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Research Paper

Role of Industrial Structural Output in Pakistan's Economy

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Abstract

This Paper explores the significance of industrial structural output for Pakistan's economy focusing on GDP analysis. This may be about the mixed fortunes of the industrial sector, where sub-sectors like small-scale manufacturing and construction are relatively healthy whereas Large-scale manufacturing and utility services are structurally and operationally challenged. The factors considered in identifying the determinants of industrial value-added include FDI, export and import, employment, tariff measures and quality of infrastructure. Using the ARDL evidence both in the short-run and long-run relationships, the coefficient result denotes that there is a positive effect of trade and infrastructure on industrial value, further negativities of inefficiencies in the utilisation of labour, high tariffs and CO_2 emissions on growth.

This analysis focuses on the critical role of sectoral development in driving economic growth and correcting structural inefficiencies in Pakistan. The manufacturing sector, burdened by neglected technology and low productivity, presents great potential for value chain integration and export competitiveness through technological modernisation. The energy sector, marred by shortages and inefficiencies, needs investment in renewable energy and infrastructure upgrades to facilitate industrial productivity and lower costs. With agriculture, its unutilised potential can be availed through modern techniques with efficient supply chain logistics by augmenting food security, along with raw material inputs to industries such as textile and food processing.

Therefore, the study concludes that investment in trade liberalisation, infrastructure, skill development and sustainable measures are critical drivers to unlock the industrial sector growth. Some of the policy implication targets are tariff cuts, FDI promotion, infrastructure development, green technology adoption, and making industrial policies robust for the development of the economy and welfare of the people in Pakistan.

Introduction

Structural change refers to the process of change in production specialisations or a shift from low technology, low skill intensity and low wage rate activities to high technology, high skill intensity and high wage rate activities. This paper aims to apply newly developed methods and tools for examining past patterns and possible future directions of structural change in Pakistan to evaluate its previous economic experience and to advocate for future economic development[1].

As has been observed in other countries of South Asian region, Pakistan also was now moving from an agriculture-based economy to a service-based economy. While manufacturing has assumed different roles at various points of development in East Asia, the share of manufacturing to the GDP of South Asian major economies has plateau at 1980 level except Bangladesh. The decline has mainly, been offset by the growth in the service sector as we shall see in this paper. In the Indian case for instance, where the economy has been growing healthily in the last 25 years, a weak manufacturing might not be such a huge problem.at different stages of economic development, South Asia's manufacturing share of gross domestic product (GDP) has remained stagnant since 1980 in all major economies except Bangladesh. The fall of agriculture has been largely picked up by services. In countries like India, where the economy has been experiencing healthy rates of growth for the past quarter of a century, a lacklustre manufacturing sector may not translate to a major concern. In the case of Pakistan the burden is not exactly situated that way. The growth trend of the country since 1960 has been declining and the country's economy mainly relied on the inflows of aid. However, a young and primarily low skill labour force including women has been augmenting. Carrying out low skilful labour as China, intensive manufacture is part of the road map to steer the country towards achieving higher medium-term growth and more inclusive prosperity. With a continuous advancement in the value chain by China enchants a more specialised labour force and rising wages then the vacuum could well be filled by Pakistan same as Bangladesh. The following literature has some content about the following facts During the previous administration[2].

[1]Hausmann, R., & Klinger, B. (2008). Structural transformation in Pakistan. Center for International Development, Harvard University, Cambridge.

[2]Sanchez-Triana, E., Biller, D., Nabi, I., Ortolano, L., Dezfuli, G., Afzal, J., & Enriquez, S. (2014). Revitalizing industrial growth in Pakistan: Trade, infrastructure, and environmental performance. World Bank Publications.

In its development efforts Pakistan used the framework called the Framework for Economic Growth launched in 2011. Based on the Pakistan's Planning Commission Growth Strategy 2011 Framework, this undertaking introduces the growth plan and reveals the strategic move required to build Pakistan of the future – an industrialised, rapidly developing country. As highlighted in the Framework, this something portable industrialisation has been envisaged to act as an engine of growth towards achievement of the country's economic as well as human development objectives. This new administration in Pakistan is relatively young but has a clear pointer to its preference for continued and inclusive growth[3].

The paper implies the significance of trade liberalisation in promoting access to markets and integration into global value chains. However, it also critically assesses the path and setting in which liberalisation has progressed in Pakistan. A lot of it was prompted by multilateral conditionalities, with no corresponding institutional, infrastructural, or industrial support systems in place. This strategy resulted in early exposure of local industries to foreign competition, leading to deindustrialisation instead of competitiveness. The paper thus does not argue against liberalisation in general but advocates a strategically controlled, phased process that is consistent with local capacity-building and policy protection, so that the gains from openness are shared equitably and sustainably.

Research Question

The research question of this study is as follows

- How do structural inefficiencies, environmental constraints, and policy interventions impact industrial value-added and GDP growth in Pakistan?"

Research Objectives

- To explore the role of determinants such as FDI, trade, infrastructure, and environmental sustainability in driving industrial growth.
- To explore the effect of industrial value added to the national GDP of Pakistan and how Pakistan can improve its industrial structure to contribute in the GDP growth of Pakistan.

[3] GOP 2011. Pakistan: Framework for Economic Growth. Islamabad: GoP Planning Commission.

Literature review

The transformation of an economy's industrial structure as a determinant factor in economic growth has been researched widely especially concerning transition economies. Internationally, industrialisation is positively perceived as a mechanism for transferring from low-technology industries such as agriculture to high-technology industries for manufacturing and services as espoused in the development patterns of the East Asian countries[4]. These countries have thus used more strategic investments in infrastructure and trades and developed human capital that supports industrial growth rates at high levels. Nevertheless, South Asia, inclusive of Pakistan, has remained more or less at a standstill in terms of industrial GCI since the 1980s for the most part, and while Bangladesh has recently entered the global production network export-led industrialisation stream[5].

Regarding Pakistan, prior research shows that structural problems are key constraints of industrial developments. As the authors Amjad and Awais established their work in 2016, the industrial sector face; energy crisis, weak infrastructure, and high tariffs that increase production cost hence deterring competitiveness. Large scale manufacturing (LSM) being the largest sub-sector of the industrial sector has been the most sensitive to the macroeconomic fluctuations and external proximate factors like supply chain vulnerability and shifts in global commodity prices[6]. On the other hand, small-scale manufacturing (SSM) has proved mature, with an average annual growth rate of 8-9% in contrast to high dependence on import and volatile demand of large-scale industries[7].

This growing factor has been deemed significant in influencing the performance of industries around the globe though its impact on Pakistan's industrial growth has researched scantily. In other developing countries like India and China research has shown how incorporation of green technologies like renewable energy and energy efficient equipment uplifted the productivity of the industrial sector and also worked to

[4] Lin, J. Y. (2012). New structural economics: A framework for rethinking development and policy. The World Bank.
[5] World Bank. (2020). Bangladesh's manufacturing growth and integration into global value chains. Washington, DC: World Bank.
[6] Zaidi, S. A. (2019). Issues in Pakistan's industrial development. Karachi: Oxford University Press.
[7] Pakistan Economic Survey. (2024). Industrial sector performance: Key trends and challenges. Islamabad: Ministry of Finance.

reduce the environmental costs[8]. For instance, CO_2 emissions due to Industrial activities in Pakistan persist and a lot of energy wastage as well as old infrastructure gnaws of the environment and regulatory cost[9].

Deficiencies in the labour market condition also limit IVA in Pakistan to a greater extent. According to the Asian Development Bank's report in 2022[10] there are some constraints to industrial growth which include: skills gap, low levels of human resource productivity, and incompetent training. These challenges are tougher in infrastructure sectors such as construction and utilities; and skilled work force as well as stable energy source is a key to support growth.

This study fills the existing literature gap by analysing the factors that influence IVA in Pakistan by using the Autoregressive Distributed Lag (ARDL) model. Unlike previous research works, this one combine both environmental and structural determinants like CO_2 emissions and quality of infrastructure to provide short-run and long-run impacts on industrial enhancement. Further, the study also reveals that the manufacturing and slaughtering industries at a small scale are even more promising and strong growth engines, which provides policy recommendations for improving the productivity of industries. By filling the gaps in the literature on the liberalisation of trade, labour dynamics and environmental agenda of a country, this study improves the understanding of Pakistan's industrial structural deficit and contributes to the effective attempt at sustainable industrialisation.

Failure to address the industrial structural deficit of Pakistan will have very serious economic and social implications. The trade deficit will continue to expand due to the cost of production, import dependency, and low competitiveness in international markets. The opportunities of global value chains will be missed, and Pakistan will not be able to utilise its geographical advantages and the youth bulge for attracting foreign investment and integrating into the global trading world. The stagnation of the industrial sector will further exacerbate unemployment, especially in the rural and semi-urban sectors, thus deepening economic disparities. Unless and until reforms

[8] Kumar, R., Singh, A., & Sharma, P. (2021). Green technologies and sustainable industrial development: Lessons from India and China. Journal of Cleaner Production, 279, 123456.
[9] Siddique, M., & Khan, S. (2023). Environmental inefficiencies in Pakistan's industrial sector: A policy perspective. Pakistan Journal of Development Studies, 42(1), 101-119.
[10] Asian Development Bank. (2022). Pakistan's labor market trends and skills development initiatives. Manila: ADB.

are undertaken, reliance on outdated infrastructure and energy inefficiencies will drive up the cost of production, discouraging both domestic and foreign investment.

Much trade liberalisation in Pakistan has been motivated not through active national industrial policy, but rather as a conditionality attached to multilateral loans from institutions like the IMF and World Bank. Structural adjustment programs and lending agreements have frequently necessitated tariff reduction, deregulation and market opening without proper sequencing or protection for the domestic industry. Consequently, trade liberalisation was effected in an environment of institutional weakness and poor industrial readiness, exposing local industries to international competition without the technological or financial ability to compete. Critics contend that such externally driven reforms gave priority to macroeconomic objectives at the expense of long-term industrial strategy, resulting in early deindustrialisation and chronic current account deficit. The experience highlights the imperative of synchronising trade reforms with domestic preparedness and institutional build-up, instead of embracing conditionality-based liberalisation that dismisses local economic intricacies.

Pakistan Industry Sector

The industrial sector's performance outlook for FY 2024 is realising its mixed recovery prospects, emphasising opportunities and issues. Those are the year-on-year growth rate: 1.21% remains higher compared to the decline of -3.74% in FY 2023.

Nevertheless, there is a variable trend in the recovery for sub-sectors within the construction industry; some sub-sectors have had robust recovery while others have been experiencing structural and operational challenges. Mining and Quarrying experienced growth rate of 4.85%, due to enhanced conditions for mining and mining operations through demand on raw materials and mineral export. This growth proves the sectors sustained contribution to the improvements of industrial performance.

Manufacturing which is the largest subsector in industry expanded by 2.42%. In the above basket, Small Scale Manufacturing stood out as the best performer, thus growing by 9.08%. This growth may have been occasioned by its ability to align its operations with the local market and its employment contribution. Slaughtering, which is also included under manufacturing industry also recorded a healthy growth of 6.63 percent

boosted by increased do-mestic demand and enhanced livestock production. On the other hand, Large Scale Manufacturing index rose a mere 0.07% due to high inflation rate, high cost of production and disrupted global supply chain. From the trend of LSM, one gets to realise that large industrial units are very sensitive to macroeconomic and external shocks.

In the Electricity, Gas, and Water Supply sector, the figures went significantly down by -10.55%. Lower levels of energy production and distribution indicate significant problems, including obsolete infrastructure, energy scarcity, or problems of the utility services that distribute energy. Reduced investment in this sector is therefore likely to have a negative impact because energy is an essential input in any activity.

The Construction section on the other side reflected good growth rate of 5.86%. Most of this recovery may be blamed to increased private sector expenditure this may be on things like construction of housing units, infrastructure, and other business and commercial projects. The rise in the sector is suggestive of it being a growth driver for the economy, create employment and boost expenditure on other sectors like cement and steel.

Pakistan's recurring over-reliance on short-term commercial banking for the largest share of industrial finance indicates more fundamental structural frailties within its financial system. Lack of diverse long-term financing instruments—corporate bonds, development finance institutions, and venture capital—has denied industries an abundance of choice when seeking patient capital. The fact is being aggravated by immature capital markets, low investor confidence, and regulatory impediments discouraging private sector ingenuity in finance arrangements. Moreover, decades of protectionist industrial policies have encouraged short-term solutions and credit rationing at the expense of the creation of deep, market-based funding structures. Consequently, enterprises suffer from endemic liquidity constraints and cannot make long-horizon investments necessary to drive productivity and competitiveness in the global value chain.

The industrial sector’s improvement in FY 2024 is conditioned by the strengthening of some sub-sectors of industry and the continuation of problems in others. A comparison of results presented in the tables reveals that at industry level, Mining Exhibited high-

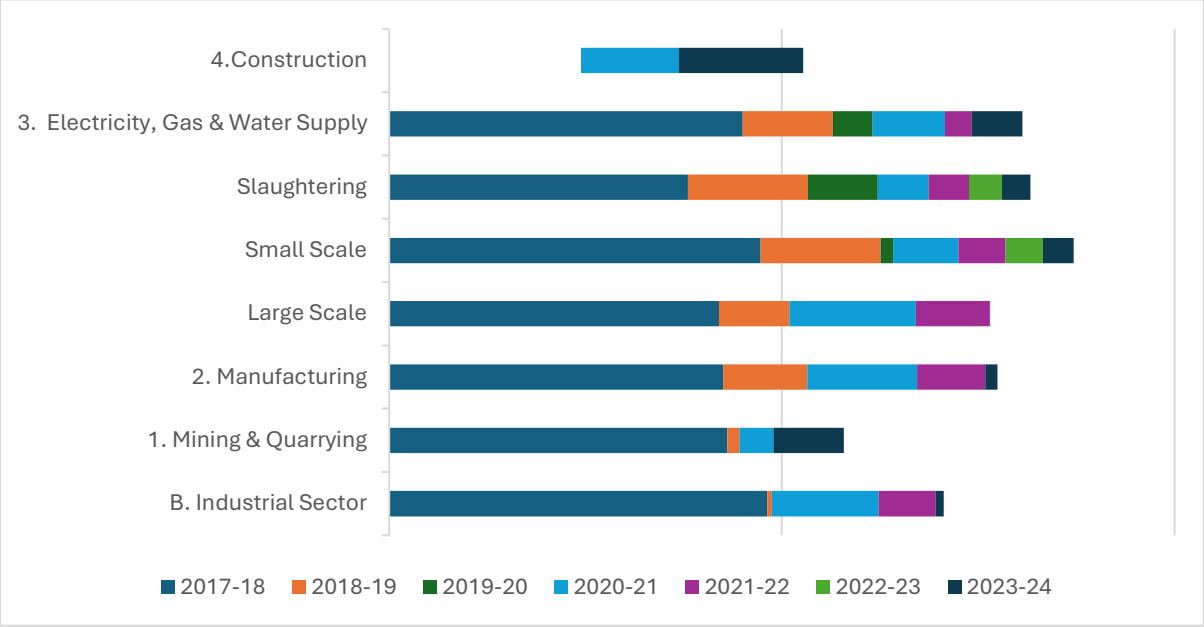
performance, Small-Scale Manufacturing, Slaughtering and Construction displayed moderate performance while the Large-Scale Manufacturing and utility service sectors remained. Fight against inflation, increasing the energy's reliability, elimination of the disruptions in chains of supply are deemed essential in maintaining and enhancing the industrial sector in the future[11].

Table 1: The growth rate of the Pakistan's industry

Sectors	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**
B. Industrial Sector	9.18	0.25	-5.75	8.20	7.01	-3.74	1.21
1. Mining & Quarrying	7.26	0.54	-7.17	1.72	-6.66	-3.31	4.85
2. Manufacturing	7.08	4.52	-7.80	10.52	10.86	-5.29	2.42
Large Scale	6.92	3.53	-11.23	11.50	11.90	-9.87	0.07
Small Scale	8.82	9.01	1.37	8.98	8.90	9.14	9.08
Slaughtering	5.76	5.89	5.90	6.11	6.29	6.41	6.63
3. Electricity, Gas & Water Supply	7.95	5.55	3.53	9.01	4.36	9.95-	10.55
Construction	19.55-	18.14-	3.08	2.39	1.83-	-9.25	5.86
All values are in percentage *Source:PES[12]*							

[11]Pakistan Economic survey 2023-2024
[12] Pakistan Economic survey 2023-2024

Table 2: Industrial Growth Chart:



The chart provides information regarding growth performance throughout the years 2017-18 for different sub-sectors in industries and 2023-24 with variations evidently seen across the components. The overall industrial sector displays much volatility where it recorded high growth rates in the assessment years 2017-18 and 2020-21 which reveal the availability of a favourable operating environment in those years. No such figure could be available for the end of March 2020, but a drop in the amount to Rs 30,000 crore in 2019-20 hints at disruptions, possibly due to the COVID-19 crisis. Thus by the year ending 2023-24 the sector has been moderate to recover after facing some challenges in 2022-23.

The mining and quarrying industries are showing fluctuations with deep declines in 2019-20 and 2021-22. Nevertheless, the sector shows a higher level of performance in 2023-24 indicating better conditions of resource extraction. The two sectors that dominate the total industrial activity index are manufacturing as a sub-sector of the industrial sector and it also shows corresponding movements. From Figure 1, it is clear that it has fallen in 2019-20 mainly due to the COVID-19 pandemic and resultant disturbances in the global supply chain and contradictions in the economy. Thus, large-scale manufacturing alone fails to make quick recovery and is suggestive of problems faced by the big players in the rat chase. Small scale manufacturing industry on the other hand reveals far more stability and is characterised by constant growth rates in

spite of the years of industry cyclical decline. Slaughtering too shows good results due to stable realisations in the livestock processing as well as meat production.

The graphs involving Supply for the sub sector – Electricity, Gas and Water supply gives the indication of the most fluctuating growth curve. Slightly decreased in 2022-23 to show that there are serious issues with energy and utilities infrastructure that probably affected industrial performance. Construction shows volatile trends which have a negative growth in 2019-20 and 2022-23 stating less investment in infrastructure at these years. These projections show, however, that the sector gets quickly back on its feet in 2023-24, which might be attributed to additional reactivation of private consumption and investment or government intervention.

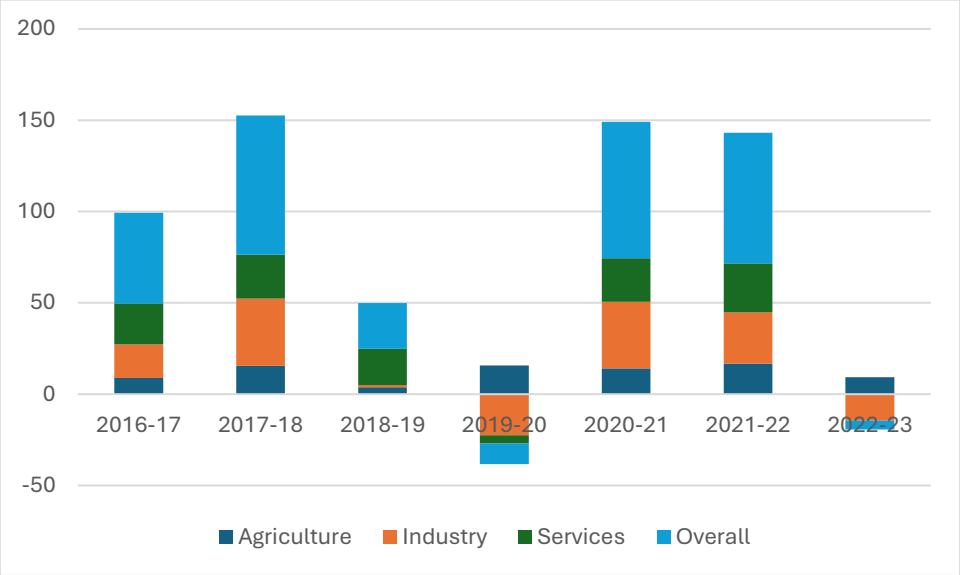
The figures, however, stress 2019-20 as the year of decline in almost all the sub-sectors and a rather contingent recovery in 2020-21 for manufacturing and construction sub-sectors in particular. In 2022-23, the industries comprising the energy sector experience a tough time, on the other hand, the sector of small scale manufacturing and slaughtering revolves around the elevation phase in terms of growth and development, thus, appearing as robust divisions. Construction shows itself to be a very robust recovery industry.

Table 3: Sectoral Wise growth rate

Year	**Agriculture**	**Industry**	**Services**	**Overall**
2016-17	8.89	18.37	22.43	49.69
2017-18	15.49	36.83	23.98	76.3
2018-19	3.77	1.18	19.96	24.91
2019-20	15.69	-22.58	-4.41	-11.3
2020-21	14.09	36.48	23.96	74.53
2021-22	16.83	28.01	26.73	71.57
2022-23	9.17	-14.36	0.19	-5
All values are in percentage *Source: Pakistan Bureau of Statistics*[13]				

[13] PBS. National accounts. 2023-2024. Available at https://www.pbs.gov.pk/sites/default/files/national_accounts/publications/qna/QNA%20Release%20for%202023-24Q1.pdf

Table 4: Sectoral Growth Visualisation



The figure above shows the contribution of Agriculture, Industry and Services sectors as well as their combined effect on economic growth for the FY 2016-17 to FY 2022-23. Every bar is indicative of the total contribution of these sectors to the cumulate growth as it also shows their performance and the importance in comparison to other sectors.

Looking into the chart of overall growth from FY 2016-17 to FY 2017-18, but it reveals that Services emerged as the most dominating income sector. Agriculture also is continually increasing while industry's contributions are moderate during those years. This suggest sectoral stability before facing difficulty in the subsequent fiscal periods as highlighted next. In the financial year 2018-19, there is a stupendous drop in the overall growth with Industry experiencing a decline. Industry portrays a smaller positive percentage than the previous years which is also the case with Agriculture and Services. This a clear indictment on Industrial performance and implies that during this period there must have been external of internal economic factors such as changes in production, trade or industrial investment.

The year FY 2019-20 unveils a dramatic regression in the overall growth scenario of India and the Industry as well is in negative contribution. Services also shrink sharply and barely grow for Agriculture to support the decline. This period probably covers the times of the global economic slowdown due to the COVID-19 pandemic affecting multiple spheres at the same time. Annual growth in FY 2020-21 also indicates a

significant improvement in overall growth led significantly by Industry and Services. The agriculture industry also has moderate contributions and could be seen as reliable during the progress of recovery effort. This period defines recovery of the economy from major shocks that may upset growth pattern. The summary of FY 2021-22 shows that overall growth remains positive, While Services are again ranked highest with Agriculture and Industrial taking the second position. Thus, the overall performance is still high, however, the contributions are lower than that of the FY 2020-21 peak recovery point, suggesting that the segment is stable after the marked upturn.

The overall growth in FY 2022-23 has reduced significantly and more than half of the decline is due to the low contribution of Industry. Agriculture and Services hold mild ratios but their combined influence cannot compensate for a sharp Industrial pull back. This has been an indication of the ever menacing issues within the industrial sector probably as a result of inflation, energy problems or macro-economic fluctuations. This chart also strongly supports the relevance of placing Services at the apex of the leading contributors to the growth over the years while agriculture, though steady, is a minor player. The most fluctuation in carbon emission is shown in the Industrial sector, which is proved to be more vulnerable to the blow of the economic recession and structural problems. This visualisation therefore calls for sustainable economic growth and development as regards the sectoral productivity.

Table 5: Components of Industry FY 2024

Industrial Activities	**Share in Industry**	**Share in GDP**	**Growth Rate (%)**
1. Mining and Quarrying	9.13	1.66	4.85
2. Manufacturing	65.25	11.89	2.42
i) Large Scale	45.24	8.24	0.07
ii) Small Scale	12.65	2.30	9.08
iii) Slaughtering	7.37	1.34	6.63
3. Electricity, Gas, and Water Supply	12.61	2.30	-10.55
4. Construction	13.01	2.37	5.86
All values are in Percentage *Source: PBS*[14]			

[14] Pakistan Bureau of Statistics. Industry. 2024. Available at https://www.pbs.gov.pk/content/industry

Analysing the industrial sector's contribution to the economy as presented in the table below for FY 2024:- Sub-sync shares in the total industry • Sub-sector shares in GDP • Sub-sector growth rates. Mining and Quarrying is about 9.13% of the industrial portion and 1.66%of the GDP with a growth rate of 4.85%. This means that there is steady growth that may have been occasioned by demand in raw materials and constant mining exercises. Manufacturing takes the largest proportion of the industrial sector with 65.25% and accounts for 11.89% of the GDP. The average industry growth rate is 2.42% therefore indicating moderate growth for the manufacturing industry. Among manufacturing industries Large Scale Manufacturing dominates with 45.24% contribution in the industry and 8.24% in the GDP and a very slow growth rate of 0.07% showing problems like Inflation, Supply chain disruptions or weak demand. Small Scale Manufacturing contributes 12.65% to the industry and 2.30% to GDP although growing strongly at 9.08% for the period, this sector is more adapted to the domestic market. Slaughtering share is 7.37% in industry and 1.34 % in GDP with a comparatively high growth rate of 6.63%, it may due to constant demand of meats and other related products.

The sub-sector Electricity, Gas and Water supply is only 12.61 % of the Industrial value added and 2.30% of GDP, yet it has contracted with - 10.55% growth rate. These are quite suggestive of major issues which might include problems such as energy scarcity or problems in the efficiencies of essential services such as the utilities for industry. Specifically, it estimates the construction sector to represent 13.01% of the industrial sector and 2.37% of GDP, with at a growth rate of 5.86% which points to recovery in infrastructure development as well as in the private sector. This sector seems to have moved in sync with government's expenditure and the real estate market.

The statistic data reveal the structure of the industrial sector through identifying the limits and growth in manufacturing industry especially in small scale manufacturing and slaughtering industries as the most potential backward link for the industrial sectors. Nevertheless, the average growth of large scale manufacturing suggests structural problems The performance of large scale manufacturing is evidence of structural issues. A major concern that has not pulled through positive change is Electricity, gas and water supply with a major negative growth Existences recorded in construction, underlined its importance in the industrial process and employment

creation. In summary of the table, the industrial sector appears to give a fairly good picture but has some weaknesses that need improvements.

Manufacturing, construction and utilities are important subsectors of Pakistan industrial sector and each sector has significant role in contributing to the economic development, employment opportunities and industrialisation. It has been identified that small scale manufacturing constitutes a strong growth, recovering industrial segment; the major characteristics of which include its orientation on the internal market needs, the large scale employment opportunity to the population especially from the rural and semi urban areas employment opportunities that it offers to people. Nevertheless, much has not been achieved because of constraints like restricted export opportunities, use of outdated equipment, and inadequate funding in technology upgrade. The sector can create new opportunities for growth and competitiveness in both domestic and global value chains through linking small-scale manufacturers to value systems, offering cheap funding for technological enhancements, and supporting industrial clusters.

Contrary to that construction sector is one of the fastest-growing sectors with 5.86% growth rate in FY 2024 because construction sector acts as a key support to industrial and economic growth as far as multiplier effect on allied industries like cement, steel and glass etc. This sector not only serves to remedy deficiencies in the stock of physical capital but also generates highly significant demand for low and semi-skilled manpower. However, a key drawback that hinders its growth is that its environment is encumbered by regulations, inflation which contributed to a corresponding increase in costs, and dependency on imported inputs. The targeted measures, including the simplification of the approval of projects, increasing the use of domestically manufactured construction products, and funding affordable housing, will help provide a continuous and effective development within this sector to continually support successful urban development and infrastructure establishment.

The three main categories under utilities, namely electricity, gas, and water supply are fundamental to keeping industrial activities and Pakistan’s industrial structure viable. However, the sector is inefficient and has shrunk by - 10.55% in FY 2024, because of old infrastructures, many times outages, and high transmission losses. This is more so apparent in the energy sector where fossil has been proven to cause high cost and

is negative to the environment calling for an immediate shift to renewable means. Systemic inefficiencies require radical changes that include upgrading the existing distribution networks, and more importantly investing in renewable power projects, incorporating of energy efficiency measures. Maintaining the security and affordability of the supply of utilities is also an important factor that contributes the industrial growth as well as acts as an incentive for foreign investment.

Industrial Policies

Investment Incentives

The industrial policy of the government for the country as well as for the foreign investors are the same in terms of investment incentives concessions and industrial facilities required for the growth and development of industries. While most of them form part of federal budget, the government uses Statutory Regulatory Orders (SROs) which are one-off policy announcements made through executive orders, to provide industry-specific incentives. Specific sectors such as the information technology business and solar energy enjoy different types of fiscal's incentives. As for the common Structure of guarantees, it can be concluded that the government does not provide guarantee for FDI projects, as well as jointly finance FDI projects. But under the 1994 Power Policy AEPB, the government offered sovereign risks for long term power purchase agreements that assured payments to IPPs in case of non-payment. The government has also ensured sovereign guarantees for both CPEC and non-CPEC related projects includes investment and returns and in Joint venture.

Among others, the SBP provides various incentives and borrowing facilities for Small & Medium Enterprises and other segments of economy for renewable energy sector, youth, agriculture, women entrepreneurs and housing needs. The current government of Pakistan has nurtured investment incentives regarding renewable energy which include feed-in tariffs, net metering, tax exemptions and soft loans. The 2019 Alternative and ARE also seeks to double the contribution of renewable power from the current 5% to 30% by 2030. The policy suspends import duties on imported machinery for manufacturing and production in the country and also removes corporate income tax for renewable energy projects.

The government permits import of renewable energy equipment and energy storage systems without paying any duty. However, concern with the storage technologies has

been expensive thus the slow investment into the equipment. The 2020 EV Policy aspires to achieve the overall EV market penetration of 30% by 2030 and to encourage setting up of charging infrastructure through diverse incentives; Extra Custom Duty Rebate, Sales Tax Exemption, and Tariff Rate Quota for charging stations for Electric Vehicles.

Export processing zones (EPZ) of the government are in Risalpur, Gujranwala, Karachi, Sialkot, Saindak, Gwadar, Reko Diq, and Duddar. These zones facilitate tax and duty holidays on equipment, machinery, and materials for the investor; and the indefinite loss carry forward; and Single Window of the EPZ Authority for import and export clearances.

The 2012 SEZ Act as supplemented in 2016 permits domestic and export-driven enterprises to launch companies, and cooperation between the state authorities and the private sector within SEZ. In light of the Pakistan's 2013 Investment Policy, any manufacturer who brings in technologies that are not available in the country can be awarded the same incentives as companies are afforded in the country's SEZs. Currently, 24 Special Economic Zones have been planned in Pakistan. Some of incentives given to all investors in SEZs include; Tax incentive of 10 years tax credit, Waiver of import duty of plant materials and machinery one and for all, Connection to utilities easily. Despite these advantages for both foreign and domestic companies, Pakistan's SEZs have not been successful in attracting investments because of the following reasons; location and absence of fundamental infrastructural facilities. Pakistan also plans to set up nine special economic zones under CPEC Each of those SEZs is still in the early stage of development and at present does not have adequate infrastructure.

Special incentives are available to EOUs, which refers to a free standing industrial unit engaged exclusively in exporting 100% of its production. Some incentives for EOU are tax holiday for machinery and raw material imported into the country and exemption from import duty of motor vehicle. EOUs can set up their business anywhere in the country. The laws also entitle both foreign investors and local investors to the similar investment privileges within Pakistan.[15].

[15] https://www.state.gov/reports/2024-investment-climate-statements/pakistan/

Although the influence of the political elite on economic decisions is considerable, historical economic literature and evidence from emerging markets imply that diversified sources of finance, especially market-based and structured finance (e.g., green bonds, sustainable finance instruments), played an important role in financing green energy and large-scale infrastructure projects in the world. These include India and Vietnam, where market-based finance has greatly promoted renewable energy and industrial projects, discrediting the argument that no nation develops through these channels. The secret is in open governance and efficient policy implementation and not the form of financing.

Visualise trends in IVA, sub-sector performance, and growth rates.

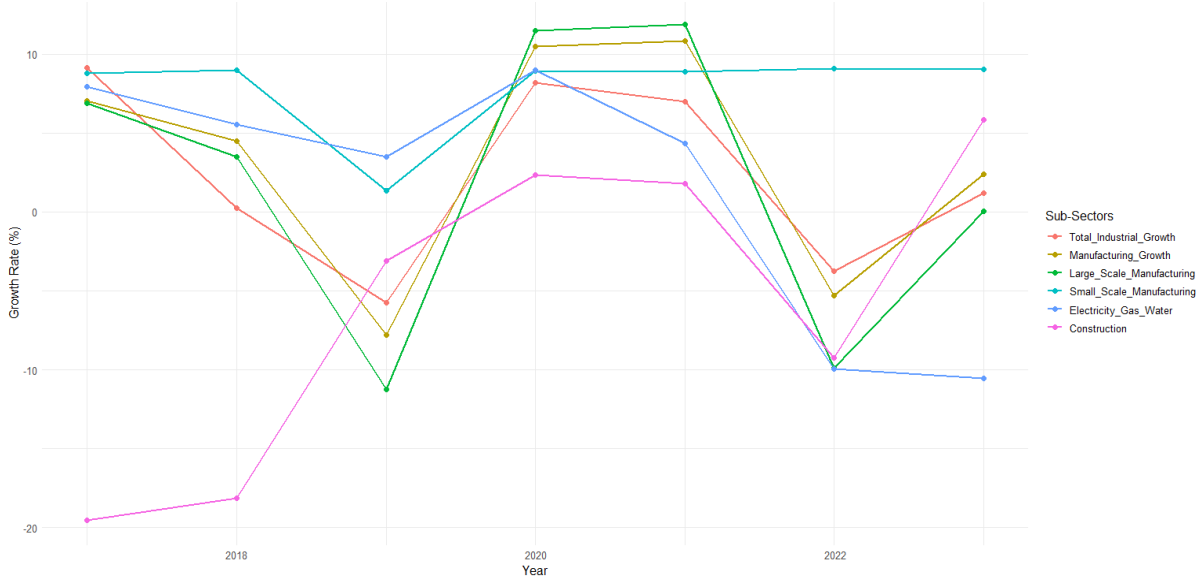


Figure 1: Industrial Valu Added (IVD) and Sub-Sector Growth Trends

The chart provides an important perspective on how Industrial Value Added (IVA) and all its sub-sectors have been growing and functioned from 2017 to 2023. Another wins theoretical steady growth rate, as small scale manufacturing shows moderate steady growth rates of about 8-9% for the period. Its comparative features are resolution in domestic demand, flexibility and relatively low necessary capital to compare with large-scale industries and making it a stable support for industrial progression in case of economic events. On the other hand, large scale manufacturing reflects high fluctuations and contracted significantly in 2019 (-11.23%) and 2022 (-9.87%) due to economic throw away, import compression and energy crunch. This is due to the fact that although the sector had a brief period of recovery in 2020 the volatility evidenced

shows that it requires the right polices to increase energy efficiency and stabilise inputs and investment.

The utility sector (electricity, gas and water) continues to experience issues whereby the decline is projected to be worst in 2022 with a -10.55% The industry has structural problems, outdated networks and often energy shortages. This poor performance complicates challenges underlying other industrial sub-sectors thereby signifying the need to for change in investments such as renewable energy and the modernisation of distribution networks. The construction sector is notably the most volatile with dropping to -19, 55% in 2017 and rising to 5, 86 % in 2023. An impressive increase was observed in 2020 due to the growth of infrastructure measures as well as housing and civil construction projects; nevertheless, its development is hampered by high regulations, escalating costs, and the import dependence of some materials. One can propose a further enhancement of the construction sector through manipulation with the tax stimulus for mass housing, infrastructure bonds, and simplification of effective legislation.

The stock market has an important function in industrial development by offering equity-based, long-term financing that supplements or replaces traditional bank finance. In Pakistan, nevertheless, the connection between stock market development and industrial growth continues to be fragile. Although in theory, a healthy stock exchange has the potential to mobilise capital, allow firms to expand, and decrease reliance on debt, Pakistan's stock market is shallow and industrially underutilised. Few industrial companies are listed, and those that tend to have low investor confidence, governance problems, and market volatility that discourage long-term investment. Additionally, the capital market's limited accessibility—both geographically and in terms of investor base—means that it has not become a mainstream channel for industrial fundraising. Strengthening this connection involves regulatory reforms, better corporate governance, and encouragement of industrial firms to list, which would deepen the financial system as well as promote broad-based industrial development.

Sectoral analysis and the potential growth impact on Pakistan

Sectoral analysis pinpoints strengths and challenges within industries to spur reform efforts and sustainable growth. Industrialisation improves manufacturing boosts

exports, increases employment and stimulates innovation. Renewable energy investment cuts cost and removes shortages in power-reliant industries. Modernising agriculture increases food security and produces raw materials for agro-industries. It improves the economy by developing information technology and infrastructure with a reduced cost of doing trade, hence attracting investment. Growth in one sector stimulates others, creating a ripple effect for overall economic stability and prosperity. Strategic sectoral focus unlocks a nation's economic potential and ensures sustainable development.

Sectors	Current Issues	Potential Improvements	Growth Impact
Industrial Manufacturing	Inefficiencies and outdated technology.	Introduce automation and advanced machinery.	Increased contribution to GDP.
	Low export competitiveness.	Focus on export-oriented manufacturing.	Job creation.
	Weak value chain integration.	Enhance value chain integration.	Greater integration into global value chains.
Energy and Utilities	Energy shortages and reliance on non-renewables.	Invest in renewable energy projects (solar, wind, hydropower).	Lower production costs.
	Inefficient transmission and distribution systems.	Upgrade infrastructure to reduce energy losses.	Improved industrial efficiency.
			Attraction of foreign investments.
Agriculture and Agri-Business	Low productivity and inefficient supply chains.	Introduce precision farming and high-yield crop varieties.	Boosted rural incomes.
	Post-harvest losses.	Develop food processing and logistics.	Enhanced export potential.
	Lack of modernisation.		Raw material supply for industries like textiles.
Textiles and Apparel	Dependence on raw material exports.	Encourage vertical integration from raw materials to finished goods.	Higher foreign exchange earnings.
	Lack of value addition.	Target high-value markets (technical textiles).	Reduced trade deficits.
	Weak global branding.		Increased employment opportunities.
Technology and IT Services	Limited digital infrastructure.	Implement skill development programs (AI, data analytics).	Economic diversification.

	Insufficient government support for IT startups.	Promote IT exports through government incentives.	Increased FDI.
			Enhanced productivity across other sectors.
Construction and Infrastructure	Poor quality of transport and logistics networks.	Develop public-private partnerships for highways and ports.	Improved trade efficiency.
	Underdeveloped urban infrastructure.	Enhance regional connectivity through CPEC initiatives.	Reduced transportation costs.
			Industrial growth in economic zones.

Methodology

Industrial structural deficit is computed in this study using the effect of different independent variables on the industrial value added for the country. In order to test these associations, this paper uses the Autoregressive Distributed Lag (ARDL) modelling technique, which can suggest short and long-run cointegration between variables, and thus, is especially appropriate for the analysis of FDI. The reason for adopting the ARDL model is because among the variables Under consideration there exists co-integration and the data is tested to be stationary at first difference. This approach provides realistic and accurate estimation of the relationships with the least probability of the occurrence of estimation error due to integration of the mix I(0) and I(1) variables. The co-integration between the series of interest and the selected non-stationary variables are tested using the ARDL bounds testing approach and, subsequently, the short-term and long-term parameters are estimated. The correlation exists between the data of this study which is why this study uses the ARDL model to check the short-run and long-run relationship. Thus, this research methodology points out how these independent variables affect industrial value-added in the short and long run to appreciate both the short-term and endogenous effects of the variables. One of the limitations of the ARDL model is if the data is stationary at I(2). Because all the data is stationary at I(0) and I(1) levels so this study can run the ARDL model.

Data Collection

The data for this study has been sourced from reputable and diverse resources to ensure the reliability and comprehensiveness of the analysis. Time series data has

been used in this paper with the time period from 1999-2023. The following sources and variables are considered:

The study relies on data from various reputable sources to analyse the factors influencing industrial value-added and the broader implications for addressing the industrial structural deficit. Data from the World Development Indicators (WDI)[16] includes Foreign Direct Investment (FDI), representing the flow of external investment into the industrial sector; Trade (exports and imports), which reflects trade performance and its contribution to industrial growth; Terms of Trade Adjustment (TTA), capturing the impact of trade terms on industrial development; CO_2 emissions, measuring the environmental costs of industrial activities; Labor Force, indicating the role of human resources in industrial output; Industrial Value Added (IVA), serving as the dependent variable for the analysis; and Tariff Rate, highlighting the influence of trade policies on industrial performance. Additionally, data from the Pakistan Bureau of Statistics (PBS)[17] provides information on Gross Domestic Product (GDP), which is used to examine the relationship between industrial value-added and GDP. The Pakistan Economic Survey[18] contributes data on infrastructure, transport, and other key sectors, which are utilised to develop the Infrastructure Quality Index (IQI). This index, created specifically for the study, uses data on transport infrastructure and other connectivity means to reflect the quality and availability of infrastructure, a critical factor in enhancing industrial productivity and growth.

the study incorporates data from multiple sources to provide a comprehensive approach to capturing factors influencing industrial value added and its implications for Pakistan's industrial structural deficit. This comprehensive dataset contributes significantly with strong potential to carry out synthesis of the short-run and the long-run dynamics which may in turn assist policymakers within the development of proper strategies towards the elimination of industrial deficit and subsequently enhance the economic performance.

[16] World Development Indicator. https://databank.worldbank.org/source/world-development-indicators
[17] Pakistan bureau of statistics. National Accounts, 2024. Available at https://www.pbs.gov.pk/content/national-accounts
[18] Pakistan Economic Survey 2023-2024. Available at https://finance.gov.pk/survey_2024.html

Theoretical framework

The theoretical framework serve as a basis of this study by presenting the hypotheses that would explain relationship between major economic factors. On this ground, two equations have been developed to model industrial value-added and the national GDP. These equations are intended to measure effects of different factors on the industrial value-added and, consequently, their share in the national GDP.

Equation I:

IVD= f (ln(FDI),ln(Trade),ln(TTA),ln(Labor Force),ln(Tariff Rate),ln(IQI),ln(CO2 Emissions))

This equation represents industrial value-added (IVD) as a function of several critical factors, including Foreign Direct Investment (FDI), which reflects the role of international capital flows in industrial growth; Trade, highlighting the importance of trade in driving industrial output; Technology Transfer Agreements (TTA), indicating the influence of technological advancement on industrial development; and the Labor Force, capturing the contribution of human resources to industrial productivity. Additionally, the Tariff Rate examines the impact of trade policies on industrial performance, while the Industrial Quality Index (IQI) represents the quality and efficiency of industrial production. Finally, CO_2 emissions measure the environmental implications of industrial activities, which may affect both sustainability and efficiency.

Equation II:

GDP=f(Industrial Value Added)

This equation describes the industrial value-added that forms the driver of the national GDP. It considers the vital contribution of the industrial segment in the Gross Domestic Product of the country. Industrial value-added is argued to be among the key pillars to growth of GDP, therefore continues to validify its place in formulation of economic policies and strategies.

These are the equations that go into empirical analysis so as to regress these relations between the variables in question. With this understanding in mind, the study seeks to offer some understanding of the interrelationships between industrial development for national economies and how and to what extent a range of factors affects industrial value-added.

Results

Short Run results

Dependent variable = Industrial Value Added

Independent varialbes	**Coefficient value**	**P-Value**
FDI	-0.0030374*	0.062
Trade	0.01954721*	0.005
Terms of trade adjustment	-0.0007463	0.341
Labour force	-0.218877*	0.037
Tariff rate	-0.7434507*	0.000
Infrastructure qualitiy index	0.0303546*	0.000
Co2 Emissions	-0.1796024*	0.013
		R-Square= 98

All variable are significant at 1%, 5% and 10% level

Source: Author's Own Calculation

The use of ARDL in the analysis offers the short-run results showing the factors that determine IVA, which can be regarded as the essential information regarding the short-term trends of the industrial sector. Foreign Direct Investment (FDI) has negative coefficient equal to -0.0030374 and has a significant level, 0.062, less than 0.10 which means marginal significance of FDI at 10% level to industrial value added. FDI can be negatively impact the Industrial value added of the country. it could be because of several reasins including misallocation of resources, focus on non-industrial sector, short term adjustment costs, import-intensive operation and underdeveloped supply chain.[19] This implies that, while FDI promotes industrial development in the long term, FDI may have little or even negative impacts in the short-term owing to adjustment costs, structural inefficiencies or misalignment of investment with short term industrial requirements. Trade signifies at 0.1954721; p= 0.05 indicating that trade, which may include exportation and importation, have a strong influence in promoting short-run industrial growth. The evidence of a very high positive correlation herein enhances the rationale of trade liberalisation and market access towards enhancing industrial performance.

[19] https://www.adb.org/sites/default/files/publication/28178/er066.pdf

The result reveals that, in the short-run, the coefficient of the Terms of Trade Adjustment (TTA) variable is negative and insignificant but -0.0007463 (p-value 0.341). Thus, on the one hand, it may be suggesting that trade changes are gradual and may do not exert immediate pressure on industrial processes. The labour force does however have a very negative coefficient of -0.218877(p-value=0.037) and this confirmed the prior theorisations suggesting that an increase in the labour force brings about a decline in industrial value added in the short run. This paradoxical outcome might be due to factors including malemployment, skills gaps, or ill deployment of human capital; all of which negatively impact production and the real industrial growth.

The tariff rates have a highly significant negative coefficient of -0.7434507 (p-value 0.000), showing that as the tariffs are high, the more negative would be the impact on the industrial value added. It underlines the adverse effects of protectionist trade policies on industrial performance, where higher tariffs raise production costs and reduce competitiveness, limiting access to essential inputs and global markets. On the other hand, the Infrastructure Quality Index (IQI) has a very highly significant positive coefficient of 0.0303546 (p-value 0.000), indicating that infrastructure plays a vital role in increasing the productivity of industry. Better infrastructure implies better connectivity, lower transaction costs, and support for efficient industrial operations, which contributes positively to short-run industrial growth.

CO_2 emissions do have a negative impact on the industrial value added: the coefficient is -0.1796024, p-value 0.013. Higher emissions mean worse industry performance. This may due to environmental inefficiency, or regulatory penalty, or unsustainable practices followed by industries that could restrain their output. The high explanatory power of the model, reflected in an R-squared value of 98%, indicates that 98% of the variation in industrial value added in the short run is explained by the included variables. This strong fit emphasises the reliability of the model in capturing the short-run dynamics of the industrial sector.

The results highlight the crucial role of trade openness, infrastructure development, and environmental sustainability in driving short-term industrial growth. They also underpin the potential dangers of inefficient labour market dynamics, protectionist policies, and environmental inefficiencies. In order to ensure balanced and sustained growth in the industrial sector, all these challenges need to be faced by policymakers

through the fostering of a skilled workforce, the reduction of barriers to trade, and the provision of incentives for environmentally sustainable industrial practices. These findings provide very useful insights into the short-run determinants of industrial value added and may inform targeted strategies toward improving industrial productivity and overall economic growth.

Inverse relationship exists in some variables, such as FDI, labour force participation, and CO_2 emissions relative to IVA, due to several structural, economic, and environmental factors. The impact of FDI is adverse mainly because it can be incompatible with the objectives of domestic industries, often targeting areas that are not productive or are heavily import-based and hence do not contribute meaningfully to local value addition. Adjustment costs, comprising competition with domestic producers and reliance on foreign factors, may offset these gains in the short run. In turn, an expansion in the workforce may be negatively correlated if labour lacks the necessary skills or if labour markets are plagued by inefficiencies that result in underutilisation or misutilisation of human capital. Environmental inefficiencies, measured by CO_2, also place both regulatory and operating costs on industries, so reduce the productivity of such industries. These variables highlight systemic deterrents, such as misplaced resources, underdeveloped infrastructure, and institutional inefficiency that could limit the smooth input factor used by the industrial sector to pursue value enhancement continually.

Long Run results

Dependent variable = Industrial Value Added

Independent varialbes	**Coefficient value**	**P-Value**
FDI	-0.16007*	0.006
Trade	0.3061796*	0.000
Terms of trade adjustment	-0.0019603*	0.055
Labour force	-1.754873*	0.055
Tariff rate	-0.3818222*	0.008
Infrastructure qualitiy index	0.527289*	0.000
Co2 Emissions	-0.1440374*	0.010
		R-Square= 96

All variable are significant at 1%, 5% and 10% level

Source: Author's Own Calculation

These are the long-run results from the ARDL model, hence very crucial in shedding light on what factors affect IVA and implying very key notes for policy-making. Foreign Direct Investment reveals a negative coefficient with a value of -0.16007 that is significant at p-value = 0.006. The results put into implication probable inefficiencies in the effective use of foreign investment for domestic industrial growth due to structural constraints, misaligned priorities in investments, or dependencies on sources of funding otherwise foreign. Policymakers could focus on increasing absorptive capacity in domestic industries and ensure that FDI is channeled into sectors with high growth potential and value addition. Trade, with a positive coefficient of 0.3061796 (p-value 0.000), emerges as an important driver of industrial growth and also implores the need to continue open trade policies, further improve market access, and work toward export-led industrialisation. This strong positive relationship may underline the need for trade liberalisation, reduced barriers, and integration into global value chains to maximise benefits from trade on industrial performance.

Liberalisation in Pakistan has actually been shaped by terms imposed by multilateral institutions, which usually criticises the sovereignty and economic autonomy of the country. However, multilateral conditionality usually measures up to international economic standards of market efficiency and transparency. The criticism usually arises

from a lack of local preparedness and poor domestic policy frameworks and not because of the idea of liberalisation. Successful negotiation and domestically-driven policy designs are very important in guaranteeing positive results from liberalisation prescriptions.

The coefficient for TTA is very small and negative (-0.0019603, p-value 0.055), which indicates that its impact on industrial value added is not statistically significant at the 1% level. This may suggest that trade terms adjustments take longer to influence industrial growth significantly or that their effects are mediated by other factors. Similarly, while not in the long run, an increased labor force reduces industrial value added, as evidenced by its coefficient, which is large and negative (-1.754873) with a p-value of 0.055. This counterintuitive result may reflect such challenges as inefficiencies in labor allocation, low productivity, or mismatches in skills leading to underemployment. These challenges could be met by investment in education, skills development, and labor market reforms that may enhance the contribution of the labor force to industrial growth.

The tariff rates, however, depict very strong negative impacts with a coefficient of -0.3818222 and a p-value of 0.008, hence evincing the hurtful effects of protectionist trade policies on industrial performance. Increasing tariffs raise production costs and reduce competitiveness, besides decreasing access to important inputs and international markets. This finding implies that policies that will foster trade liberalisation and reduce trade barriers to increase the competitiveness and efficiency of the industries are much needed. Infrastructure quality—measured by the Infrastructure Quality Index—has a very important coefficient of 0.527289 (p-value 0.000) to industrial development. This finding flags the transformative impact that improvements in infrastructure have had on industrial productivity, connectivity, and cost efficiency. Investment in modern infrastructure like transportation, energy, and communication networks is one of the most crucial channels for further industrial expansion and long-term economic growth.

The CO_2 emissions, represented by a negative coefficient of -0.1440374 (p-value 0.010), have shown that in the long run, environmental inefficiencies and unsustainable industrial practices have adverse effects on industrial value added. It thus largely determines IVA among the sectors: Cement and Steel through its strong

implication of the above imperfections on high fuel intakes; energy production as they entail considerable carbonisation during processes such as in thermal energy; other major sectors and hence in many sectors with industries manufacturing inefficient goods or consuming resources highly. Some examples are offered globally from countries like Germany, China, and India regarding adopting green technology through carbon capture, energy-efficient machinery, renewable energy integration, and the circular economy. For example, Germany integrates renewable energy into the industrial process while carbon capture is adopted by China in cement production through efficient kilns. To reduce emissions and boost IVA, Pakistan needs to embrace energy-efficient technologies, promote renewable energy within industries, introduce carbon pricing mechanisms, and encourage circular economy practices, such as waste recycling. Collaboration with global leaders in green technology and providing incentives for sustainable industrial practices can help align Pakistan's industrial sector with global sustainability goals and improve competitiveness while ensuring long-term environmental and economic benefits.

The findings are an eye-opener for the industries to adapt cleaner and sustainable ways of productions supported by policies that promote green technologies and penalise excessive emissions. The high explanatory power of the model, with an R-squared value of 96%, confirms its robustness and reliability since it explains 96% of the variation in industrial value added in the long run. All these findings underline the critical importance of trade promotion, infrastructure improvement, labor inefficiency removal, trade barrier reduction, and environmental sustainability promotion for balanced and sustained industrial growth. These would provide the policymaker with insights on how to design targeted strategies that address the underlying challenges and, using the identified drivers, maximise the contribution of the industrial sector to economic development.

GDP vs Industrial value added

Dependent Variable	Independent Variable
GDP	**IVA**
	0.1908 (0.061)

Source: Author's Own Calculation

The table represents the relationship between GDP (Gross Domestic Product) as the dependent variable and Industrial Value Added (IVA) as the independent variable. The coefficient value is 0.1908, with a standard error of 0.061 (in parentheses). This indicates that a one-unit increase in industrial value-added leads to an approximate 0.19-unit increase in GDP, demonstrating a positive and statistically significant relationship between the two variables. The low standard error suggests a reliable estimate of the coefficient, further supporting the robustness of this relationship. The result highlights the critical contribution of the industrial sector to the overall economic output of the country, emphasising the need for policies that promote industrial growth to sustain and enhance GDP. This finding aligns with economic theories that identify industrial development as a primary driver of economic growth, as it not only directly adds to GDP but also stimulates other sectors such as services and trade. This relationship underscores the importance of strategic investments in the industrial sector to achieve broader economic goals.

The slow development of large-scale industry of Pakistan is due to reliance on importing, power crises, bureaucratic complexities and lack of modern infrastructure. On the other hand, small scale industries continue to do well because they are more competitive, domestic-oriented, cheaper to run and quicker to respond to adversity. To resolve these issues, large scale manufacturing in Pakistan needs the energy reforms, availability of affordable financing, and technological improvements in operation, which may be conducted as policies.

Conclusion

The findings of the present study testify the significance of industrial sector for the development of Pakistan economy, IVA as well as the interconnection between the mentioned sort of added value. The short-run and the long-run studies presented above also point to a number of issues that indicate that the performance of the aircraft industry depends on a number of factors such as FDI, trade, the efficiency of the labour force, tariff rates, quality of infrastructure and environmental conditions among others. While trade openness and infrastructure improvements are proven positive factors, subsequent shocks continue to dampen the industrial domain’s potential. In more details, the suboptimal use of labour and high tariff rates lead to structural rigidities

and Application constraints on sustainable growth are given by environmental inefficiencies and CO_2 emissions.

The positive relationship between IVA and GDP as agreed in the analysis places the industrial sector at the nerve center of national economic performance. Being one of the main factors which define the GDP, the industrial development occupies the leading position in the determination of economic policies and strategies. This has however been done with the backdrop of Oakley's industrialising economy where areas of weakness within the industrial sector have to be managed with a view of achieving long term steady growth. The vulnerability of energy networks, disruptions in physical energy supply chains connected to a globally integrated logistics system, and swings in key aggregate variables and indicators provide a coherent set of risks that highlight the rationale for targeted interferences.

But there are apparently drafted future prospects and changes which Pakistan's industrial segment can be through. This shows that small scale manufacturing and operating sub-sectors such as slaughtering has a lot of potential in employment generation and development of the new economy that is relatively more, diversified. In addition, the identified research outcomes strengthen the need to use capital investments selectively to the environmentally sustainable measures more so given that the cost of CO_2 emissions for IVA reflects the price of inefficient industrialisation.

It also predicts the possible trend of harmonisation of industrial policies with global market demand, particularly for now that Globalisation is forcing Pakistan to take over the vacuum being created by China from low-skill, low-value manufacturing to high technology manufacturing. Following the advantage of young and expanding labour force and favourable geographical location, Pakistan has an opportunity to develop as the player in labour extensive industries for manufacture.

However, it predicates fundamental reforms, and a drive to surmount systematic imbalances, enhance skills as well as spur investment in high returns segments. The study adds value to the existing literature by identifying causes for industrial value-added and mapping them to the objective of the country's economic growth. It brings out the required balance of integrated initiatives and sound approaches in tackling structural factors in the sector with special focus on the opportunities the sector offers. If the industrial sector becomes oriented towards sustainable growth, productivity

increase, competitiveness boost, it can serve as a long-term promising platform for economic growth and universal well-being. These insights provide a clear direction for policy makers, investors and stakeholders to collectively ensure a vibrant industrial growth landscape for Pakistan. Another important fact is mainstreaming women and marginalised groups into the labour force of Pakistan can tooltip be referred to as a revolution in making to increase and diversify the industrial growth rate and to overcome the social issues and squandering talented human power. Today, these groups are ignored in Pakistan's labour market especially in the manufacturing and industrial zones. Making cultural, structural and policy adjustments it is possible for the country to open spectacular opportunities for the cooperation between disabled and non-disabled people.

Women and marginalised group employment in Pakistan can significantly contribute to the create economic value and help the country in eradicating poverty while at the same time improve the industrial labour force. Nevertheless, gender and other minorities continue to struggle for representation in the industrial sector resulting from working constraints, social characteristics convection, low level of education, and inadequate training, underlying access to formal employment. In this way, Pakistan is ready to solve the problems with labour force deficiency, to enhance productivity, and promote inclusive development using this unexploited human capital.

Industrial growth and matching the global trends in Pakistan require changing its structure, building skills, and making smart investments. Issues such as low productivity, energy waste, and environmental damage require a broad approach. Policymakers must improve the quality of infrastructure, use renewable energy, and encourage sustainable practices in industries. Specific reforms regarding foreign direct investment aligned with industry needs and training programs for a diverse workforce can speed up the move toward a strong industrial environment.

Public-private partnerships (PPPs) are not the only tool but one successful model of several financial instruments. PPPs efficiently transfer risks and bring together public regulation and private-sector efficiency and have been very successful with infrastructure and utility sectors worldwide. PPPs, however, must for Pakistan be supplemented by other financing means like sovereign green bonds, multilateral

agencies' development finance, and equity-based investment to diversify funding and risk sources with effect.

Pakistan's industrial underdevelopment is not merely an outcome of economic limitations, but is deeply entrenched within the political economy of rent-seeking. The political leadership has traditionally restricted economic diversification in the form of short-term patronage, protectionist incentives, and sectoral privileges at the expense of broad-based, productivity-oriented industrial policy. Instead of promoting competitive markets and allowing for private sector-led innovation, policy choices have, in many cases, been made on the basis of vested interests, leading to misallocation of resources, no institutional reforms, and opposition to structural change. This has caused inefficiencies to become entrenched and deterred investment in high-growth, export-oriented, and labor-intensive industries. Confronting industrial stagnation, then, calls for more than technocratic responses but a reorientation of governance priorities away from elite capture towards long-term, broad-based economic change[20].

Future research may be conducted on specific industrial policies that are tailored to the needs of sectors such as small-scale manufacturing, construction, and high energy-using industries. Comparing with other fast-growing economies such as Bangladesh, Vietnam, and India will help understand which are the best ways of growing industries and boosting exports. Furthermore, by studying how global trends, such as Industry 4.0 and green technologies, impact Pakistan's industrial policies, a plan can be developed to bring new ideas into the traditional industries.

Potential Sectors for High growth rate

The potential is related to the different high potential sectors in Pakistan economy including slaughtering, small scale manufacturing, construction and IT industries. The slaughtering sector as for instance recording a burgeoned growth of 6.63% in the FY 2024 can well leap towards international markets such as Halal meat export. Others include tax holidays for new generation abattoirs, export promotion incentives or grants for adoption of hygienic practices, and training of workforce will further improve its impact on the economy. Likewise, low-tech manufacturing, which has recorded a growth rate of 9.08%, is crucial for employment and local markets. It has potential with

[20] An Interview from Mr Haroon Sharif

also little incentives from the government such as low-cost loans for technological advancements, export promotion schemes, tax incentives for research and development and digital literacy grants would allow to tap into this opportunity and assimilate the market into the supply chains. A construction industry which is expanding at a rate of 5.86% in FY 2024, and it provides and leads the construction of infrastructure & urbanisation as well supporting sectors industries. It would benefit from substantive support in form of infrastructure development bonds, tax credit for affordable housing, green construction subsidies, and efficient and effective PPP. Last but not the least, the IT sector which has emergent export market of $2.6 billion in FY 2022-23 volume is transformative. Non-recovery of IT exports, venture capital funds for start-ups, setting up of STZs and support to freelancer and SMEs adopting technology tools can help Pakistan as the industry player in the global digital economy. By offering these high-growth sectors incentives that are collectively tailored, Pakistan can achieve sustainable economic growth, create employment, which will also strengthen industrial and technological profile.

Sector	**Targeted Incentives**
Slaughtering	Tax holidays, export subsidies, grants for hygienic practices, and skill development programs.
Small-Scale Manufacturing	Low-interest loans, export support, tax rebates for innovation, cluster development, and digital transformation grants.
Construction	Infrastructure bonds, tax breaks for affordable housing, PPP incentives, and green construction subsidies.
Information Technology	Tax exemptions for export firms, funding for startups, Special Technology Zones, and freelancer support programs.

Sectors given in the table have to respond to structural economic fault lines like labour market inefficiencies, environmental limitations, technological lag, and infrastructural shortfalls. This paper selects potential sectors (small-scale manufacturing, slaughtering, construction, and renewable energy) based on their resilience, employment opportunities, and ability to integrate into global value chains. Strategic investments and special policies in such sectors directly counter fundamental fault lines such as unemployment, import reliance, ecological decay, and economic disparities, hence offering holistic socio-economic dividends.

Funding Mechanisms for Infrastructure and Clean Technology

Funding Mechanism	**Description**
Public-Private Partnerships (PPPs)	Encourage collaborations between the government and private investors to fund large-scale infrastructure projects, such as energy-efficient industrial parks and renewable energy facilities. Example: Use PPPs for modernising SEZs and logistics networks.
Green Bonds	Issue government-backed green bonds to attract local and international investors interested in funding clean energy and sustainable infrastructure projects. Target projects include renewable energy integration, smart grids, and carbon capture technologies.
International Development Funds	Leverage funding from international organisations like the World Bank, Asian Development Bank (ADB), and Green Climate Fund for projects aligned with climate goals. Example: Seek grants for circular economy practices and green technology.
Tax Incentives for Private Sector Investments	Provide tax credits and exemptions for companies investing in clean technologies, renewable energy, and sustainable infrastructure. Encourage self-funded industrial upgrades by reducing corporate tax rates for green initiatives.

Carbon Pricing Revenue	Implement carbon pricing mechanisms, such as carbon taxes or emissions trading systems, to generate funds for environmental and industrial infrastructure projects. Reinvest carbon revenues into clean technology adoption and renewable energy incentives.
Export Credit Agencies (ECAs)	Utilise ECAs to provide financial guarantees or low-interest loans for exporting green technologies and industrial equipment.
Blended Finance Models	Combine development finance and private capital to de-risk investments in clean technology and infrastructure projects, encouraging higher private-sector participation.

Policy Recommendations

- Reducing tariff rates is essential to lower production costs and increase competitiveness in global markets. Additionally, strengthening trade agreements will improve access to international markets and foster export-oriented industrialisation, ensuring the industrial sector can fully leverage global trade opportunities.
- Investment in modernising transport, energy, and communication infrastructure must be prioritised to support industrial productivity. Addressing inefficiencies in energy distribution and ensuring reliable utility services will help reduce industrial disruptions and support sustainable growth.
- Launching national skill development programs is critical to address labour skill mismatches and enhance productivity. Furthermore, integrating women and marginalised groups into the workforce can leverage untapped human capital, increasing economic inclusivity and resilience.
- Offer tax benefits or subsidies to industries that meet quotas for hiring women and individuals from marginalised communities.
- Developing targeted policies to align FDI with industrial priorities will ensure investments support value-added production and technology transfer. Simplifying regulatory frameworks will attract more foreign investors while maintaining oversight to avoid dependency and ensure sustainability.
- Providing financial incentives and support programs to small-scale manufacturers, known for their resilience and adaptability, is essential. Encouraging innovation and

diversification in small-scale manufacturing will drive growth, generate employment, and improve industrial stability.

- Pakistan needs to diversify the industrial finance environment by encouraging market-based, long-term products like green bonds, sovereign bonds, export credit facilities, and blended finance models. Such instruments have the capacity to mobilise private and development capital, minimise dependence on short-term commercial banking, and finance strategic industrial development with more sustainability and fiscal prudence.
- Implementing policies to incentivise the adoption of clean technologies and renewable energy in industrial production is crucial. Penalising unsustainable practices will encourage compliance with environmental standards and reduce CO_2 emissions, ensuring the industrial sector operates sustainably.
- Consistency in industrial policies is vital to avoid disruptions caused by frequent policy changes. Fostering collaboration between government agencies, private sector stakeholders, and international partners will address systemic challenges and ensure cohesive development efforts.
- Enhancing the effectiveness of Special Economic Zones (SEZs) by improving infrastructure, providing streamlined services, and incentivising technology-driven industries is necessary. Focusing on value chain development will integrate industries and improve linkages between domestic and global markets, boosting competitiveness.
- Implementing measures to control inflation and stabilise the exchange rate will reduce uncertainties for industrial investors. Addressing fiscal deficits is equally important to ensure consistent government support for industrial initiatives and long-term stability.
- Pakistan needs to align foreign direct investment (FDI) with national industrial goals through promoting joint ventures, ensuring local value addition, and transferring technology. The FDI policy needs to reward partnerships that improve indigenous capabilities, link local enterprises to global value chains, and enable long-term industrial upgrading.
- Create safe places to work alongside facilities for childcare, transportation in order to ensure that women take their positions in industries such as; textiles, and food processing.

- Provide tax incentives for industries to maintain a 15-20% workforce of female and marginalised persons with subsidies paid for by the wages of workers.
- Implement a set of financial instruments to increase women's entrepreneurship and lift the least protected categories – women presenting small manufacturing or having access to markets.
- New hires to companies should be women and marginalised workers; the government should, therefore, subsidise their wages for 12-18 months to minimise employer expenses.

Action Matrix

Action Area	Pathways to Solution	How to Implement Each Solution	Actor Responsible	Timelines
Strengthen Global Competitiveness	Develop export-led growth strategies by integrating industries into global value chains and diversifying industrial output.	Provide market access support through trade agreements, develop export hubs, and streamline export processes.	Ministry of Commerce, FBR, and trade associations	5 years
Achieve Industrial Decarbonisation	Implement carbon pricing mechanisms, such as carbon taxes or emissions trading systems, to encourage decarbonisation across industries.	Establish a legal framework for carbon pricing, conduct stakeholder consultations, and phase in pricing mechanisms sector by sector.	Ministry of Finance, Ministry of Climate Change, and private sector representatives.	5 years
Strengthen Supply Chains and SEZ Infrastructure	Upgrade infrastructure within Special Economic Zones (SEZs) to enhance industrial linkages and improve logistics.	Allocate public-private partnership (PPP) funding to build transportation, energy, and communication networks in SEZs.	Ministry of Planning, SEZ authorities, and private investors.	2-5 years
Expand Renewable Energy Integration	Encourage industries to transition to renewable energy sources such as solar and wind.	Provide tax credits for industries investing in renewable energy solutions and create	Ministry of Energy, Alternative Energy Development Board (AEDB), private	2-5 years

		industry-specific energy transition roadmaps.	renewable energy firms.	
Promote Energy Efficiency in Industries	Provide financial incentives for industries to adopt energy-efficient machinery and upgrade production technologies.	Launch a national "Green Industry Grant" program to subsidise retrofitting and upgrades for high-emission sectors.	Ministry of Energy, Ministry of Industry, and private sector associations.	0-2 years
Reduce Tariffs and Simplify Trade Policies	Lower tariffs on industrial inputs to reduce production costs and increase competitiveness in global markets	Conduct a tariff rationalisation exercise led by the Ministry of Commerce and Federal Board of Revenue (FBR), with input from industry associations.	Ministry of Commerce, FBR, trade bodies, and Chambers of Commerce.	0-2 years

About the Author

Dr Aneel Salman holds the distinguished OGDCL-IPRI Chair-Economic Security at the Islamabad Policy Research Institute (IPRI) in Pakistan. As a leading international economist, Dr Salman specialises in Monetary Resilience, Macroeconomics, Behavioural Economics, Transnational Trade Dynamics, Strategy-driven Policy Formulation, and the multifaceted challenges of Climate Change. His high-impact research has been widely recognised and adopted, influencing strategic planning and policymaking across various sectors and organisations in Pakistan. Beyond his academic prowess, Dr Salman is a Master Trainer, having imparted his expertise to bureaucrats, Law Enforcement Agencies (LEAs), military personnel, diplomats, and other key stakeholders furthering the cause of informed economic decision-making and resilience.

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