaheen Systems, founded three years ago, specialises in AI model training and machine learning. The company faces financial challenges, citing funding issues. Despite acknowledging AI opportunities, Zaheen Systems notes a significant gap in AI-specific training from universities. In response, the company advocates for government support and underscores the importance of curriculum development with a practical focus. Zaheen Systems also outlines its plans and initiatives in collaboration with educational institutions. Currently, the company receives limited support from NUST.

Looking ahead, Zaheen Systems envisions a 5-year plan involving product export. The company emphasises collaboration with universities, urging a practical equipment focus in educational programs and a consistent syllabus with free education. Notably, Zaheen Systems observes the absence of a comprehensive government plan for the short, medium, and long term.

A.1.5 Al-Basirr Technologies

Al-Basirr Technologies, a mobile application development company with a workforce of 15-20 employees, primarily serves clients in England's small industry sector. The company faces challenges related to an underdeveloped work environment and reported issues within its employee-to-employee culture. Financial concerns, including an increased burden and decreased

salaries, are noted. Despite achieving 70-80% of set targets, Al-Basirr Technologies identifies a lack of collaboration for students and emphasises the need for government support, particularly in the form of NSTP-type opportunities.

Additionally, the company recommends providing advantages for startups to encourage growth. Notably, Al-Basirr Technologies observes a general lack of government support for incubation centres, leading to the closure of many such facilities. In conclusion, the company advocates for an increase in the number of NSTP-type technology centres for enhanced support within the sector.

A.1.6 WarisTech

Established in 2012, WarisTech, a small to medium-sized company with 15 employees, specialises in providing web development, mobile development, and optimisation services to offshore clients. The company faces financial challenges, including payment issues and difficulties with implementing payment gateways in the banking sector. Notably, there is a limitation on holding funds in USD, leading companies to keep remittances in foreign countries. WarisTech identifies an opportunity for automation, which is hindered by the current low purchasing power.

Despite a significant increase in internet content over the last 4-5 years, students are deemed ready for industry-level work at their graduation level, and the current university curriculum is considered suitable for servicing purposes. Looking ahead, WarisTech will explore avenues such as product development in its 5-year plan. The company recommends improvements in the banking sector, advocating for a free hand on remittances and dollars in the account.

A.1.7 ByteEvo

Founded in 2014, ByteEvo is a small-sized IT company specialising in touch-screen product software, particularly embedded Android solutions designed for the health and fitness industry. With a workforce of 7 technical employees, the company operates on an export-focused business model. ByteEvo faces challenges, including customs issues related to equipment import and a lack of supportive infrastructure for gyms in Pakistan.

In terms of technical skills, the company requires expertise in Android and IOS development, C++, Java, web development, and React skills, including React Native. The economic landscape influences ByteEvo, as the prevailing situation prompts good talent to prefer opportunities abroad. While recognizing the quality of graduates from renowned institutions like FAST and NUST, ByteEvo expresses concerns about the lack of a positive space for graduates from other universities.

Looking ahead, ByteEvo outlines a 5-year plan to expand its operations by focusing on mobile app development. The company offers recommendations for curriculum development, focusing on interpersonal skills, and promoting practical experience.

A.1.8 Rapix

Rapix, a multifaceted IT company, strategically focuses on three key verticals: hardware research and development (R&D), AI-based software R&D, and renewable energy. The company operates primarily in software exporting, targeting markets in the Middle East, including Saudi Arabia, Oman, and Muscat. However, Rapix faces challenges in hardware import, particularly issues related to taxes, with a notable observation that the predominant focus is on IT, with little attention given to hardware aspects. Despite this, Rapix identifies promising opportunities in top-notch sectors such as AI and cybersecurity. The company advocates for the teaching of relevant skills at the university level, emphasising the need for a revision of the outdated curriculum to meet market demands.

While Rapix acknowledges commendable government support for the IT industry, exemplified by initiatives such as the P@SHA awards, it notes a significant gap in support for hardware production companies. Rapix attributes its success to strategic talent acquisition and hiring individuals with the right skills for the company's diverse operations. In terms of market trends, Rapix identifies AI and blockchain as dominant forces.

A.1.9 XYLEXA

Established five years ago, XYLEXA stands as an AI product-based company specialising in medical products, with a workforce ranging from 10 to 12 employees. Focused on early disease detection, particularly in breast and chest cancer, as well as arterial blockages, XYLEXA's products aim to facilitate early-stage diagnosis, supporting doctors and radiologists in their work.

However, the company has faced a significant challenge in involving doctors, who harbour scepticism about AI tools potentially replacing their roles in the medical field. In terms of workforce expectations, XYLEXA looks for basic knowledge of Python and machine learning from fresh graduates, recognising that while universities contribute to making graduates market-ready, there exists a notable gap between theoretical understanding and practical implementation skills.

Despite the innovative strides made by XYLEXA, the company notes that it has received insufficient government support, particularly in establishing IT parks. Looking towards the future, XYLEXA outlines a 5-year plan to export its medical products to the US market, demonstrating a commitment to expanding its global presence.

A.1.10 Rapidev

Rapidev, operating as a conglomerate with three primary verticals—software development, defence R&D, and commercial R&D specialising in energy-efficient products—stands at the forefront of AI and ML-based products. With a clientele spanning Pakistan, Asian countries, Gulf countries, and the Middle East, the company boasts a workforce of 170, encompassing both technical and non-technical roles. Recognizing the future as AI-driven, Rapidev underscores the necessity to equip students with AI expertise, notably highlighting the scarcity of specialists, especially in computer vision and satellite image processing, within Pakistan.

The company addresses the substantial gap between academic curricula and industry demands, proposing collaboration between university representatives and industry professionals during course content development. Rapidev advocates for enhanced facilitation for SMEs and private industries, urging the government to provide certifications and courses. With ambitious growth plans aiming for a tenfold expansion in the next three years, Rapidev attributes its success to a well-trained human capital and suggests the government's involvement in developing the Human Development Index (HDI).

The company further emphasises the need for an entrepreneurial culture, startup support, and reduction of tax compulsions. Proposing the establishment of technology parks in major cities, Rapidev envisions a privatisation strategy for these hubs to bolster the IT landscape in Pakistan.

A.1.11 Global Tech Consulting

Global Tech Consulting, a web development company with a workforce consisting of 7 technical and 3 non-technical members, has been operating for 5 years and is characterised as a small-sized entity, generating a monthly revenue ranging from \$ 3,000 to \$ 5,000. Specialising in web development, the company faces challenges in acquiring sales and securing larger value projects. Despite operating in the IT industry in Pakistan, the company perceives limited opportunities in the broader sector.

Concerns are raised about the average skill levels of the workforce, particularly emphasizing the widespread lack of work ethics and dedication. While recognising exceptions from a few universities, the company advocates for better education and training resources, especially in lucrative areas like AI. Regarding government involvement, Global Tech Consulting advocates for minimal intervention, suggesting that the government's role should focus on increasing the number of IT graduates and facilitating the industry's ability to attract foreign investment. Pakistan's technology infrastructure is assessed as average, and the company attributes its success factors to personal connections.

Looking forward, Global Tech Consulting intends to explore areas such as AI and ML. The overall sentiment towards government involvement is cautious, emphasising the importance of allowing the IT sector to grow naturally with limited macro-level policies aimed at improving educational resources and infrastructure.

A.1.12 Data Pilot

Data Pilot, a small-sized IT company specialising in data science projects, has been operating for three years, primarily offering software services. The company recommends a strategic shift for the IT industry, proposing a focus on building software 'products' alongside traditional service provision. In terms of educational emphasis, Data Pilot suggests prioritising tools over fundamental subjects, such as compiler construction, in IT education. While assessing university contributions, the company notes a partial fulfilment of the required skill set and expertise. Government intervention is sought with a call for increased salary packages for hands-on trainers and addressing infrastructure concerns, such as reliable internet connectivity and low electricity costs.

The success of Data Pilot is attributed to its focus on the latest technologies. The company identifies current trends in the global IT market, emphasising the significance of investments in AI, Big Data, VR, and Security for export success by Pakistani IT companies. Additionally, recommendations include facilitating the export of technical human resources with the anticipation of valuable exposure upon their return. The study also advocates for the establishment of a freelance platform for Pakistan, drawing parallels with platforms like Upwork.

A.1.13 Amazon Seller Society

Amazon Seller Society, a specialised firm in PPC and Amazon Account Management operating in the Middle East, primarily in the UAE, provides crucial support and full account management for individuals and companies engaged in selling on Amazon in the region. Notably, the company highlights minimal domestic issues in its UAE base. However, it identifies challenges within the industry, specifically noting a lack of professionalism and dedication.

Additionally, a notable gap is observed between industry requirements and academic offerings, indicating a need for improved alignment. The company commends past government initiatives aimed at enhancing connectivity in public places and emphasises the overall affordability of connectivity. Recognising the trends in the global IT market, the Amazon Seller Society advocates for a strategic shift, encouraging the industry to leapfrog traditional paths and embrace futuristic technologies, particularly AI and its sub-branches, to gain a competitive advantage on a global scale.

Riding the E-commerce and Amazon wave, the company anticipates growth in tandem with the expanding market. Moreover, it emphasises the importance of connecting academia with the industry and proposes a focus on international tech collaborations as vital strategies to bridge existing gaps.

A.1.14 The Creative Street

Creative Street, an IT company with a workforce comprising 10 technical and 10 non-technical employees, has been in operation for two years, focusing on digital marketing and Shopify web development within a small-sized company. Specialising in offering home organisation products through E-commerce platforms, the company encounters challenges related to exchange rates and awareness but identifies significant opportunities in the E-commerce sector.

Skill development within the company is predominantly self-taught, reflecting the absence of mentorship on a national scale. The assessment of universities in terms of providing the necessary skills and expertise is considered minimal. Infrastructure challenges include poor internet connectivity, high costs, load shedding, and expensive video conferencing subscriptions. The success of The Creative Street is attributed to following international trends and leveraging digital marketing through influencers. Over the next five years, the company envisions transforming into a large-scale agency and actively contributing to spreading awareness about online work, freelancing, and remote job opportunities. Additionally, the Creative Street recommends the establishment of E-commerce Academies and the introduction of courses to address skill gaps within the industry.

A.1.15 Safasha Business Solutions

Safasha Business Solutions, an IT and Management Consultancy service with over four years of operational experience and a team of over 25 members, specialises in the development of ERP and accounting applications. The company focuses on implementing customised ERP solutions locally and abroad, specifically in the off-the-shelf and customised ERP solutions domain. Challenges faced include issues with client requirements, financial effort falling short of the given scope, team switching, payment delays, and staff availability.

In global markets, Safasha Business Solutions identifies opportunities in AI, ML, Data Analytics, Open Cart, ERP, and RPA. The company advocates for certifications in emerging technologies at the university and college levels, addressing the absence of practical-based training institutes for graduates. However, it expresses dissatisfaction with the skill set provided by universities. The company recommends government support through the development of IT centres, tax exemptions, and stipend payments for software houses hiring fresh candidates. Infrastructure challenges, encompassing connectivity, bandwidth, uncertain electricity availability, and high internet rates, prompt recommendations for low-cost internet, a national cloud infrastructure, and allied facilities.

Success factors include a focus on digital transformation, cloud infrastructure, and engagement in emerging technologies. Future strategies involve global expansion through either direct investments or partnerships with foreign entities, with a call for government support in company incorporation and investment protection. The company emphasises the importance of

partnerships with established brands and a focus on emerging technologies for future growth. Recommendations centre around IT centres, cloud infrastructure, internet facilities, data security, investment protection, tax benefits, support for small entities, exemptions for small IT sectors, and comprehensive government support for international market entry.

A.1.16 NetSol Technologies Limited

NetSol Technologies, a global information technology company with nearly 28 years of industry experience and a workforce of 1700 resources, is dedicated to providing IT solutions and services to the financial and leasing sectors worldwide. The company highlights challenges in expanding its IT/software exports, citing concerns about stability within Pakistan and global geopolitical uncertainties, particularly involving China and the USA.

Key opportunities for the IT industry in Pakistan, as identified by NetSol, include professional services, managed services, AWS, and system maintenance. The company acknowledges the high quality of coding and problem-solving resources in Pakistan. However, it identifies areas for improvement in terms of maturity, reliability, and professionalism within the local talent pool. NetSol Technologies suggests that universities are falling short in equipping students with the necessary skill set, leading proficient individuals to seek additional skills from online learning platforms.

The company recommends that the government support universities by increasing funding to produce more graduates and allocating resources to research for achieving vertical growth. NetSol Technologies attributes its success to tax benefits and the availability of reasonable and affordable resources in the market. Current trends in the global IT market, according to the company, include Artificial Intelligence, data sciences, machine learning, and low-code / no-code. In terms of government initiatives, Netsol Technologies emphasises the need for efforts to increase the number of graduates and, if given ministerial powers, would focus on stabilising the environment, enhancing security, facilitating international travel, and creating a foreign-friendly working environment.

The representative provided insights into Netsol Technologies' perspectives on challenges, opportunities, talent pool assessment, success factors, global IT trends, and government recommendations.

A.1.17 Empathise

Empathise, specialising in e-commerce tool development, has outlined several challenges in its survey responses. The company faces issues related to payments, encompassing payment processing challenges, difficulties in setting up payment accounts, issues with bank accounts, and problems with the payment gateway itself. These challenges collectively impact the smooth functioning of the e-commerce tools developed by Empathise. The intricacies involved in payment-related processes, account creation, and payment gateways are critical aspects that the company is currently addressing to enhance the efficiency and effectiveness of its e-commerce solutions.

Appendix B

Unleashing the Potential of Pakistan's IT Industry: Building for Massive Software Export Growth

Approximate time for completing this survey: 10 minutes

This funded project aims to present an official report, which will be submitted to the Government of Pakistan via the PIDE platform. The primary objective is to identify key challenges and provide policy recommendations that aim to enhance the IT sector in Pakistan.

1. Organization Name?
2. Representative Name?
3. Representative Contact Information (Email and/or Phone)?
4. Can you please describe your position and role within the company?
5. Can you provide a brief overview of your company? Number of employees (technical and non-technical), years in operation, and key areas of expertise within the IT sector?
6. What is your company's current level of involvement in exports, both in terms of products and services? (Dollar value/range or small/medium/large category)
7. What is your specific area of focus in exports?

8. What challenges does your company currently face in expanding its IT/software exports, both within Pakistan and internationally?
9. In your opinion, what are the key opportunities for the IT industry in Pakistan to achieve significant export growth?
10. How would you describe the skill sets of the IT workforce in Pakistan, and what steps could be taken to enhance these skills for better global competitiveness?
11. Are there specific skill gaps or areas of improvement that you have identified within the local IT talent pool?
12. Do you think universities are providing the skill set and expertise to their graduates that are essential requirements in today's IT industry?
13. Do you believe the government is providing sufficient support to the IT industry? If not, what role do you think government policies play in supporting the growth of the IT industry in Pakistan?
14. How would you rate the existing technology infrastructure in Pakistan for supporting software development and export activities? (connectivity, bandwidth, energy cost, dependability etc.)?
15. What are the major factors that have contributed to the success of your company?
16. In your opinion, what are the current trends in the global IT market, and how can Pakistani IT companies align with these trends for export success?
17. How do you see your company evolving/growing in the next 5 years?
18. What are your brief recommendations for the government and policymakers that can contribute to the growth of the IT sector in Pakistan?
19. If you are made the minister of Pakistan's IT sector and have full support from all the pillars of the state. What key measures would you like to take for the IT sector?

PART II

INVESTMENT & EXPORTS

Policy Briefs



DECODING THE EAST ASIAN SUCCESS AND UNLEASHING FDI'S POTENTIAL TO BOOST LOCAL LEARNING - DEVELOPING A POLICY ROADMAP FOR PAKISTAN

Twangar Kazmi and Mujahid Abdullah

INTRODUCTION

East Asia's Foreign Direct Investment (FDI)-driven learning model offers significant and practical lessons to developing economies, such as Pakistan, on pursuing a path towards sustainable export-led growth. FDI stands as a critical catalyst for economic growth, especially in export-driven strategies, as demonstrated by the success of East Asian Economies. These nations have effectively utilised FDI to drive technological advancements, bolster local industrial capabilities, and foster innovation.

Economic growth has traditionally been explained using neoclassical models focusing on labour, capital, and diminishing returns, which predict a steady state with no long-term income growth. Technology has been recognised as a key driver of growth, initially seen as an external factor but later incorporated into models as an endogenous element. Recent

literature emphasises the importance of technology adoption at the firm and industry levels. FDI plays a vital role in technology transfer and economic transformation, fostering innovation through knowledge spillovers. However, the effectiveness of these spillovers depends on local firms' absorptive capacity and the institutional environment.

Notably, from 1965 to 1990, East Asia had the highest average GDP per capita growth globally. The region underwent a dramatic transformation, with economies such as Japan, Hong Kong, South Korea, and Singapore leading the initial growth phases, followed by ASEAN members and China, which adopted export-driven industrialisation. Vietnam is also on a similar growth trajectory. FDI sources have shifted, with significant contributions now from within Asia. East Asia's growth has reduced poverty, driven by labour shifts, education, and productivity.

METHODOLOGY

The methodological framework emphasises the role of absorptive capacity, influenced by factors such as human capital, intellectual property rights, and trade openness, in mediating the impact of FDI on economic growth. The research encompasses three phases: a comparative policy analysis of East Asian economies, case studies of successful FDI-driven industries, and an econometric model assessing the effects of macroeconomic indicators and institutional characteristics on technology spillovers.

KEY FINDINGS FROM DATA ANALYSIS

This research highlights the crucial determinants that influence its capacity to generate knowledge and productivity spillovers. These determinants include intellectual property rights (IPR), investment environment, legal systems, government size, trade openness, and human capital development.

Intellectual Property Rights (IPR)

A strong, robust IPR framework is crucial for protecting intellectual assets and fostering innovation-led FDI. Empirical studies indicate that solid IPR protection attracts FDI by lowering the risks of intellectual property theft and encouraging

multinational corporations (MNCs) to invest in high-technology sectors. For example, Park and Lippoldt (2008) found that effective IPR enforcement results in increased technology transfer and knowledge sharing. However, the link between IPR and FDI spillovers is complex, as evidenced by mixed results in the analysis. While there is a direct correlation between IPR and labour productivity, its interaction with FDI is not straightforward. Developed economies with skilled workforces may not gain as much from FDI spillovers as less developed countries with fewer patent applications. Overall, countries like Japan and South Korea, which have strong IPR protection, benefit from increased innovation capacity and productivity improvements driven by FDI.

Investment Environment

Gross Fixed Capital Formation (GFCF), which represents investment in physical assets, is essential for economic health and productive capacity. Higher levels of domestic private investments, indicated by GFCF, are linked to more substantial FDI spillovers measured through labour productivity. A resilient domestic investment environment supports and enhances the positive impacts of FDI, making economies more attractive to foreign investors and better equipped to benefit from knowledge spillovers.

Legal System

A strong legal system is vital for protecting IPR, enforcing contracts, and settling disputes, thereby enabling FDI-driven productivity spillovers. Countries with solid legal institutions, such as Japan and Singapore, attract FDI and boost productivity through efficient judicial processes and strict protection of intellectual property. These legal frameworks motivate MNCs to participate in activities that lead to significant knowledge spillovers for domestic firms.

Size of Government

Minimal government interference encourages efficient resource allocation, competition, and FDI inflows, driving technological diffusion and productivity growth. However, excessive government intervention can hinder entrepreneurial activity and deter investment. The analysis reveals that higher levels of government interference harm FDI spillovers to total factor productivity. Countries like Hong Kong and South Korea, with fewer regulatory burdens, create supportive environments for innovation, entrepreneurship, and investment.

Trade Openness

Open trade policies facilitate the inflow of foreign capital, technology, and expertise, enhancing productivity

and encouraging innovation. While countries with fewer trade restrictions tend to enjoy higher growth rates and greater economic gains from FDI, the analysis reveals no significant effect of trade openness on productivity spillovers. The positive influence of trade openness on FDI spillovers lessens in fixed effects regressions, indicating that the advantages depend on other structural and institutional factors specific to each country.

Human Capital Development

Investments in education, training, and skills development are essential for leveraging FDI to foster knowledge and productivity spillovers. Countries that focus on education reform and vocational training, like Taiwan and Malaysia, are better equipped to absorb and apply foreign technologies and managerial practices effectively. However, empirical evidence suggests that higher human capital may reduce the impact of FDI on productivity, as highly skilled economies often already operate at high levels of efficiency and innovation.

KEY DISCUSSION POINTS

Trade Openness

Pakistan's dependence on import tariffs for tax revenue undermines trade integration and export

competitiveness. High tariffs and a weak tax administration led to prolonged protection of domestic industries, which hampers their development and competitiveness. The National Tariff Policy (NTP) of 2019 aims to promote trade and eliminate anti-export bias, but it retains elements of domestic protection, thereby perpetuating market inefficiencies. Non-tariff barriers (NTBs), such as cumbersome customs procedures, regulatory compliance requirements, and bureaucratic red tape, further hinder trade. These barriers create a less favourable environment for FDI by raising the cost of imported inputs and intermediate goods, shielding inefficient domestic industries, and restricting market access. As a result, these conditions limit FDI's potential to generate backward and forward linkages with local firms, crucial for spillover effects. Protectionist policies also misallocate resources to less efficient sectors, reducing the potential for FDI to drive technological and managerial advancements across the economy.

Promoting Foreign and Domestic Investment

Pakistan's low savings and investment rates seriously limit its ability to attract and effectively utilise FDI. The economy does not produce enough resources for adequate savings, resulting in insufficient investments. Private sector financing

focuses more on government borrowing than on supporting the SME sector. This situation restricts domestic investment in vital infrastructure, such as transportation, energy, and telecommunications, which discourages foreign investment. Even when FDI flows into the country, poor infrastructure diminishes its efficiency and productivity, reducing potential benefits. Domestic firms lack the financial capacity to engage in joint ventures or partnerships with foreign investors, hindering opportunities for technology transfer and collaborative innovation. Investments are not channelled into high-value, export-oriented sectors, leading to persistent inefficiencies and limiting the overall impact of FDI on economic growth.

Human Capital Development

Pakistan's human capital development is concerning, ranking 134th out of 157 countries on the World Bank's Human Capital Index (HCI). This low ranking reflects poor educational outcomes, with children averaging only 8.8 years of schooling and a quality-adjusted education level of around 4.8 years. Public concern over the quality of education is high, with many believing it hampers economic performance. This underdeveloped human capital affects the ability to

absorb and implement advanced technologies introduced by foreign investors. The workforce's lack of essential skills and education limits industrial innovation and productivity, reducing the potential for technology transfer and knowledge spillovers. Without a strong foundation in education, local industries struggle to engage in innovative activities, which in turn affects product development and process improvements.

non-political autonomous entity (free from the bounds and influence of federal/provincial governments that change every 5 years or sooner).

- Depoliticise the Special Investment Facilitation Council (SIFC) and move away from ad-hoc arrangements, expand its vision, and increase the economic ambition (targets).

KEY POLICY REFORMS

Structural Reforms

- Elimination of short-termism; continuity of policy and removing the political conflict of interest preventing long-term policies from taking root and materialising.
 - o Enhanced role of autonomous bodies, such as the State Bank, to ensure smooth transition of economic policies after the end of one term of government
- A multi-party-political consensus, endorsed by leading national economists, on economic reform targeted at FDI-supported export-oriented re-industrialisation. Custodian and implementer of this reform package should be a

Research and Development

- A comprehensive investors' needs assessment for enhancing FDI in export sectors, outlining the minimum requirements of potential foreign investors to Pakistan.
- Assess with projections of competitors to Pakistan's traditional export sectors (such as Textiles) and cease opportunities for capturing a greater market share based on changing global export trends. Identify and prioritise target markets based on criteria such as market size, growth potential, geographical proximity, cultural affinity, trade agreements, changing trade partners, and changing competitor dynamics.

- Conduct a capacity and quality gap analysis of Pakistan's manufacturing sector and that of global competition in key export sectors.
 - Conduct thorough market research to identify new export opportunities and shifting consumer preferences in both new and existing markets. Target regions with untapped potential, tailoring export strategies to capitalise on emerging trends and diversifying the export mix. Share these insights with the private sector to enhance competitiveness.
 - o Use data analytics, AI market intelligence tools, and trade promotion agencies to pinpoint high-potential export markets based on factors such as demand trends, tariff structures, regulatory environments, and comparative advantages.
 - Carry out a comprehensive analysis of significant local and global value chains involving Pakistani firms to inform and guide future policy decisions.
- protections for intellectual property rights, including patents, copyrights, and trademarks.
- Establish an effective dispute resolution system for intellectual property cases to prevent prolonged court proceedings for both foreign and domestic companies.
 - Reassess the effectiveness of Technology Parks and evaluate the extent of knowledge sharing and technology transfer among firms and institutions, offering suggestions for their enhancement.
 - Reassess and evaluate the effectiveness of the Export-Import Bank of Pakistan (EXIM Bank) in achieving its goal of improving the competitiveness of Pakistani exporters.

Trade Measures

Regulatory

- Conduct a study on the IPR regime and recommend legal changes to strengthen
- Enhance market access for exports by negotiating trade agreements, lowering tariff



and non-tariff barriers, and expanding preferential trade arrangements with key trading partners.

- Streamline trade procedures and prioritise initiatives to simplify customs clearance processes, speed up trade documentation, and harmonise regulatory standards to reduce transaction costs and improve the ease of doing business.
- Enhance international cooperation and collaboration with bilateral and multilateral partners, including development agencies, international financial institutions, and regional organisations, to support Pakistan's export promotion objectives through providing technical assistance, capacity development, and market access support.
- Actively engage in trade negotiations, participate in regional economic integration initiatives, and leverage international trade forums to improve market diversification and export competitiveness globally. A vibrant regional economic corridor and connectivity increase the prospects for economic growth. Immediate neighbours are the most suitable candidates for

trade and innovation benefits, partly because of geographical proximity and shared culture and values.

Human Capital Development and Technology Transfer

- Increase important government spending on education, skills development, and vocational training programmes to create a skilled workforce, boost productivity, and satisfy the needs of a knowledge-based economy.
- Improve access to education, healthcare, and social services, promote inclusive economic opportunities, and empower marginalised communities to participate in and benefit from economic development initiatives.
- Invest in establishing and developing bilateral and multilateral research institutes and innovation centres focused on key industries.
 - o Develop an autonomous automotive institute focused on developing human resources, piloting the latest technology, creating master plans, and

collaborating with leading automobile companies such as Denso, Honda, Nissan, and Toyota to enable transfer of technology and know-how.

- Facilitating technology transfer by expanding or promoting the mandates of existing planning and development departments such as the Ministries of Planning, Development & Special Initiatives, Commerce, and Science and Technology.
- Facilitate the transfer of technology and licensing agreements to help Pakistani firms access advanced technologies and expertise from foreign partners. This includes encouraging collaboration with multinational corporations, research institutions, and technology providers to acquire, adapt, and implement cutting-edge technologies that boost productivity and competitiveness.

CONCLUSION

This research identifies key factors that influence the ability of FDI to generate knowledge and productivity spillovers in host economies. It emphasises the importance of strong intellectual property rights (IPR), a stable investment climate, an efficient legal system, strategic government intervention, open trade policies, and human capital development. For Pakistan, overcoming barriers such as limited trade openness, low domestic investment, and underdeveloped human capital is crucial to harness FDI's potential for sustainable economic growth fully. Improving trade policies, creating a supportive investment environment, and investing in human capital can markedly enhance Pakistan's capacity to benefit from FDI-induced knowledge and productivity spillovers, echoing the successes seen in East Asia and recognising that this potential can be transformative for the country in a relatively short period, warranting detailed exploration and consideration within national policy discussions.



DECAPITALIZATION IN THE PAKISTAN STOCK EXCHANGE

Abdul Wahid and M. Zubair Mumtaz

INTRODUCTION

The Pakistan Stock Exchange (PSX) serves as a critical barometer of the country's economic health, facilitating the listing and trading of shares in companies. However, from 2010 to 2023, the PSX experienced significant decapitalization, marked by a net decrease of 03 firms. During this period, only 67 companies were newly listed during this period, while 170 were delisted. This alarming trend of delisting, whether voluntary or involuntary, underscores underlying economic, regulatory, and market challenges. The situation contrasts sharply with the Indian market, which saw a net increase of 1,315 companies, highlighting the need to understand the factors driving companies away from the PSX.

This study identifies the firm-specific and market-related factors contributing to delisting on the PSX. By examining a sample of 60 delisted firms and comparing them with 60 firms that remained listed, this study

offers actionable insights for policymakers to enhance market stability and attractiveness.

A vibrant and growing stock market is crucial for economic development, as it provides companies with access to capital, enhancing their visibility, and fostering investor confidence. Understanding why firms are choosing to delist is crucial for creating a more supportive regulatory environment and promoting sustained economic growth. The significance of this study lies in its potential to inform policy decisions that can reverse the trend of decapitalization.

METHODOLOGY

This study targets all firms delisted from the Pakistan Stock Exchange (PSX), National Stock Exchange (NSE), and Bombay Stock Exchange (BSE) from January 2010 to September 2023, as well as listed firms that remained on these exchanges. Delisting is categorised as either voluntary or involuntary.

The focus of this study is specifically on voluntary delisting decisions. The sample includes 60 delisted firms and 60 matching firms listed on the PSX. The firms have been selected based on market capitalisation. Data has been collected for three years preceding each firm's delisting to ensure a comprehensive analysis. For example, if a firm was delisted in 2013, data from 2010 to 2013 has been used. Financial data has been sourced from firms' financial reports, while governance-related information has been obtained from these reports and the firms' websites. This approach ensured a robust and accurate dataset for analysis.

The Cox Proportional Hazards Model was employed to determine the factors influencing delisting. This model allows for the examination of the relationship between the survival time of firms (time until delisting) and a set of explanatory variables, including a firm's specific and market-related factors, to provide a comprehensive view of the determinants.

FINDINGS

Global Listing Trends

The global listing trends reveal a significant decline in the number of listed firms in South Asia and other major markets. From 2000 to 2020, South Asia experienced a decrease in

listed companies from 6633 to 6329, indicating a higher delisting rate compared to new listings. Similarly, the number of listed firms in the United States decreased from 5860 in the 2000s to less than 4400. These trends suggest that several factors, including rising interest rates, the financial crisis of 2007-08, and shifts in investor preferences towards markets offering higher returns, have contributed to the decline in equity markets globally.

Capital Erosion at PSX

PSX experienced significant capital erosion from 2010 to 2023, with a net listing decline of 103 companies. Despite reaching an index level of over 72,000 points, the PSX faces a delisting trend, particularly during domestic crises such as the energy crisis and security issues. The sectors most affected by delisting include textile spinning, textile composite, exchange-traded funds, and investment banks. Capital inflows and outflows fluctuated during this period, with certain years experiencing higher decapitalization.

Determinants of Delisting at PSX

Our study utilises the Cox Proportional Hazards model to identify key factors influencing a firm's decision to voluntarily delist from the stock market, focusing on



financial, firm-specific, and governance-related aspects. The analysis reveals critical financial performance indicators such as Earnings Per Share, Price-Earnings Ratio, Dividend Payout Ratio, and Profit Margin, with corresponding hazard ratios suggesting that superior financial metrics decrease the likelihood of a firm going private. Additionally, firm-specific factors like liquidity, growth, and financial management practices significantly impact this decision. For example, higher revenue and profit growth rates decrease the propensity to delist, while high debt levels and increased operational costs like audit and listing fees increase it.

The study also highlights the influence of corporate governance and market dynamics on delisting decisions. Larger, well-established firms with diverse boards are less likely to delist, whereas higher insider ownership and bureaucratic complexities in state-owned enterprises increase the likelihood. Moreover, market volatility and regulatory challenges further complicate the stability and operational environment for firms, influencing their decision to remain public or go private.

These findings underscore the complex interplay of financial performance, firm characteristics, and external market and governance factors in shaping corporate strategies in the stock market.

KSE 100 Index Constituents and Financial Visibility

Our analysis of the KSE 100 index as of June 2024 reveals a dynamic composition, with a notable concentration of influence among the top firms. The index's weight is distributed such that the top six companies constitute 25%, the next in line seven firms constitute another 25%, and 19 companies make up the third quartile (50%-75%). The remaining 68 companies account for the final 25% of the index weight. The net profit margins and dividend payout ratios across these quartiles vary, highlighting both remarkable progress and financial challenges in different sectors. This data led us to investigate the top five sectors with the highest index weightage to understand their impact on the overall market.

Oligopoly of Rent-Seekers

The banking sector, leading the KSE 100 Index with a 19% weight, showcases a 28.73% dividend payout and a 13.42% profit margin, fueled by high policy rates and monopolistic practices that restrict new entries, enhancing its market value. Following the banking sector, the Oil & Gas sector commands 10.56% of the index weight, benefiting from state ownership and rising fuel prices, resulting in a 32.35% profit margin and a 36.75% payout ratio.

The Fertiliser sector, essential for agriculture, holds a market monopoly supported by energy subsidies, showing a 12.99% profit margin and a 43.50% payout ratio. The Power Generation & Distribution sector also operates under a monopolistic regime, earning capacity charges and maintaining profitability with a nearly 100% asset utilisation ratio despite high electricity bills.

Lastly, the Technology & Communication sector, comprising 8% of the index weight, thrives on a monopoly with five companies, driven by a youthful, tech-oriented demographics, resulting in robust profits and a 36.00% payout ratio.

Top Delisted Sectors

The top sectors experiencing higher delisting rates include Textile Spinning, Textile Composite, Exchange Traded Funds, and Investment Banks. Sector-specific factors such as Earnings Per Share (EPS), Price-Earnings Ratio (PER), and firm size significantly influence the likelihood of delisting. The findings suggest that financial performance and market conditions within these sectors significantly influence firms' decisions to delist from the PSX.

Determinants of Delisting from the Indian Market

In the Indian market, similar factors influence delisting decisions, but with notable differences. The Indian stock exchanges (NSE and BSE) saw a net increase in listings, attributed to more favourable regulatory policies and better financial visibility for smaller firms. Key determinants of delisting in the Indian market include: (a) Indian exchanges have less stringent regulatory requirements compared to the PSX, making it easier for firms to remain listed, (b) the Indian market offers higher financial visibility and better growth opportunities for smaller firms, reducing the likelihood of delisting and (c) Similar to Pakistan, market conditions and financial performance significantly influence sectors like textiles and finance, but Indian firms benefit from a more supportive regulatory environment.

DISCUSSION & CONCLUSION

The decapitalization of the PSX, characterised by a net negative listing, poses significant challenges to Pakistan's economic growth and market stability. This study identifies multiple determinants influencing



delisting decisions, ranging from financial performance and corporate governance to market dynamics and sector-specific factors. Discussions with SECP and PSX officials, as well as with brokers, investors, and firm managers, reveal that regulatory complexities increase the costs and duration of listing and compliance.

Performing firms attract investors with high net profit and payout ratios, but many struggle due to inflation and limited consumer spending. Competitive returns on sukuk and sovereign bonds put smaller, lesser-known companies at a disadvantage, as only well-supported large entities tend to thrive in such a market. Market volatility and governance issues, particularly in SOEs, push companies towards privatisation, influencing market stability and policy. Family-run firms also face governance issues causing an adverse impact on stock market.

These insights are crucial for policymakers and regulatory bodies like the SECP to develop strategies that enhance the financial stability and visibility of listed firms.

KEY POLICY RECOMMENDATIONS

1. Reduce compliance costs and streamline regulatory procedures for firms to make it attractive for them to list on the stock exchange and then sustain the listing.
2. Ensure that all sectors receive equal support in terms of incentives and tax rebates to foster balanced growth.
3. Promote robust corporate governance practices, including increasing non-executive directors and ensuring diverse boards.
4. Enhance financial visibility through accurate and timely disclosure of financial information and performance metrics.
5. Implement measures to reduce the influence of specific families and bureaucrats in policymaking regarding the financial markets and stock exchange, fostering a competitive market environment.



CHALLENGES AND OPPORTUNITIES IN HALAL BEEF EXPORTS FROM PAKISTAN

Shahzad Kouser and Abedullah

INTRODUCTION

Background of the Study

Livestock is a crucial sector in Pakistan's agro-based economy, accounting for 60.84% of the agricultural value added through products such as milk and meat, contributing 14.63% to the national GDP, and 1.6% to total exports. Over 8 million rural households engage in animal husbandry, deriving 35-40% of their livelihoods from this sector. The national herd includes 57.5 million cattle, 46.3 million buffaloes, 87 million goats, and more. Among meat-producing animals, cattle have shown the highest compound annual growth rate (CAGR) of 3.5% from 1991 to 2024. However, the average carcass weight for cattle/buffalo in Pakistan is 196 kg per animal, significantly lower than the 297 kg per animal observed in leading producing countries. Improving this requires focusing on healthy meat animals, adopting modern husbandry practices, ensuring adequate feeding resources, and implementing proper feeding plans.

Enhancing per-animal meat productivity could make Pakistan a significant player in the international halal beef market.

Pakistan's halal meat industry is experiencing rapid expansion. In 2024, total halal meat production, including beef, mutton, and poultry, reached 5.8 million tons with a CAGR of 3.9%. The country's meat consumption in 2022 was 3.5 million tons with a CAGR of 0.8%. The significant difference between meat production and consumption growth rates indicates a substantial surplus, presenting an opportunity to increase foreign exchange earnings through the export of meat. Failure to capitalize on this potential could reduce profitability or drive the illegal sale of live animals.

Meat exports were negligible until the 1998 Annual Trade Policy. According to the State Bank of Pakistan, exports of meat and edible meat offal increased from US\$14 million in 2003 to US\$467 million in 2023, with a CAGR of 18%. Among meat types, beef is the largest export sector, contributing US\$332 million,

followed by fish, mutton, offal, poultry, and others. Despite being the 15th largest meat producer globally, Pakistan ranks 57th in meat exports, highlighting the underperformance and the need to address constraints hindering expansion.

Beef Exports of Pakistan: Challenges and Potentials

The global beef industry has experienced exponential growth over the past two decades. The market value for beef (cattle meat) has quadrupled from US\$166 billion in 2002 to US\$332 billion in 2022 and is projected to reach US\$422 billion by 2028, with a CAGR of 4% from 2022 to 2028.

Pakistan's exports of bovine (cattle and buffalo) meat have been continuously rising since 2003. Bovine meat exports have surged from US\$0.747 million in 2003 to US\$332.271 million in 2023, with a CAGR of 37%. Despite a 9% decline in 2022, attributed to a drop in export prices, exports showed a fast recovery (31% increase), reaching US\$570 million in 2023. However, 92%-98% of exports are in the fresh/chilled category, expanding at a CAGR of 34%. Pakistan's share of the global beef market is a mere 0.08%, highlighting the country's instability.

Pakistan exported approximately 86,886 tons of bovine meat, representing 3.3% of its total beef

production (2.6 million tons), to six Gulf Cooperation Council (GCC) countries—United Arab Emirates (UAE) (51%), Saudi Arabia (16%), Kuwait (12%), Qatar (9%), Bahrain (5.4%) and Oman (3.3%)—which collectively accounts for 95.7% of exports, highlighting that these markets are relatively more accessible to Pakistan because of less stringent import restrictions. The frozen beef market is expanding, with Brazil, Australia, and the USA dominating the sector. The demand for frozen beef is attributed to its prolonged shelf life and transportation viability. Pakistan's high electricity prices make it uncompetitive in the international market.

The global demand for halal meat is increasing due to its quality and nutritional value. The halal meat market was valued at US\$202 billion in 2021 and is projected to reach US\$375.1 billion by 2030. Despite producing organic halal beef, Pakistan's market share remains minimal, highlighting the need for attention from researchers and policymakers.

Objectives

The key objective of this policy brief is to evaluate the current practices in halal beef exports, including sourcing, transportation, processing, and storage, and government efforts to establish an FMD-free zone.



Moreover, the study aims to identify challenges faced by exporters, such as regulatory issues, infrastructure, logistics, and quality control, and to explore opportunities to enhance halal beef exports.

STUDY AREA AND DATA COLLECTION

Exporters in Karachi, Lahore, and Islamabad are mainly involved in beef exports. The study employs a mixed-method approach. A questionnaire was designed to conduct face-to-face interviews with beef exporters in Karachi, Lahore, and Islamabad, aiming to collect various information. The questionnaire covers the demographic characteristics of exporters, current practices in the supply chain of halal beef exports, challenges faced by exporters in halal beef exports (including regulatory, infrastructure, logistics, and quality control issues) and opportunities to enhance beef exports. A profitability analysis is also conducted to explore the economic feasibility of beef export.

FINDINGS

Foot and Mouth Disease in Pakistan and Government Efforts

Internationally, two primary approaches are used to achieve FMD-free status: (1) government

subsidies for FMD vaccination, (2) enforcement of FMD vaccination certificates during animal mobility or purchase. Pakistan has an opportunity to significantly enhance its beef exports by eradicating FMD. Preventing FMD requires just two annual doses of vaccination, costing Rs. 500 per animal. The national-level marginal cost for FMD vaccination would be US\$179 million annually (Rs 51.9 billion/year=Rs. 500*103.8 million cattle and buffaloes). This marginal cost of vaccination can be easily recovered by boosting beef exports, potentially reaching 2.5 million tons valued at US\$13 billion to China and other high-value markets. The government of Pakistan is also attempting to establish an FMD-free zone with vaccination under the China-Pakistan Economic Corridor (CPEC) initiative. Additionally, the government of Punjab and the Chinese Royal Group have recently established a FMD disease control compartment in Sheikhpura. By achieving and maintaining an FMD-free status in this compartment, Pakistan can enhance the health of its livestock, improve productivity, and gain access to high-value international markets that require strict compliance with animal health standards.

In 2017, the Government of Pakistan (GoP) signed an MoU with the Food and Agriculture Organization (FAO) of the United Nations to implement a

preventive FMD vaccination program in the Cholistan region. This region is chosen to establish an animal quarantine zone due to its geographical location, as it has two natural boundaries: the Indian frontier on the back side and the river Sindh border on the front side. Under this program, the FAO assists the GoP by procuring FMD vaccines, training both government and private sector staff in animal treatment and vaccination, and establishing veterinary diagnostic laboratories across the region. All cattle and buffalo are vaccinated free of charge twice a year. The program has expanded to the Bahawalpur division, covering the districts of Bahawalpur, Bahawalnagar, and Rahim Yar Khan. Since its inception, 12 inoculation cycles have been completed, administering 800 million doses of vaccine in the Bahawalpur division. The Bahawalpur Livestock & Dairy Development Department (BLLLD) has reported zero incidence of FMD in 2023, indicating the program's success.

Descriptive Analysis of Beef Exporters

Survey data reveal a notable difference in the ownership of slaughterhouses: about 33% of beef exporters in Lahore own slaughterhouses, whereas in Karachi and Islamabad, the ownership proportions are 75% and 100%,

respectively. This implies that most beef exporters in Karachi and Islamabad can have more integrated supply chains, enabling exporters to better control the quality and activities. Exporters in Lahore have more penetration in international beef markets and exported the highest volume (2,951 tons) of beef during the last six months, followed by Karachi (2,275 tons) and Islamabad (100 tons). The low volume of Islamabad's exports is due to this exporter being relatively new to the market.

Features of Halal Beef Demanded from Exporters

The features of halal beef demanded by importers in Pakistan vary. For instance, three certifications are demanded by importers of Qatar, Kuwait, and Oman: Halal Certificate to ensure the bovine animal is slaughtered and processed according to Islamic laws issued by Halal International or the Punjab Halal Department); Animal Health Certificate to assure high standards of quality compliance issued by Animal Quarantine Department (AQD) in Lahore and Karachi, and Certificate of Origin issued by the Chamber of Commerce and Industry. Although the UAE, Saudi Arab, Egypt, Iran, Indonesia, and Malaysia require four certifications: a Halal Certificate, an Animal Health Certificate, a Certificate of Origin, and a Self-Certification of

slaughterhouses (issued to those slaughterhouses that adhere to strict hygiene and safety standards).

In addition to these certifications, halal beef importers demand various features, including meat from younger animals, desi breeds, pink colour, fat layer, lean meat, and specific packaging types. Exporters must adapt to these demands to maintain their market position.

Practices in Halal Beef Exports from Pakistan

Beef exporters source live animals from their farms, livestock markets, contract farming, or cattle feedlot farms. After this, bovine animals are transported to slaughterhouses, where they are provided with sweet water and feed and allowed to rest for 24-48 hours before slaughtering. Then, the animals are slaughtered by trained personnel and are given a rest of about 5-7 minutes according to Islamic laws. After removing the skin and cutting the animal from the centre, a veterinary doctor at the slaughterhouse inspects the liver and heart of slaughtered animals and prepares an ante mortem report, which must be endorsed by the Animal Quarantine Department (AQD). Meanwhile, the animals are

processed into two or four pieces of carcasses or bone-in cut or boneless, after removing offal. After cutting, meat is chilled or frozen in the chiller or freezer of the slaughterhouses, according to the export order. After this, beef is subsequently packed in cloth or vacuum packaging, depending on the mode of travel or type of meat. Finally, the packed beef is transported in reefer containers via chiller vans from the slaughterhouses to the airport.

Profitability Analysis of Halal Beef Exports

The animal buying cost is the most significant component of costs, which hampers Pakistan's exporters' ability to compete with Indian frozen beef products in the Middle East. The second most significant cost component is the air freight charges, which are crucial for the rapid transportation of this perishable product. Among the minor costs are transportation costs for animals from the livestock market to the slaughterhouse and from the slaughterhouse to the airport, animal handling costs, slaughtering costs, the cost of an animal health certificate, and export development charges. In short, 90% of the costs are attributed to raw materials.

Table 1: Profitability Analysis of Chilled Halal Beef Export

Items	Value (Rs/animal)	Value (Rs/kg)
Animal buying cost	78,000	975
Livestock market charges	340	4
Transport cost from the market to the slaughterhouse	1,000	13
One-day feeding + deworming costs	400	5
Slaughtering + packaging + chilling costs	1,000	13
Animal health certificate cost	240+200=440	6
Transport cost from the slaughterhouse to the airport	500	6
Air freight charges	326.5*80= 26,120	327
Export Development Charges (0.25%)	287	4
Total cost	108,087	1,351
Revenue from beef	1,316*80=105,280	1,316
Skin	1,500	19
Offal earnings	8,000	100
Total Revenue	114,780	1,435
Profit	6,693	84

Note: we assume that an average animal has 80 kg of meat production. We used average air freight charges as given in Appendix IX.

Source: Authors' computations.

A sizeable revenue comes from offal earnings, which highlights how crucial it is to use every part of the animal to maximise profitability. The profit per animal is Rs 6,693, while the profit per kg of beef is Rs 84. This analysis suggests that exporting chilled halal beef from Pakistan to GCC countries is both viable and profitable. Moreover, the beef export industry in Pakistan is a high-volume business, with an average profitability of Rs 24.8 million per

month (Rs 84 per kg*(1,775,333 kg/6 months)).

Challenges and Opportunities in Halal Beef Exports from Pakistan

Table 2 outlines four significant challenges faced by Pakistan's halal beef export industry, along with potential interventions and proposed outcomes.



Table 2: Challenges and Opportunities in Halal Beef Export from Pakistan

Challenges	Consequences	Interventions	Opportunities
Regulatory Challenges			
i. Regulation of meat prices	a. Disincentivise the producers	• Deregulation of meat prices	- Pull factor for productivity enhancement
	b. Lower the quality of meat		- Attract investment
ii. Illegal slaughtering of female and young animals	a. Decrease horizontal growth	• Strict enforcement of the Animal Slaughter Control Act	- Preservation of the female population for breeding
			- Encourage fattening of young calves
iii. Smuggling of live animals to Iran and Afghanistan	a. Difficulty in finding healthy animals for beef exports	• Cut on the smuggling of live animals	- Potential to increase formal exports
	b. Damages the local industry of byproducts (casing, bones, gelatin, etc.)		
iv. High electricity tariff and energy crises	a. Expensive fodder and transport	• Reduce agri-energy tariff on fodder production, livestock farming and meat processing for export	- Enhance international competitiveness
	b. High cost of boneless beef production		- Shift from chilled to frozen beef export
	c. Reduce international competitiveness in boneless frozen beef		- Compete in boneless meat
v. No National FMD-CP	a. Huge production losses and trade barriers to high-end markets	• Implementati on of National FMD-CP	- Access to new high-value markets
	b. Delay in FMD approval of the zone from WOAHA	• Development of more FMD Control compartments and zones	
Logistical Challenges			
i. Limited space in passenger flights for exports	a. Increase the costs of exports	• Fix space in passenger flights or provide cargo flights	- Enhance export volume
	b. Risk of rejection of consignment		

Challenges	Consequences	Interventions	Opportunities
Logistical Challenges			
ii. Limited availability of cold vans	a. Reduce export volume	• Subsidise import of cold vans	- Improve export quality
Infrastructural Challenges			
i. Unavailability of cold storehouse at airports/seaports	a. Reduce beef quality and increase the cost of export	• APMEPA needs space from the government. to build a cold store house at the airport	- Increase international competitiveness
ii. Few breeding farms	a. Difficulty in finding healthy animals	• Encourage breeding farms through subsidy or credit	- Increase beef exports
iii. Few fattening farms	a. Low carcass weight: 196 kg per animal	• Effective awareness and capacity building of farmers	- Export at a high international price
Quality Challenges			
i. Unnecessary inspection at airport	a. Compromise product quality and safety	• Efficient and streamlined monitoring	- Increase competitiveness of exporters in the global marketplace
ii. Expensive and cumbersome process to get animal health certificate	a. Delay in consignment	• Online and 24/7 certification from AQD	- Timely delivery of export order
ii. Lack of animal traceability	a. Cannot track disease or breed	• Increase the scale of the Pakistan Animal Identification and Traceability System (PAITS)	- Gain trust of importers

Source: Authors' computations.



This table identifies that beef exporters face several challenges related to regulatory, logistic, infrastructure and quality that hinder their profitability and expansion of beef industry. By implementing focused interventions—such as process simplification, infrastructure development, skill training, and policy reforms—Pakistan can enhance its position in the international halal beef market, promoting sustainable growth and expanding access to high-value markets.

RECOMMENDATIONS / POLICY IMPLICATIONS

- 1) Implement an integrated regulatory framework, enforcing the Animal Slaughter Control Act, banning live animal smuggling, and developing a national FMD control program.
- 2) Encourage investments in cold storage facilities and imports of cold vans.
- 3) Ensure dedicated space for beef exports in passenger flights.
- 4) Establish a robust quality control system at the slaughterhouses and airports
- 5) Promote PAITS to track breed and disease
- 6) Build the capacity of farmers and exporters through training programs focused on best practices in feedlot management, animal health, and export procedures
- 7) Develop training programs covering biosecurity measures, early disease detection and reporting
- 8) Encourage public-private partnerships to mobilise resources for infrastructure development, research, and technology adoption
- 9) Deregulating meat prices in the domestic market to promote quality. It will help to narrow down the quality difference in the domestic and international markets
- 10) Target high-value markets in China by ensuring compliance with their specific requirements
- 11) Promote the halal aspects of Pakistani beef, particularly in the Middle East and Southeast Asia

UNLEASHING THE POTENTIAL OF PAKISTAN'S IT INDUSTRY: BUILDING FOR MASSIVE SOFTWARE EXPORT GROWTH

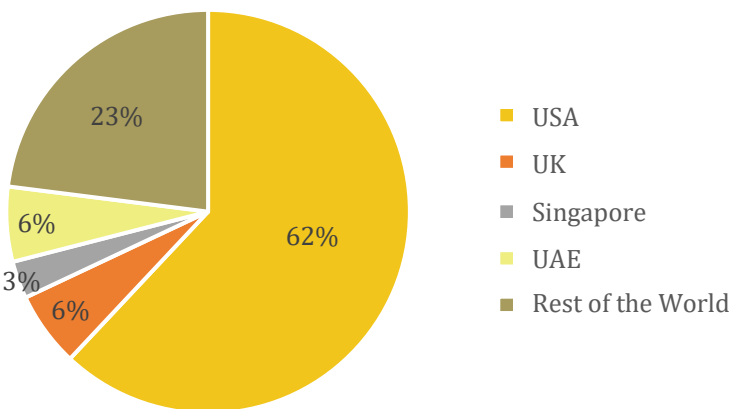
Naveed Arshad, Waqar Ahmad, and Kashif Manzoor

INTRODUCTION

In the current industrial revolution, IT exports are the backbone of any country's economy. The IT sector is the second-largest sector in Pakistan's economy after trading. However, the industry faces challenges that are common to emerging IT markets. In 2022, Pakistan exported \$2.6 billion worth of software services and products. However, when compared to similar economies such as Argentina (\$9 billion), Egypt (\$5 billion), Vietnam

(\$9 billion), and the Philippines (\$26.9 billion), Pakistan's software exports appear less remarkable. The overall export of IT in terms of percentage around the world is shown in Figure 1. From a global trade standpoint, Pakistan's contribution to global exports of Computer Services remains modest, but it has shown growth, rising from 0.17% in 2017 to 0.3% by 2021. However, assessments of Pakistan's export markets and individual firm exports indicate significant potential for enhancement.

Figure 1: Pakistan Software's Services Export (Country-wise)



Source: SBP (2023).

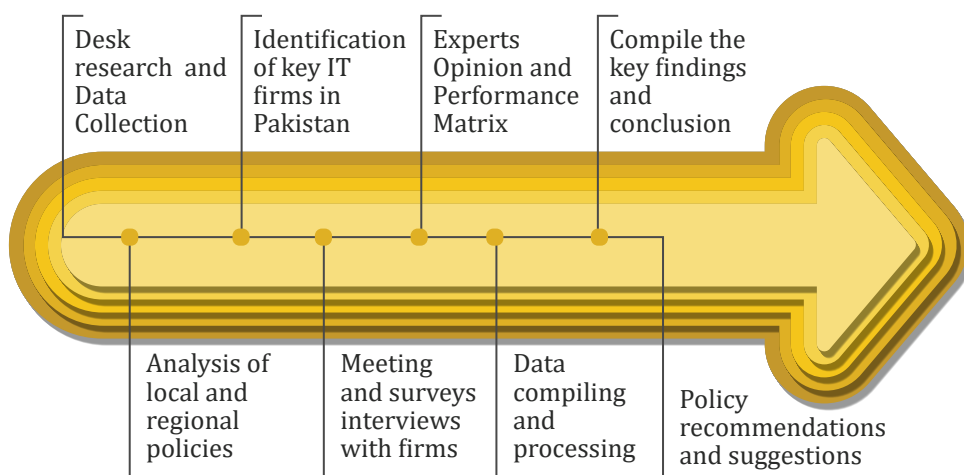
This study seeks to examine the factors influencing the growth and competitiveness of Pakistan's software export industry and outlines strategies for enhancing its global market position in anticipation of the upcoming fifth industrial revolution. The research endeavours to offer policy recommendations that can guide policies and practices aimed at fortifying Pakistan's software export industry, fostering economic growth in the context of the fifth industrial revolution.

METHODOLOGY

The project is segmented into several milestones, as illustrated in Figure 2. The study started with comprehensive desk research into published materials on the software industry in Pakistan and globally. This has been followed by an analysis of local and regional policies, particularly those impacting the IT

sector in South Asia. Key IT-related industries in Pakistan were identified and analysed to gather relevant data. Subsequently, formal meetings were held to gather expert opinions for administering surveys involving representatives from various reputed companies in Pakistan, including Confiz Limited, Systems Limited, NetSol Technologies, and others. A performance matrix has been developed to analyse Pakistan's current standings with respect to other countries based on 10 key variables. The collected data underwent thorough processing and validation. Based on the findings from this analysis and comparative performance matrix, key challenges were identified, and detailed policy recommendations were formulated for both the government and industry to provide a comprehensive understanding for developing a roadmap to enhance IT exports.

Figure 2: Description of the Project and Proposed Methodology



Source: Authors' computations.



FINDINGS AND CONCLUSIONS

A comprehensive analysis indicates a strong demand for enhanced education and training programs to bridge the skill gap in Pakistan's IT sector. There is a clear call for academia-industry collaboration to align educational outcomes with market needs, alongside the necessity for government support in providing financial incentives and fostering a conducive environment for startups and emerging technology sectors.

Based on the performance matrix, despite many challenges, Pakistan holds immense potential, leveraging a low cost of living, though it must address various challenges. Addressing these challenges necessitates a multifaceted approach. Infrastructure challenges, such as poor internet connectivity and high operational costs, coupled with a significant skills gap in technical and professional areas, are noted barriers. Financial constraints, such as funding issues and increased operational costs, are common concerns among surveyed companies. The primary issue is the insufficient supply of human resources, making it a supply-constrained industry. Companies often secure contracts and sales but struggle to find the necessary human resources in the local market, leading to inefficiencies

in the supply chain. Various taxes on human capital reduce costs, ultimately decreasing sales and making the industry less competitive. The Brain drain further depletes the existing human capital, reducing the local IT industry's competitiveness compared to other countries. Government efforts to incentivise the freelance market while disincentivising major IT companies discourage large companies from establishing a presence in Pakistan, resulting in a lack of significant partnerships with major companies. IT-related SMEs are becoming holding companies in other countries to offer tax-free salaries to their employees, thereby retaining the entire profit abroad while only incurring the costs in Pakistan. Collaborative efforts of policymakers at the government level, industry leaders, and educational institutions are essential in building a robust and competitive IT ecosystem.

POLICY RECOMMENDATIONS

Policy Recommendations for Government

Curriculum Alignment: The curriculum should be focused on and aligned with both international standards and local industry requirements. Fundamental knowledge is essential, but the

Higher Education Commission (HEC) must also streamline its curriculum revision process to allow universities to update their course offerings promptly. Ensuring that highly qualified instructors are available for core courses at all institutions is challenging, so a hybrid model utilising online courses from reputable platforms like LUMSx could be beneficial. Industry-specific knowledge is becoming more important than purely technical coding skills. Closer collaboration with industry experts can help develop relevant courses. Assessment methods should evolve to include comprehensive mechanisms, such as the testing protocols used by Confiz Limited, to accurately measure graduate preparedness and align them with suitable career paths. This approach will establish a benchmark for assessing the proficiency of graduates from various universities.

Taxation on Human Capital:

Various taxes on human capital reduce local cost competitiveness, decreasing sales and making the industry less competitive globally. Brain drain depletes existing human capital, further diminishing the local IT industry's competency. High salary taxes often lead local companies to establish entities abroad or use illicit financial channels, exacerbating brain drain. For instance, a 40% tax on salaries of 800k PKR is excessive compared to

developing world standards. In fact, when compared with other countries, including Bangladesh, India, the UK, and the UAE, Pakistan has the highest personal income tax rate of 24% for average IT developers, based on an individual salary of \$2,000, with respect to the UK and the UAE. To bolster the IT industry, the government should protect its workforce with a more lenient taxation policy and view IT services as part of the international market to enhance competitiveness.

Government Procurement:

In many government procurement cases, Pakistani companies receive no significant advantages. Often, conditions are imposed that exclude Pakistani companies from competing in the local tenders. Currently, Pakistani government procurement policies appear biased against local companies. It is crucial for the government to prioritise local companies, which would not only support their growth but also enable them to compete internationally.

Gap between Low-Skilled and High-Skilled Workers:

The integration of AI has significantly impacted the number of entry-level jobs, reducing the distinction between Low-Skilled and High-Skilled workers. High-skilled workers can enhance their productivity by up to tenfold through the effective use of AI, whereas low-skilled workers may not achieve



comparable gains. There should be an increased emphasis on cross-functional education to prepare graduates for the diverse challenges they will face. To mitigate the brain drain and enhance the quality of local talent, there is a need for a scalable, autonomous digital platform that can provide affordable university education to a broader audience of young learners. This scalability would reduce the cost of education and improve accessibility across the board.

Encourage International Companies to Open Offices in Pakistan: The government should encourage international companies to establish offices in Pakistan by implementing regulatory reforms, offering tax incentives, and fostering relationships with global tech giants. Incentives are key. Political and economic instability is not the main hindrance, as companies like Microsoft operate in countries with similar challenges. The government should favour companies investing in Pakistan and address the challenges faced by freelancers and SMEs abroad by implementing balanced tax policies that encourage local operations while ensuring fair contributions.

Encourage Companies to List Themselves on the Stock Exchange: The government should encourage companies to list themselves on the stock exchange, thereby opening up investment

opportunities. To achieve this, rules and regulations should be streamlined and made more accommodating. Moreover, listing on the stock exchange enhances accountability and cultivates a culture of financial discipline among companies.

Define the IT Sector as a Niche: Pakistan should identify and prioritise the IT industry as a strategic niche for national development. By focusing on this industry, the country can leverage its expanding tech talent pool and establish a robust digital economy. To be more specific, the government should focus on a key segment of the IT industry, such as finance, cybersecurity, or software development, and allocate resources to its expansion.

Promote Local Development of Systems: Pakistan should stop depending on costly imports from international businesses and instead invest in building local capacity to produce computer systems and related technologies. Through the development of a domestic manufacturing sector, the country could reduce costs, generate employment, and boost GDP. The initiative would improve Pakistan's technological independence while also making technology more accessible and cheaper for local companies and consumers. A good niche in manufacturing is the IoT sector, which has heavy duties and

taxation on its required components like ICs, capacitors, resistors, etc. It is strongly recommended to define the IoT industry as part of the IT industry with the same set of incentives as the IT industry.

Ease the Invest and Exits for Companies and Facilitate the Investors:

Careem was co-founded by a Pakistani, but the company was incorporated in the UAE instead of Pakistan. This decision was made to facilitate investors, ensuring that when the company exits, they could easily recover their investment. However, this approach may not have been entirely successful if this company were incorporated in Pakistan, as it remains uncertain whether investors will get their money back. This issue raises important questions. As a result, most product-based companies do not invest in Pakistan, while the majority of investment-focused companies are service-based. The government should facilitate exits and provide guarantees to investors, ensuring they can recover at least a portion of their investment if the company exits. Bringing start-up investments into Pakistan is an uphill journey, and rules on outward foreign currency flow make it impossible to exit.

Resolve the Internet and Connectivity Issues:

In this era of the industrial revolution, Pakistan still lags in terms of quality internet and connectivity services. When

compared based on internet speed, Pakistan ranks 101st out of 111 countries in mobile internet and 145th out of 160 in broadband internet. Only 45.7% of the overall population has access to good internet connectivity. While the world has moved on to 5G and even 6G, the country is still primarily relying on 3G/4G networks. These statistics are alarming, and the government should take immediate measures to improve efficiency and provide quality internet access to every corner of the country.

Strategic Recommendations for Industry

Workforce Training: IT companies should conduct their own training programs, with private industry investing in talent development to balance demand and supply. However, this requires significant financial commitment, feasible only for a few large organizations. The government could incentivise companies by offering free land, space, or other incentives. Designating existing technology zones for companies that establish skill development centres alongside their operations would encourage private sector participation in skill enhancement.

Leverage Emerging Technologies:

The field of developing technologies, such as AI, is currently driving significant advancements in automation and analytics. Along



with AI, blockchain technology is the way of the future. It provides decentralised security and transparency that extends beyond banking and can be applied in industries such as supply chain management and healthcare. Companies should diversify their efforts to incorporate blockchain and AI to navigate this transformation successfully.

Focus on Product Development in Addition to Servicing: Companies should broaden their scope to incorporate both service and product development. Successful companies, such as NetSol, which have persevered during difficult economic times, can serve as models. Companies can create new revenue streams, strengthen their market resilience, and reduce their dependence on external economic variables by investing in the development of innovative products.

Revaluation of Operations and Strategies in the Context of Generative AI: Companies should reevaluate their operations and strategies in the context of developments in Generative AI. They can unleash new creative possibilities, optimise workflows, and significantly increase productivity by incorporating this

state-of-the-art technology. Adopting generative AI can enhance decision-making skills, provide competitive advantages, and lead to the development of more personalised and effective services.

Assist in Enabling Startup Culture in Universities: Companies should aggressively encourage and assist university startups. Companies can provide aspiring entrepreneurs with invaluable resources, such as funding, market knowledge, and mentoring, by collaborating with academic institutions. Additionally, fostering a startup culture at the university level can help bridge the knowledge gap between industry and academia.

Promote Internationalization: One major factor behind Systems Limited's growth is its internationalisation. They have offices in various countries, along with corresponding teams of developers and specialists, which allows clients to choose the location where they prefer to work. Other major IT companies in Pakistan should adopt this approach and promote internationalisation as much as possible. This will help them expand their footprint in the international market.

RASTA Publications

- 2022 RASTA Local Research, Local Solutions (LRLS): Energy Issues, Volume 1
- 2022 RASTA LRLS: Urban Development, Volume 2
- 2022 RASTA LRLS: Technology & Public Service Delivery, Volume 3
- 2022 RASTA LRLS: Social Sector Development, Volume 4
- 2022 RASTA LRLS: Markets & Regulations, Volume 5
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