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Integrated Policy Strategies and Regional Policy Coordination for Resilient, Green and Transformative Development: Supporting Selected Asian BRI Partner Countries to Achieve 2030 Sustainable Development Agenda

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A Green Industrialization Policy Framework for Pakistan

Abstract

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Introduction

Pakistan's Prime Minister announced an Economic Transformation Agenda and Implementation Plan (ETAIP) in November 2024. While noting worrying trends --- chronic low growth in GDP per capita (1.3% over decade), falling low investment, which was 14% in 2024, weak export growth and chronic fiscal stress ---, ETAIP considers that poorly conceived trade policy incentives (such as tariffs, non-tariff barriers (NTBs), taxes, subsidies and price controls) have incentivized import substitution and non-tradables over exports. The ETAIP provides an overall policy framework for growing exports, increasing private investment and maintaining fiscal stability. It is being implemented with the help of extensive regulatory reforms and is adopted by the Planning Commission to help the Planning Commission set develop priorities for the country. Planning Commission has announced a Five Es Development Framework, titled URAAN [Flight], which makes exports the first of five priority areas. The other 4 Es are E-Pakistan, environment and climate change, energy and infrastructure, and equity and empowerment. This framework aims to drive sustainable growth, enhance digital transformation, ensure ecological balance, advance green energy, and promote inclusive economic progress for Pakistan. The forthcoming New Industrial Policy adopts greening of manufacturing as a policy objective. Similarly, the forthcoming Strategic Trade Policy Framework 2025-30, aiming at a translation of the vision of making Pakistan an export-led economy with the help of multiple strategic pivots, chooses the greening of exports as one of the major pivots in Pakistan's production and trade system. These are good news. We hope the Green Industrialisation (GI) Framework, here proposed will be made available to the relevant ministries to help them grow a bigger focus on greening of manufacturing in Pakistan and integrate diverse policy fields and further refine their action plans. Active participation by a large number of policymakers from different federal government ministries and provincial governments demonstrates the presence of a high level of awareness of the need to escalate green transformation of the economy. The increasing ferocity of climate-related events, the 2025 floods being the latest example, have created an acute sense of urgency too. In this regard, the contributions of this UNCTAD project are very timely.

Pakistan is currently under an IMF Program, which has helped stabilize the economy. The government has introduced reforms in many critical areas of the economy, with the help of its development partners and is reorganizing its development agenda and has initiated a number of initiatives to enable the private sector to play its due role in the economic revival of the country. The government has established a high-level Special Investment Facilitation Council [SIFC] not only to facilitate big ticket foreign and domestic investment mobilization initiatives, it is also entrusted with giving a push to policy reform, helping to overcome sticky policy coherence and coordination issues. In these circumstances, the private sector is also more inclined to pay more attention to compliance, though the government is still struggling on the front of resource mobilization, which might pose a challenge for the green transformation of the economy. The IMF however has approved a $ 1.4 billion Resilience and Sustainability Facility aimed at green support.

The IMF recently consented to the government proposal to subsidize the implementation of an ambitious National Electric Vehicle Policy 2025, through a new petroleum levy. This is a big step towards green transformation, taking care of Scope 2 emissions[1] in the manufacturing sector in a significant way. The federal and provincial governments are

[1] Scope 2 emissions are the indirect greenhouse gas emissions that occur from the production of purchased electricity, steam, heat, or cooling that an organization consumes.

investing more in the green transformation public infrastructure, including investments particularly in Punjab, where they have created a uniformed enforcement force for the Environmental Protection Agency of Punjab. Their primary focus at this moment is air pollution being caused by factories. Hopefully, these efforts succeed in promoting the ultimate objectives such as productivity, standards, environmental value, consumer protection, public health and fairer exchange.

Our green development policies in the past have operated, more often than not, at the macroeconomic level, allowing more influential sectors to have better access to relevant public goods provided by the government such as in the energy sector. Studies developed under the UNCTAD project for Pakistan and national consultations have amply demonstrated that, in order to benefit from the new vents of growth in manufacturing created by greening policies/strategies at the federal and provincial levels, Pakistan needs to integrate and align its policies and initiatives in the form of integrated sectoral policy strategies and initiatives, with due attention to sectoral dynamics. This approach should help policymakers to come up with a more sophisticated combination of policies and interventions better suited to the green manufacturing problems of each sector/sub-sector in the respective geographical setting. The proposed GI Framework is situated in this perspective. Since this approach is new, our GI Framework has adopted an experimental development policy design, relying primarily on the 13 studies produced under UNCTAD project for Pakistan.

1. Green Status of Manufacturing in Pakistan

1.1. General

The performance of Pakistan's manufacturing sector, to start with, [as reported in official documents pertaining to the formal economy] has been lacklustre over the past 25 years. The manufacturing sector growth rate stood at 1.3% in the 2024-25 fiscal year and manufacturing and mining together contributed 13.2% to the country's GDP. The sector share in GDP increased only 3.4% from the year 2000 (between 2000 and 2024?) and employment fell by about 3 % (in the same period? Not sure this employment figure makes sense since a period of 24 years is very long and employment could have behaved in more volatile fashion than a 3% fall over such a long period?). Manufacturing performance in Pakistan is a major policy worry. Punjab and KPK (Khyber Pakhtunkhwa) have already announced industrial policies to help manufacturing in Pakistan and the federal government is working on a new industrial policy and is re-jigging other policies, such as tariff and investment policies, and technical and vocational education and training (TVET), with the same objective of strengthening Pakistan's manufacturing sector.

Pakistan stays committed to SDG 9 pertaining to industrial development and has set the following targets for target 9.2:

i. Increase manufacturing value added from 13.56% (2015) to 16% (by 2030?)

ii. Increase manufacturing employment from 15.33 (2015) to 18 %

According to the latest available National Voluntary Review [of SDGs], carried out in 2022, with the data up to 2020, manufacturing value added is stagnant at 12.23 % since 2017.

Indicator 9.4.1 i.e., CO2 emissions per value added, is the most important. The target focuses on the transition of industries to cleaner paths, to make them sustainable and resource efficient, by adopting clean and environment friendly technology and industrial process (linking to SDG 12 adopting clean modes of production). The target is also the key to overall green structural transformation of the economy. The CO2 emissions per value added in 2022 was 0.17kg/$ as compared to 0.20kg/$ in 2017 as per the SDG tracker of the Ministry of Planning Development and Special Initiative, Government of Pakistan. [the relevant dashboard does not include data on SDG 9.4]. The overall annual CO_2 emissions have recently declined after years of increase. This indicates some progress towards greener production methods, though the total level of emissions remains high.

Target 9.5, dealing with research and upgradation of industrial technologies, is also stagnant, with Pakistan currently spending 0.2% of GDP on research and development, though the number of universities and publication has improved. The government had set the target for increasing the research and development expenditure as a proportion of GDP from 0.2 % of GDP (2015) to 2% of GDP by 2030. Given the recent financial crisis and the resultant austerity brought by the IMP Program for Pakistan, this would mean a limited scope of the R&D expenditure going significantly up in the near term.

It can be concluded that Pakistan still faces major structural challenges in terms of SDG 9 and has not yet reached the point where it can be seen successfully transforming its

manufacturing. It is not an exaggeration to say that Pakistan has succeeded much less in greening its manufacturing as compared to many peer countries. We can have a fair idea of the green status of Pakistan by looking at its performance on the Green Future Index 2023. The index has been developed to analyse and measure to what extent economies are moving towards clean energy, innovation, industry, agriculture, and society.[2] The index has four pillars:

i. carbon emissions,

ii. energy transition,

iii. green society (government and industry),

iv. clean innovation.

Pakistan showed some progress toward the greening of its economy in 2022 and was placed at 55 out of 76 in 2022 according to the Green Future Index but its ranking dropped to 67 again in 2023 with its score even below that of 2021. According to the report, the rank indicates that Pakistan is increasing clean innovation such as green infrastructure investments and sustainable policy making and carbon emissions. Energy transition towards renewables is an aspect that measures how much effort is made for the green industrialisation. Pakistan has already committed to NDC to transit to renewable energy by 60% by 2030. The table below shows the breakdown of the Index score.

Pillar	**Ranking in 2023 out of 76**
Carbon emissions	68th
Energy transition	56th
Green society	72nd
Clean innovation	33rd

Source: Green Future Index, 2023

Carbon emissions remain a problem for the country, though energy transition shows a moderate improvement. In terms of green society, it can be concluded that not much has been achieved. The breakdown of the pillar of the green society is as follows:

Green Society

Sub Index of Green Society	**Ranking in 2023 out of 76**	**Score out of 10**
3.1 Green Buildings	59th	4.7
3.2 Recycling efforts	41st	2.6
3.3 Net change in forestation	71st	3.4
3.4 Meat and dairy consumption	35th	6.6
3.5 Green transport	64th	3.4

Source: Green Future Index, 2023

The above table gives a snapshot of what position Pakistan is in. One important difference from the global experience and the top ten countries is that they had started much earlier with investments in green transport and renewable energy i.e. green

[2] MIT Technology Review Insight, “Green future Index”, 2023.

infrastructure. Pakistan has not yet fully achieved the structural transformation of industry and infrastructure, that is, the country is not able to completely transform its industry into green industrialisation. The table below provides a more detailed picture to the effect that the carbon emission pillar is still far behind in green transition.

Carbon Emissions

Sub Index of Carbon Emissions	Ranking in 2023 out of 76	Score out of 10
1.1 CO2 Emissions	48th	5.5
1.2 CO2 emissions growth	66th	5.6
1.3 CO2 emissions growth in transport sector	60th	6.3
1.4 CO2 emissions growth in industrial sector	65th	3.7
1.5 GHG emissions growth in agricultural sector	72st	3.4

Source: Green Future Index, 2023

The current policy focus on NDCs is rather limited to tree plantation and renewable energy. More recently, there is greater attention being paid to the transport sector. The manufacturing processes in any case are still largely beneath the radar of the policymakers, except where export compliances are involved, as elaborated below.

1.2. Major Sectors

1.2.1. Agriculture

The agriculture sector in Pakistan accounts for 23% of the GDP and 37% of the workforce. The sector has various challenges in terms of greening, primarily due to inefficient resource utilization or wasteful use of natural resources, traditional marketing system inefficiencies, disparities in land ownership and lack of effective policies for awareness and education of farmers on climate-resilient and climate-smart agriculture. These problems are further compounded by the vulnerability to climatic shifts and the inadequacy of autonomous adaptation measures by farmers. However, the research study done under the UNCTAD Project on the role of agriculture in green industrialization in Pakistan[3] finds willingness amongst farmers to adopt sustainable practices and climate-smart agriculture. Many farmers have solarised water pumps --- although the underlying motivation is to reduce energy costs ---and this has helped reduce high energy consumption.

A major challenge in Pakistan is that the average farm size has decreased while at the same time number of smallholders has increased creating inequalities in agricultural income of farmers. This has compounded the problems linked with as market inefficiencies due to multiple intermediaries resulting in long supply chain and low farm gate price of the produce. It is hard for a large number of vulnerable farmers to afford green transformation of agriculture.

[3] See: https://unctad.org/system/files/information-document/unda2030d04-pakistan-agriculture_en.pdf

1.2.2. Textiles

The textile sector in Pakistan contributes 8.5% of GDP, around 60% of national exports and approx. 38% of the national workforce. The sub-manufacturing processes mainly comprise cotton ginning, spinning, weaving, dyeing and finishing and fabrication of clothing, home textiles etc. Each of these manufacturing processes entails greenhouse gas (GHG) emissions, water and air pollution, high energy and resource consumption. With the increased use of synthetic fabrics such as polyester coupled with fast-fashion rise, it is imperative to green textile manufacturing industry. The textile industry uses 49% of total industrial water in Pakistan whereas less than 1% of industrial water is treated according to the industry sources. The textile industry, in many areas of Pakistan uses underground water and discharges back chemically polluted water. In Pakistan, 15% of cultivated areas are used for cotton production, whereas 0.38% of global land use is for cotton production. Moreover, 25% of pesticides used globally are used for cotton crops. These challenges of unsustainability in textile sector are not unique to Pakistan but require urgent attention due to its both environmental impact and trade implications with help of integrated green industrialization strategies.[4]

1.2.3. Transport

The transport sector has a high emissions profile in Pakistan. The transport sector in Pakistan largely comprises of road-based network, which has vastly expanded in the last decade. The contribution of transport sector in GHG emissions in Pakistan is third largest with 51.31 million tons of CO_2 equivalent (approximately 10 % of total country emissions). This share has drastically increased since 2010 with rapid urbanization, inadequate public transport and declining railway sector. The major challenges towards greening the transport sector in Pakistan is the limited ability of the masses to switch from private to public transport systems, 95% of national freight demand being met by road networks, poor investment and low priority accorded to railways, slow progress of the oil refineries and local auto-industry in upgrading the for euro-5 fuel standard and lack of clear policy and road map for old fleet renewal, especially old buses and trucks and euro-2 standard private vehicles as the trucks manufactured in 1981–1990 comprise over one-fifth of the fleet. Reduction of transport-related emissions is one of the major objectives of NDCs in Pakistan with an ambitious target to reduce vehicular emissions by 50 % by 2023. [5]

1.3. Sub- Sectors [6]

1.3.1. Kitchenware

Aluminium kitchenware production [stoves, utensils, cutlery] in different cities of Pakistan, with Gujranwala, Karachi, Sialkot, and Wazirabad as the main centres has grown significantly over the past few decades. A good part of production is exported but the bulk stays in the country, in different qualities, reflecting the socioeconomic realities of different households in Pakistan. While studying the sub-sector of kitchen stoves, it was found that, due to the use of poor-quality stoves, a large amount of natural gas is wasted, amounting to 30-40 billion cubic feet. This gas wastage is causing a financial loss of $300 million and accounting for 2% of methane gas emission. Pakistan's aluminium utensils have high potential in Middle Eastern and European markets, but Pakistani products fetched lower prices in the global market due to the absence of Quality Controls (PBC, 2023). The quality assurance measures for raw material used in

[4] See also https://unctad.org/system/files/information-document/unda2030d02-pakistan-textile-industry_en.pdf
[5] See also https://unctad.org/system/files/information-document/unda2030d03-pakistan-transport_en.pdf
[6] For extensive separate studies for these micro- sectors see: https://unctad.org/project/policies-for-green-development-in-asian-bri-partner-countries

manufacturing process and testing of the end products are very limited. As per the National Energy Efficiency and Conservation Authority (NEECA), the consumption of energy by the industrial sector in Pakistan is 15% more for each $ of GDP than in India. These challenges are exacerbated by a higher proportion of SMEs with semi-mechanized processes. About 90-95% of raw material used is imported in the form of aluminium wastes and used scraps. Only 30 of aluminium is recycled domestically. The conventional recycling process employed in aluminium utensil Industries for aluminium scrap uses high energy and has a high carbon footprint. Aluminium scraps are melted in natural gas fired furnaces to recycle aluminium, in this process due to the absence of a covering on the molten metal, a lot of metal is lost by oxidation of upper layer dross aluminium and slag, also resulting in high GHG and particulate matter (PM) emissions. The industries currently lack procedures to recycle this aluminium, whereas the untreated disposal of aluminium waste from the multiple industries of both aluminium utensils and automotive industries has led to contamination of drinking water resulting in the mean concentration of aluminium in drinking water above both WHO [0.001 to 0.1 mg/litre] and Environmental Protection Agency Punjab [0.05–0.2 mg/L] Standards.

1.3.2. Vegetable Oil and Ghee Industry:

The Vegetable Oil and Ghee Industry is a large manufacturing sector in Pakistan but has received much less policy attention in terms of green industrialization. It was amongst the top five revenue contributors as per the Federal Board of Revenue in 2024. At the same time, edible oil import bill is the highest in trade value of all the food commodities imported and fourth largest in terms of overall import bill of Pakistan (PBS 2024). Our study found that the per capita consumption of edible oil in the country is even higher than India and Sri Lanka and six times higher than an average of 3 kilograms per capita across Europe (Bilal, 2022). Hence, in addition to analysing the production process this study also draws attention to the unsustainable edible oil particularly palm oil consumption and multi-sectoral use and industry interlinkages of oil seeds and vegetable oil with poultry and soap industry. The industrial effluents from edible oil industries are a major concern due to the growing negative environmental impact of de-linting, solvent extraction, refining, packaging, bleaching, hydrogenation and deodorization processes and finally disposal, re-use and recycling of used cooking oil. The poor regulatory framework, poor implementation of National and Provincial Environmental Quality Standards is resulting untreated discharge of wastewater from some manufacturing units, polluting water tributaries such as Soan River in Islamabad, water channels in Hattar Industrial Estate and Hudaira drain in Lahore. The concentration of Nickle, total dissolved substance (TDS), total suspended substance (TSS), level of chemical oxygen demand (COD) and biochemical oxygen demand (BOD) above NEQ limits. The current technological level e.g. boilers used in deodorisation process in some industries are energy intensive, while bleaching results in high SO_2 and Particulate matter emissions. The large-scale solvent extraction industry mainly relies on Hexane solvent extraction methods which has high environmental impact. There is a seeming disparity between the provinces in terms of compliance efficiency.

1.3.3. Dyeing and Finishing sub-sector of Textiles

In Pakistan, the textile industry is responsible for approximately 6% to 9.5% of country level Green House Gases emissions. The textile sector, around the world, is projected to account for 25% of World Carbon Budget by 2050. The dyeing and finishing sub-sector (36% of value of T&C) contributes approximately two thirds of carbon emissions in the textile sector globally. In Pakistan, there are 10 large and estimated 625 small units. The SME textile made-up sector consists of very small shop-like setups to medium industrial units, and they primarily use older technologies which are high in emissions as well as

water pollution. Pakistan has identified the textile sector from within the manufacturing sector for action to reduce the production of GHGs in its updated nationally determined contributions, 2021. Textile has also been the backbone of the national industrial policy, receiving the largest amount of government subsidies since 1970s. In dyeing and finishing industry, the main pollutant includes Sodium Hypochlorite for bleaching, already notified as a hazardous substance, Polyvinyl alcohol used in weaving, heavy metals chromium, mercury, lead, cadmium and azo dyes in dyeing process and formaldehyde for finishing. The dyeing & finishing industry is highly water intensive and polluting. The challenges to green this sector include low to no customer interest in green products, high implementation cost of cleaner means of production, complexity of green production processes, lack of access to credit, lack of guidance and awareness amongst SME sector and low conviction rate of textile sector by environmental tribunals.

1.3.4. Wheat

The study developed under the UNCTAD Project, and titled Regreening the Wheat Market[7] focuses on un-green commercial practices around wheat. The focus of green transformation on sustainable production in agriculture overlooks the post-harvest value gain issues of value capture. Treating wheat, a staple food, as a public good, would protect it from excessive profiteering in the form of speculative buying & hoarding with a view to gouge high prices. Therefore, there is a dire need for strengthening the positive nexus between greening and such commercial practices, which are pro-poor/pro-social. There is a need to adopt a notion of 'social' in Environmental and Social Governance, [ESG] which positions greening as the dominant medium of equity and sustainability. The commercial practice around wheat in Pakistan, over a period, has grown in such ways and directions that the objectives of equity, sustainability and fair trade are compromised. It is evident by the fact that more than half of the Pakistani population suffers from moderate to severe food insecurity, which increased dramatically from 15% in 2015 to 40% in 2021 as per the FAO. Pakistan's indicators on food insecurity and food price inflation fair badly against other countries in the region. The above-mentioned study identifies financialization of wheat market as a key concern and un-green commercial practice which drives food price inflation and reduced profit margins for the farmer. Another a unique character of our wheat market is that it is undergirded by the political economy of grain markets interweaving economic practices and micro-politics of value chain relationships. The increased influence of finance in the agri-food systems allows profit-making by investors and private equity consortia. It is imperative to optimise farmer's share in consumer price of the food commodities to provide maximum profit to the farmers and better prices for the consumers of Atta for. The 'deregulation' of wheat during the 2025 season as desired by IMF has resulted in huge losses, to the farmers and the government is thinking of reversing the policy as the farmers might move away from wheat in the sowing season later in the year.

1.3.5. Plastics

The plastic industry contributes 15% to Pakistan's GDP. It is extensively interlinked with many other sectors like the automobile industry, agriculture and telecommunications sectors etc. The plastics industry is a large manufacturing industry comprising around 11,000 processing units across the country. There are various types of plastics as per the polymer type and the environmental impact of each type varies across the life cycle. In order to make the plastic industry sustainable, the study done under the UNCTAD Project, titled Plastics: Challenges and environmental impact [8], recommends prioritizing

[7] See https://unctad.org/system/files/information-document/unda2030d34-pakistan-wheat-market_en.pdf
[8] https://unctad.org/system/files/information-document/unda2030d32-pakistan-plastics_en.pdf

three types of plastics i.e., polyethylene terephthalate (PET), polystyrene (PS) and polyvinyl chloride (PVC). Pakistan has the second largest domestic market for plastics after India with a growth rate of 15% per annum. The total production capacity of Pakistan's plastic industry exceeds 745,000 (PBIT). Plastics per capita consumption is 6.5kg and the plastic demand is growing by 15% per year (Dawn, 2025; Pakistan National Action Partnership). The plastic waste comprises 9% of the 49.6Mt of solid waste produced every year (Naeem, 2024). The country wastes 3.3 million tons of plastic and uses 55 billion single use plastic bags in a year and only 3% of all plastic waste is recycled in Pakistan. Plastic production in the country also releases a lot of GHGs, and this will increase from 0.8 billion tons in 2020 to 1.46 billion tons by 2050.

Plastics are widely used in agriculture where these plastics break down into microplastics which enter the soil and food chain and harming its quality by reducing nutrients and plant growth. The manufacturing process of plastic involves various steps, and each step requires a separate amount of high energy and water consumption. During most of these processes, various amounts of harmful gases are released into the air. GHGs are also emitted in all the stages from extracting raw material to factory gate. The prolonged and high concentrations of these toxic substances may pose a serious health threat to workers. Recycling plastic is challenging and involves many steps, each of which may have flaws and problems. The main problem with the recycling process is that it does not reduce the need for virgin plastic. Also, the chemical and physical properties of plastic make recycling challenging. Pakistan's recycling industry faces several challenges like lack of government support, increasing cost of raw materials and poor or low-quality recycled material. The public health burden of plastics, as it degrades, releasing the micro and nano plastic move into air, soil and water bodies, are immense. These particles may cause allergies, asthma, digestive problems and chronic lung diseases.

Pakistan both imports and exports plastic tableware and plastic kitchenware. The most problematic process in the manufacturing is the injection moulding process (post-polymerisation). Most of the machines are imported second-hand and have a high carbon footprint and wastage. Moreover, recycling industry for plastic is highly water intensive using 3315 liters of water per ton of plastic in which most of water is being wasted without treatment.

1.3.6. Detergents

Soaps and detergents have been an essential part of keeping people clean, hygienic and healthy for millennia. At the same time, they have also been linked to environmental and health challenges, which have increased with the evolution of detergents. Detergents have emerged as large sector, led by the multi-national brands, with a mushroom growth of non-branded detergents. The market for kitchen detergents alone account for a market size of $ 262 million with a compound annual growth rate of 1.9 %. The use of toilet detergents is also expanding quickly. However, most of the detergents these days contain non-biodegradable ingredients that cause environmental pollution, ranging from soil degradation to water contamination, with serious consequences for aquatic ecosystems and biodiversity. Per- and polyfluoroalkyl substances (PFAS), a group of man-made chemicals characterized by strong carbon-fluorine bonds, are highly durable and resistant to breakdown, earning them the nickname "forever chemicals". Exposure to PFAS is linked to serious health issues like cancer, thyroid problems, liver disease, and reduced fertility. They also impact wildlife, ecosystems, and biodiversity by persisting in soil and water. Beyond PFAS, other harmful chemicals commonly found in detergents, such as phosphates, bleach, formaldehyde, ammonium sulphate & quaternary ammonium compounds, and dioxane; contribute to environmental and health

risks. Household cleaning detergents pose significant risks, with some of the most dangerous being Harpic and sweep (sulfuric acid). These chemicals can affect the food chain and even contribute to ozone depletion. Additionally, recycling, packaging, and transportation of these products pose risks, as chemical leaks during these processes can cause further damage. The manufacturing of detergents in informal sectors, small units, or through manual processes is also highly damaging to the environment. According to the Environmental Protection Agency (2021), about 70% of imported raw materials for detergents do not comply with international environmental standards. Such operations often produce detergents with undocumented and unregistered practices. Besides these, counterfeit units produce and sell detergents with harmful chemicals. The Pakistani government has supported the soap and detergent business through incentives, like tax exemptions, grants, and attractive tariff rates. However, the sector still faces challenges, including high raw material costs, low production efficiency, limited downstream processing, unrealistic regulations, an underdeveloped regulatory framework, weak implementation mechanisms, insufficient enforcement infrastructure, lack of public awareness, and poor monitoring of imports and exports.

1.4 Binding Constraints of Green Industrialization in Pakistan

Our previous work[9] has identified key binding constraints, which are hampering/can hamper the pursuit of green industrialization in Pakistan. These include poor policy conceptualization of green industrialization, absence of peer pressure on the industry to green, inadequate policy responses from the economic ministries to the exigencies of green industrialization, problems with data, lack of green innovation, lack of awareness of the green practices, inadequate availability of green finance, structural inequities in agricultural sector, preponderance of informal economy and relatively more expensive green practices for local manufacturing. These constraints are a result of a continued dysfunctional symbiosis between improved climate and industrial policy. The GI policy framework aims at making this symbiosis functional so that these binding constraints go away paving the way for effecting a structural transformation of Pakistan's manufacturing sectors. The central feature of the proposed framework is the integration of inter-related policies. Pakistan is committed to SDGs 9 and 12, which pertain most directly to green industrialization. In the National Action Plan for SDG 12, the government identified key policy areas which would play an important role in the paradigm shift in green development under SDG 12 i.e. transport, energy, climate (change?), education, industry, and land and water ecosystems. In the case of SDG 9, the government has not yet adopted a National Action Plan.

In our view, an effective implementation of a green competition policy is the centrepiece to promote green production, in this case green manufacturing. It is hard to imagine Industrialization without markets. Markets whose competitiveness is overseen by competition laws and practice. Getting a price advantage by saving on the compliance cost creates an unfair price advantage. Green Industrialization is expected to boost the manufacturing. At present, the subject of 'market distortions' is very scattered, and we do not have a reliable data base of locale-specific negative commercial practice, except anecdotal evidence. As Pakistan did not have an Industrial Policy since many decades, we do not have sectoral regulators. We do not have reliable data on price gouging. One way to produce this data is to design the 'Polluter Pays' principle on the basis not only of the pollution cost but also on account of the price distortion in the market. The agency, which manages the 'Polluter Pays' system should also maintain a record of high achievers. Recognizing them through cash support would create more space for green

[9] https://unctad.org/system/files/information-document/unda2030d01-pakistan-green-industrialisation_en.pdf

innovation and investments in industry, transport, energy, and infrastructure development. Sectoral policies can introduce green modes of polices, which will eventually lead to greening of industry and help Pakistan become a successful circular economy.

2. Policy deficits impacting green manufacturing

2.1. Climate Policy

As noted above, Pakistan's progress to transform its manufacturing paradigm into a more climate-sensitive paradigm has been rather slow. Green industrialization has become an internationally recognized, perhaps, one of the most important, vector of modernization of manufacturing. The policy space thus created is very precious for a country like Pakistan, which is nether big on manufacturing subsidies nor on technology-led general transformation of manufacturing. Our manufacturing is an increasingly important source of GHGs as well as of traditional environmental pollution such as air pollution, water pollution etc. In bigger manufacturing hubs of Pakistan, the air and water quality now has become a major health challenge.

The climate policy of 2021 outlines the necessary adaptation steps and highlights the various sectors' vulnerabilities to climate change. These encompass the use of policy to deal with problems in several domains, including water, agriculture, forestry, coastal regions, biodiversity, and other ecosystems that are fragile. Despite Pakistan's negligible share in the world's GHG emissions, Pakistan has made clear that it is a responsible member of the international community, and it is prioritizing climate change mitigation in the energy, transportation, forestry, and agricultural sectors.

However, the one basic aspect that the policy fails to address is to focus on the greening of the industrial sector through green outputs and value addition. As an unfortunate logical corollary to this lack of focus, it is extremely hard at present to scientifically determine the green status of Pakistan's manufacturing as Pakistan currently lacks green data on industry. Most of the data available is about high pollution levels rather than having a more critical lens to it.

UNIDO has developed the following indicators in its Green Industrial Performance Index (GIP):

I. Green Manufacturing Value Added (MVA) per capita
II. Green Manufactured Exports per capita
III. Share of Green MVA in MVA
IV. Share of green manufactured exports in total manufactured exports (%)
V. Share of green manufacturing employment in total employment
VI. Co2 emissions from manufacturing per unit of MVA

In the case of Pakistan, this data except partially for the sixth indicator is not available. The CO2 emissions are available only for the manufacturing sector, and not for value-added. Each of the above indicators explores the extent to which an industry is moving towards a green future. Lack of data on green production is a very big constraint for

evaluating the progress in terms of the strategies put in place by the government for the greening of the export sector, despite the opportunities created by IOT and AI.
Following the climate change policy of 2012, the Ministry of Climate Change put in place, in 2013, a Framework for Implementation of Climate Change Policy 2014-2030. The Framework identifies the following strategies on greening the industry in Pakistan:

I. Incorporating economic incentives to promote GHG emission reduction by upgrading industrial processes and technologies.
II. Preparing voluntary Corporate Social Responsibility (CSR) guidelines and encouraging the corporate sector to create a CSR-fund to cover carbon emission reductions efforts in industrial sector.
III. Promoting the integrated “Cleaner Production” strategy in the Industrial sector by making more efficient use of inputs such as energy, water, raw material, etc.
IV. Promoting the use of energy efficient motors in the industrial sector.
V. Encouraging the industrial sector to have periodical “Energy Efficiency Audit”.
VI. Developing capacity to monitor and estimate emissions locally for each industry.
VII. Ensuring that technology transfer is accelerated for the industries like cement manufacturing to control emissions without hampering the production process.

In the case of the National Climate Change Policy 2021, which is an update of the 2012 policy, industry is not listed among the sectors of interest under adaptation. Industry was listed under ‘’Mitigation’’ with the following measures:

a. Incorporate economic incentives to promote emission- reduction by upgrading industrial processes and technologies.

b. Prepare voluntary “Corporate Social Responsibility” (CSR) guidelines and encourage the corporate sector to create a CSR fund to cover carbon emission reduction efforts in industrial sector.

c. Detailed aerosol emission impact assessment studies must be made a requirement prior to the installation of any new small and large industry that may be considered a potential source of pollution.

d. Promote integration of the “Cleaner Production” strategy in the Industrial sector by making more efficient use of inputs such as energy, water and raw materials.

e. Promote the use of energy efficient motors in the industrial sector.

f. Encourage the industrial sector to have periodic “Energy Efficiency Audits”.

g. Develop capacity to monitor and estimate emissions locally for each industry.

h. Ensure that technology transfer is accelerated for industries like cement manufacturing, to control emissions without hampering the production process.

i. Explore and introduce incentives for industries to adopt low- emission technologies

e.g. dual- functional materials for Carbon capture, utilization, and storage (CCUS).

j. Legislate opportunities for industry to facilitate transition to circular economy model and boost the market demand for recycled products.

If we compare the two sets of measures above, the 2021 measures are basically a rehash of earlier policy with some additional aspirations, such as to ‘’[e]nsure that technology transfer is accelerated for industries like cement manufacturing, to control emissions without hampering the production process.” Almost all measures continue being aspirations after all these years and we have not even produced reliable data on these measures to evaluate the progress, which could have proved helpful in developing a coherent policy framework and governance structure for the green manufacturing-cum-exports.

More importantly, it is hard to align the above measures with the UNIDO indicators to explain the scope of green transformation in the country. A cursory look at the policies dealing with the industrial and export development in the country tells us that our policy responses have not been properly attuned towards the climate change and environmental pollution neither at the federal or at the provincial levels. The industries such as Cement and energy have lately been getting more policy traction but greening the SMEs, a big source of pollution and climate change, has been rater neglected, though the greening of SMEs could become a key mechanism of industrialization in Pakistan and of export-ready SME development.

2.2. SME development policies

In Pakistan’s case, there is a massive expansion in the manufacturing by SMEs, serving fast emerging modern consumption patterns in Pakistan. In fact, the emergence of these local consumption-production systems is responsible for fast growth in Pakistan’s urbanization. Pakistan has 127 cities according to the 2023 Census with a population of 100,000 plus. Relatively more expensive imports are not only helping [indirectly] expand local production by SMEs but also help them meet more sophisticated demand in lower middle and middle classes in Pakistan. SMEs are universally considered as a vector of sustainable development. SME contribution to manufacturing output in fact is one of the sub-indicators of SDG 9, which deals with Industry.

Pakistan’s SME manufacturing production practices are not only mainly responsible for air pollution, along with vehicular pollution, water and soil pollution, the products produced by the SME sector themselves could become spreaders of pollution and the emission of GHG. Most of the kitchen stoves made by the SME sector cause indoor pollution by cumulatively emitting 30-40 billion cubic feet of gas in kitchens. Detergents [machine wash, kitchen soaps, toilette cleaners] produced by hundreds of SME units in Pakistan are releasing banned, dangerous chemicals in water. The story is not different in textile dyeing & finishing starting from the dyers in the local market. Plastics and aluminium sectors, which are afflicted with green problems from the scrap import stage, are very large sectors in Pakistan and are dominated by SMEs numbering in thousands of units. Both sectors provide employment to millions of people and are very bad polluters.

During the consultations on a GI policy framework, held under the UNCTAD Project on *Integrated Policy Strategies and Regional Policy Coordination for Resilient, Green and Transformative Development: Supporting Selected Asian BRI Partner Countries to Achieve 2030 Sustainable Development Agenda*, it was proposed to the government of

Pakistan to green SME manufacturing under a unified five pillar framework for green industrialization, realizing that the reduction of GHG would produce limited results, in the case of SMEs, if we do not also address the other four variables of greening i.e., lean manufacturing, recycling, environmental pollution control and unfair commercial practices. The new production processes emit less GHG, use less energy, are lean and pollute less. We proposed that for the case of action strategies, there was a need to go sectoral and to launch 'Sectoral Missions' to make Pakistan's SME competitive and sustainable in such a way that the SMEs' output would increase both in quality and quantity, resulting in higher incomes for the owner and more jobs in the SME sector. The sectoral green industrialization strategies however would not by optimally effective, if the 'policy integration' does not take place at the macro level as a part of SME development policy. As we know, many policy instruments are used for SME development in Pakistan. In the light of the green challenges stated above and the clear opportunity which exists in modernizing and greening under a unified framework, a new strategic mix of policy instruments needs to be developed to help both the government and the industry to envision the 'transformed green state of SMEs in Pakistan', with far better access to green finance and innovation. In this case, more of the action would take place at the provincial level. Our GI framework is expected to help the provincial government work out the interdependencies among different instruments by providing not only general support to the SMEs, which is already happening, such as small loans, technology support, R&D support, vocational training, but also facilitate access to industrial land out of cities, energy subsidies, support for energy audits, support to replace motors, boilers and compressors, cluster development support, common affluent treatment plants in the form of a unified industrial development framework. If such a framework is based on a green deficit analysis, in the form of integrated sectoral policy strategies and initiatives, we can produce great results in a relatively short span of time.

Manufacturing in Pakistan needs a stronger dedicated policy focus. Our Green Industrialization Binding Constraints Study[10] listed poor design as one of the most important binding constraints on green industrialization in Pakistan. The proposed Framework seeks to fill this gap.

3. Integrated Policy Strategies of Green Industrialization for Pakistan - Objectives and Principles of Green Industrialization Policy

The 'strategies' as actional plans are guided in their development by the objectives of the strategy and the principles which animate the strategic actions. We propose the following objectives and principles for an integrated policy strategy on GI, based on the preceding analysis of binding constraints on GI in Pakistan and sectoral as well as institutional specificities in Pakistan.

3.1. Objectives

i. Make all manufacturing in Pakistan clean, green and lean

ii. Help Pakistan's international trade benefit from green opportunities

iii. Reduce the burden of environmental pollution/crises on public health

[10] See https://unctad.org/system/files/information-document/unda2030d01-pakistan-green-industrialisation_en.pdf

iv. Enhance policy coherence and enforcement effectiveness for green industrialisation

v. Enhance value for money for public expenditure on climate change measures and environmental pollution control

3.2. Principles of Green Industrialization Policy

1.2.1. Greening as the key vector of the upgrading and modernization of manufacturing processes.

China offers a great example of harnessing the greening imperative to upgrade and modernize technologies to enhance the international as well as domestic competitiveness and equity in their economy. The EU of course is another example where green technologies have been leveraged to support the wider economy. China has turned the page in case of global compliance of environmental standards. On closer scrutiny, it becomes clear that greening became a powerful pull factor in the perpetual effort to enhance the efficiency of production processes. In the case of Pakistan, out-dated production processes due to old technologies, second-hand machines and poor manufacturing management practices, mean that industrial competitiveness is low. Given idle manufacturing capacity in Pakistan in some importance sectors such as Textiles, modernization of the manufacturing processes needs to be priority number one. As greening has become a measure of performance standards, it is a common-sense choice that Pakistan should develop sectoral technological up-gradation plans, with adequate support by the government to significantly enhance industrial productivity and derive better value from its natural and human resources.

3.2.2. Green manufacturing as a national obligation

Pakistan was one of the pioneers in establishing a federal ministry of environment in the 1970s and was an eager partner of all the international initiatives with full support from aid partners and international organizations. Pakistan ratified the UN Conventions on Environment and established the necessary institutional infrastructure on SDGs. The dissolution of the Federal Ministry of Environment in the aftermath of the 18th Amendment, declaring environmental policy also a provincial subject, was a significant set-back. The implementation of environment protection laws was always a provincial subject, and all the provinces of Pakistan have environmental protection agencies. However, the policymaking in terms of environmental protection was also devolved in 18th Amendment. Given the indivisible nature of climate issues and impacts in a country and inter-provincial pollution issues, environmental protection should have remained a shared concern between the federation and provinces. The federal government also needed a federal entity to interact with the international community and international negotiations. Pakistan created the Federal Ministry of Climate Change in 2016, now called Ministry of Climate Change and Environmental Coordination. Issues of export compliances such as the EU's CBAM, have recently created a sense of urgency. Still, NDCs do not yet cover SDGs 9 & 12 adequately. Major disasters like floods, smog, urban air pollution and heat waves have also created additional policy attention. The role of manufacturing in all this still does not get the salience it requires. There is a need to make greening of manufacturing a top national priority as a state and citizen obligation with the full involvement of the provinces and adopt ambitious goals.

3.2.3. End of a two-speed green manufacturing policy and practices for formal and informal manufacturing sectors

Most of manufacturing in Pakistan takes place in the informal sector. This creates measurement issues. As, in a normal routine, the policy follows the data and the funding follows the policy, the government's greening initiatives focus almost exclusively on large-scale manufacturing and export-oriented sectors. The local representatives of the provincial Environmental Protection Agencies do take cognisance of environmental pollution incidents, but their enforcement is limited to traditional pollution types like air, water and sub-soil. The enforcement in some cases may have been patchy, but now more and more data is being created, especially after recent initiatives of geo-tagging and the census of business establishments by Pakistan's Bureau of Statistics. Informal manufacturing activities at home and in unregistered places is also garnering attention, focused at this point on the smoke in the air and liquid effluents. In any case, GHG emission data for the manufacturing taking place in the informal sector is not being recorded as advised by UNIDO. As a result, it is very hard to develop comprehensive sectoral profiles. An end of the two-speed climate change and environmental pollution control needs is necessary, particularly now, as new measurement technologies are available and the enforcement capacity of the provincial agencies is improving.

3.2.4. Adoption of the delivery of environmental justice as a national public service

In Pakistan, despite donor-driven NGO activity and brutal, at times, man-made environmental catastrophes, the demand for environmental justice is not yet very loud. The civil society organizations do bring out the implications of neglecting climate change and, in addressing this, the maximum they ask for is adaptive social protection. Justice is inevitably linked with retribution and reparations. Pakistan surely is at the receiving end of climate change despite being a negligible producer of GHG. Too big a focus on this fact however shifts the focus away from pollution to GHGs, which has not helped in establishing the principle of "Polluter Pays". Once, environmental justice is adopted as a policy principle, it would be easier to embed compliance with it.

3.2.5. Minimizing the pricing impact of environmental pollution as a negative externality

Any significant, comparative cost cutting could create competition issues. Traditionally, negative externalities, including environmental externalities, are notorious for poor measurement. In many sectors the compliance cost is believed to be inversely related to price competitiveness. With the passage of time, this became an established commercial practice, more often than not defended by the sectoral leadership. In some regions, traditionally known for weak enforcement of competition laws, it incentivises the non-compliance. With enhanced activism of environmental enforcement agencies, it is becoming increasingly difficult to continue with these practices, except in the cases, where the compliance is compromised due to politics or corruption. For the time being the wide-spread non-compliant commercial practices is more of domestic markets. In such sectors, which are partly export-oriented, the sectoral collusion is weak. Adequate support to firms willing to comply could result in a better balance of carrot and stick, which could open the whole sector for reform. The current environmental protection laws are company and case specific. The national competition laws have been sector-wide applied in the case of sector-wide cartelization. Such jurisprudence should be extended to the sector who are systematically avoiding environmental compliances.

3.2.6. Sensitivity to pollution 'black holes' in devising integrated policy strategies, with different environmental governance for cities with one million plus inhabitants

It is possible that different kinds of pollution are present in a locale at high levels at the same time. Such places are referred to as 'black holes of pollution'. This occurs more in some mega cities who top the pollution charts globally. According to the latest census in Pakistan of 2023, Pakistan has two megacities i.e., Karachi and Lahore, ten cities with a population of one million plus, and a total of 127 cities with a population of 100,000 or more. As per the 1998 population census of Pakistan, the number of cities with a population of one million or more was 6, whereas the cities with a population of 100,000 were 51. This dramatic urban growth in Pakistan is having huge environmental impacts, such as **air pollution, water pollution and scarcity, solid waste management and noise pollution.**

Loss of green spaces, urban heat and traffic congestion and associated pollution are positively correlated with the presence of manufacturing. Where there are other causes of pollution, manufacturing remains one of the most significant causes along with vehicular pollution. The adoption of the principle of addressing 'environmental blackholes' and tackling them as an environmental emergency, could help reduce a good part of a burden as a special drive.

3.2.7. Prioritise high public health impacts of manufacturing sectors

Previous studies developed under this Project[11] and by the Social Policy Resource Centre have amply demonstrated the public-health impact of polluting industries. Where the government is addressing the public health impacts of freak climate events like floods, any future green industrialization policies should prioritize manufacturing activities for reward and penalization which have highly negative public health impacts. Given the enormity of the challenge, the government should give priority in its one-year Urgent Action Plan to public health. This local and community dimension of ESG standards should be accordingly worked out and polluters should be made to contribute to the public health campaigns.

3.2.8. Base policies, strategies and actions on reliable and suitable baseline data, measurement and monitoring systems, using AI

On paper, governments always claim that they base their policies on evidence. This principle however is dysfunctional in the case of green manufacturing. Except for the Scope 2 emissions, involving transport and energy, there is no reliable, regularly published baseline data of different production processes with different technologies, duly segmenting the sectors. Modern technologies are now making it possible to regularly measure emissions and pollution and automate them in real time. The Punjab Environmental Protection Agency uses AI to generate alerts for the enforcement staff. At present, this is being done based on the colour of the smoke, which could be a problematic indicator in some cases. Quality of water and smoke coming out of the factory do help ascertain in general the compliance level, but a more scientific basis needs to be developed. The State Bank of Pakistan has published a Green Taxonomy, but manufacturing is dealt rather cursorily. The complexity of different measurement systems and the continuing disconnect between GHG measurement and the measurement of conventional pollution as per the national or provincial quality standards

[11] See e.g. https://unctad.org/system/files/information-document/unda2030d30-pakistan-detergents_en.pdf, https://unctad.org/system/files/information-document/unda2030d31-pakistan-kitchenware_en.pdf, https://unctad.org/system/files/information-document/unda2030d33-pakistan-vegetable-oil_en.pdf, as well as https://unctad.org/system/files/information-document/unda2030d01-pakistan-green-industrialisation_en.pdf.

could be overcome if the principle of data-driven policy is adopted in letter and spirit in the case of manufacturing.

3.2.9. Make compliance with key standards mandatory, linking it to state facilitation and deterrent penalties

Separating environmental quality standards from performance standards has become almost impossible now, with the latest machinery which is inherently green and lean. There is a need to end the duality between the environmental quality standards and efficiency/performance standards and involve taxation authorities to provide state support and apply deterrent penalties. Inefficient production also creates negative externalities, and the national value is lost in the process. Adoption of this principle would provide a robust foundation for creating policy coherence and governance efficiencies by mainstreaming environmental quality standards as performance standards.

4. Strategic Pillars of Green Industrialization Policy Strategies

4.1. Policy Coherence

Policy coherence is a pre-requisite to any successful public policy, both internally and with other public policies with any impact on the objectives of a green industrialization strategy. Policy Incoherence could take many forms. It is possible that two government policies work at cross-purposes to each other. Easy entry policies and state facilitation for fossil fuel exploration and business are a set of integrated policies with a high likelihood of negative impacts on climate change-related goals.

Another familiar instance of poor policy coherence is poor coordination in developing a unified framework of conceptualization and actions. This could happen at the federal government level i.e., horizontally between the Ministry of Climate Change and Environmental Coordination, the Ministry of Industries and Production, the Board of Investment, and the Ministry of Commerce, on the one hand, and vertically between the federal government ministries and provincial departments, on the other.

A lack of policy coherence can produce big challenges if some parts of government remain less than optimally responsive to changing dynamics of policies, implementation and funding. The Ministry of Climate Change and Environmental Coordination continues to treat manufacturing under “Mitigation: even though the greening of manufacturing is a much bigger challenge. Manufacturing is an activity which is dealt with/regulated by all three tiers of governance in Pakistan and the alignment of policies could be a big challenge. Pakistan faced similar problems in the case of education and health. In both cases, an inter-provincial coordination mechanism exists in the form of Councils of Ministers meeting, held periodically and chaired by the federal minister. Such an arrangement still is lacking in the case of green industrialization.

4.2. Integration of policies strategies

Integration ensures better results, particularly in policy spheres which are complex, contested and constrained when it comes to formulating strategies to realize policy objectives. In the case of green industrialization, policies to achieve the general and sectoral goals of GHG reduction [green], cleaner production [pollution reduced], leaner production, enhancing recycling and reducing un-fair commercial practices, corresponding strategies would have to be designed for each of these policy areas.

These strategies under different policy areas need to be integrated. For example, manufacturing development strategies aim at enhancing manufacturing output through easy credit, tariff protections, export opportunities, among other policy instruments. Green manufacturing strategies do not discourage production for profit as such at the cost of environment. The strategies enforcing environmental quality standards therefore need to accompany new initiatives and investments seeking to expand manufacturing. Pakistan's experience in integrating export promotion strategies and strategies promoting buyer compliance have been fairly robust.

4.3. Indigenous research and analysis

A country's green industrialization strategy needs to respond to the nature and extent of challenge, after setting the priorities. Quality research and analysis help determine the green status of different manufacturing sectors. Also, quality research and analysis help coming over the problems with measurement methodologies, collection of quality data and interpretation in the specific context of markets and commercial practices. Being at the heart of the 'policy cycle' (of diagnostics, policy formulation, policy implementation, and policy evaluation), this strategic pillar is central to the success of any policy.

Pakistan's manufacturing census has improved over time but is still evolving. We still rely on self-reported data, which could be a big problem in an environment of tax avoidance as manufacturers could resort to underreporting. A related issue is that our GI policies have been lop-sided in many ways with an imbalance between Mitigation and Adaptation, neglect of public health impact of traditional pollution, poor financing strategies etc. One source of this situation is the domination of donor agendas in climate research and climate change advocacy.

4.4. Technology development and deployment:

Pakistan still lacks a unified vision, framework, strategies and funding on green production technologies, technology transfers and entrepreneurship. Government spending on science and technology is negligible, and the output of government-backed S&T organizations leaves a lot to be desired. IT and AI deployment is producing limited-scale efficiencies, but our engineering universities are far behind their peers in the region. Being a developing country under austerity, frugal innovation needs to become a national pre-occupation supporting this key pillar of green industrialization strategies. There is an urgent need to give a big boost to start-ups in green technologies and green extension services. In many countries, the private sector service providers of greening of manufacturing processes play an important role. Unfortunately, apart from the services provided by machinery suppliers, we do not have very well-developed professional services to help with technology deployment. Giving technology solution providers a role in measurement would produce much needed synergies and bring together the technology provider, technology deployment expert and the auditors of performance standards and environmental compliances. The indigenous technology and machinery however could not compete with imported secondhand machinery. If, under this strategic pillar, such sectoral initiatives are pushed which help the sectors pool their resources for green manufacturing, this could create the much-needed buy-in to sectoral modernization.

4.5. Green compliance as an integral part of efficiency standards

The agencies entrusted with the promotion of green standards usually lack enforcement capacity and the industry lacks the trust in regulators. Compliance is but one aspect of the engagement between the government and the industry. A deeper integration/symbiosis between the environmental compliance agencies and the agency

promoting efficiency standards, including Lean and Recycling in the form of a central agency would create the necessary thickening of engagement between the government and the industry. This would enable the government to save the industry from unfair competition both in the domestic and international markets. Such a central agency could produce authentic input-output data and help measure the productivity of all the major sectors of manufacturing, ending the binary of formal and informal.

4.6. Consumer Protection

The near absence of consumer protection demand regarding un-green manufactured products deprives the government of a helpful lever which could produce a more conducive environment for the promotion of competitive green products, nationally and internationally. The producers of manufactured goods for the domestic market tend to give little information to consumers, and consumer protection in Pakistan is rather weak. There is this general impression that the price of the product takes care of the standard, which might not be the case always. With social media initiatives and campaigns by some regulators and food authorities, the situation is changing, and consumers are becoming more demanding. Still, the public health implications of sectoral emissions and affluents and of substandard goods are not understood and information on this is not actively sought by many consumers. Pakistan does have consumer courts, but they are not much resorted to, nor is there a culture of public interest litigations. Consumer protection awareness and activism is a hallmark of successful models of greening. An absence of pressure from consumers, peer pressure from other producers and pressure by the enforcement agencies reduces the incentive for manufacturers to green their production. The government, at different levels, needs to strengthen this strategic pillar by educating consumers and facilitating consumer protection activism.

4.7. Financing

For any policy strategy to produce results, governments need financing. As Pakistan has chosen to depend on (international?) donors for green financing, the international political economy priorities in climate financing dominate the discussions in Pakistan. As a result, private credit provision and access is geared more towards ‘lucrative’ sectors like energy. In the same vein, large-scale manufacturing is shaping green financing narratives in the context of Corporate Social Responsibility. Financing green industrialization systematically needs to be given central importance. We believe provincial environmental pollution control systems could be easily funded by provincial governments. If we improve public expenditure effectiveness, our financing needs would considerably go down. Financing greening and upgradation of production processes as a single undertaking makes the financing pillar of the proposed green industrialization strategy a unique strategic pillar. The IMF’s Resilience Facility might help but as argued in a previous of the project paper provided for Pakistan that looks specifically at the issues around Loss & Damage financing[12], current financial constraints could be considerably improved by adopting a different approach to the financing of green industrialization strategy, along the lines also proposed above.

4.8. Governance

In Pakistan, no national green industrialization governance architecture exists at present. The Federal Government is responsible for the Climate Change [GHG] Policy but has financing and national implementation capacity issues. The imperative to reduce manufacturing-related emissions is yet to become a principal preoccupation of the Ministry of Climate Change or for that matter the Ministry of Industries and Production or

[12] https://unctad.org/system/files/information-document/unda2030d05-pakistan-loss-and-damage_en.pdf

the Ministry of Planning Development and Special Initiatives, which is responsible for SDGs coordination and voluntary reviews. The expansion of manufacturing is not one of the five priority areas for the economic transformation plan funded by the Public Sector Development Plan. The situation is no different when it comes to provincial Annual Development Plans. With weak monitoring and evaluation of special initiatives for green industrialization, its nexus with the ministries of Industries, Commerce and Investment, Science and Technology etc. is weak. Enforcement of green standards rests with the Ministry of Science and Technology through Pakistan Standards and Quality Assurance Authority [PSQCA]. PSQCA also provides voluntary performance standards. At the provincial level, the enforcement of the Environmental Standards is with the Department of Environment, and the Department of Industry does not have an initiative dedicated to greening of manufacturing. The World Bank funded Green Development Project, which has just completed its five-year life, was dealt with by the Planning and Development Board of Punjab. It is replaced by the Clean Air Project funded by the World Bank, which deals with green industrialization only indirectly. The foreign-funded GHG control projects function as de-facto autonomous entities. By contrast, at the district government level, the local and vertical enforcement is merged but the district level is not equipped to promote green industrialization. There is no reporting done on the state of green manufacturing at the district level. The reformation of the governance architecture to steer the green industrialization strategy here proposed is critical for its success and needs bold and innovative design to deliver.

Greening is making us rethink the increasing provincialization of manufacturing governance and regulation. This has marginalized important phenomena like inter-provincial trade, domestic commerce, competition policy, public health, uniformity of compliance enforcement and performance standards and financing. Our suggestion is to endow Pakistan with a unified governance with deep integration of policies and strategies under the federal Ministry of Industries and Production, preferably through a newly created National Industrial Development Office [NIDO], which leads sector by sector greening and modernization of production processes under a unified framework.

5. Conclusions

The proposed green industrialization strategy for Pakistan is a living, dynamic document. Making new integrated green industrialization policies work within a systematic framework, as the one proposed here, would be greatly helped if some integrated strategies are piloted and their effectiveness is further observed/analyzed. Under the UNCTAD project the outlines of two such pilot strategies were presented for the case of aluminum and plastics[13]. Each manufacturing sector has its unique challenges and commercial practices. It is hard to fully comprehend the implementation challenges vis-à-vis specific “un-green” or “dirty” commercial practices and possible push backs in favour of green transformation initiatives. Pilots could produce precious knowledge about implementation and monitoring & evaluation capacities, highlight data issues and data management issues, and produce empirical evidence to further improve the effectiveness of integrated GI policies in Pakistan.

[13] See https://unctad.org/system/files/information-document/unda2030d32-pakistan-plastics_en.pdf