

Industrial Policy, its Spatial Aspects and Cluster Development in Pakistan

Inception Report

1. Introduction

The process of structural change has been a central feature in the economic growth and development of both the Western Economies and the Newly Industrialized Countries of the East. As an economy develops the share of agriculture in GDP inevitably declines while that of manufactures and services increases. In other words, structural change is a gradual shift from low productivity to high productivity activities. Along with this observable structural transformation there is a large body of empirical literature which suggests that there is a “U” shaped relationship between a country’s income level and its degree of product specialization or sectoral concentration [see, Klinger and Lederman (2004)]. At low income levels specialization is high and is primarily determined by resource based comparative advantage. As the country becomes richer the manufacturing base diversifies with firms producing and exporting a wider range of relatively more sophisticated products. However, at higher levels of income, the process reverses; specialization again increases but in high value added and technologically advanced products. Therefore increased product diversification is an intermediate stage in the process of structural transformation and economic development of a country.

In the context of the Pakistan economy this structural transformation has been skewed in favor of the services sector. Since the 1970s the growth in services has outstripped that in agriculture and industry resulting in its current 50% share in GDP. Agriculture and industry over the past decade have contributed around 25% each to GDP with the share of agriculture declining over time and that of industry remaining fairly stagnant. In fact, between 2008-09, in the wake of both internal security issues and the increasingly binding energy constraint, output in the manufacturing sector contracted by 3.3 percent with large-scale manufacturing registering a substantial decrease in output of 7.7 percent [GoP (2009)]. Notwithstanding the recent contraction of overall industrial productivity and output, the industrial structure of the country has not experienced any significant change in the course of the past thirty years. The manufacturing base remains rigidly narrow leading to a lack of product and export diversification which has been a major impediment to sustained economic growth and development of the country.

The short term revival and the long term growth of Pakistan’s economy thus hinges on both the performance and the structural transformation of its industry. As mentioned above, in the past year and a half the country has seen a dramatic retardation of economic activity characterized in particular by a stagnating manufacturing sector. The current energy crisis has further eroded the competitiveness of manufacturing resulting in a tremendous loss of income, employment and export revenues. Given the fact that the potential of growth and development of a country is inextricably linked to the extent of

investment and industrialization the continued dismal performance in industrial growth in Pakistan does not augur well for the future. Therefore it is imperative to develop an industrial policy which is implementable and has the ingredients to provide the much needed impetus to industrial growth and diversification. While focusing on the revival and restructuring of the industry the strategy would have to be guided by the over arching objective of achieving efficient, sustainable and equitable development.

Pakistan today has the highest population growth rate¹ in the South Asian region with hordes of unskilled entrants into the labour force every year. These adverse demographics pose a serious challenge to effective policy making. If the industrial base of the country does not expand to absorb this surplus labour, the burgeoning unemployment in both urban and rural areas is likely to have serious socio-economic and political ramifications.² On the other hand, a growing population has the potential to become a significant economic asset, if adequate policies are in place to facilitate the development of a large, healthy and skilled labor force. Therefore a central motivation and aim of the industrial policy should be to generate widespread employment and raise income levels across the country, with the longer term aspiration of achieving convergence in living standards in rural and urban areas. This would subsequently reduce the incidence of poverty and lessen the widening inter and intra regional income inequality. An industrial policy, which emphasizes domestic as well as international linkages, promotes and facilitates entrepreneurial activity, focuses on the development of small and medium scale industries, and provides an impetus to services, trade, transport and other ancillary sectors, can achieve the objective of inclusive and broad based growth.

The formulation of the industrial policy would be in accordance with the overall growth and development priorities of the Government of Pakistan (GOP) as broadly identified by the “9-point” Plan put forward by the Planning Commission (PC) and the Prime Minister’s Economic Advisory Council (EAC). In fact most of the priority areas highlighted by the Plan where ‘deep, broad-ranging, and sustained’ policy intervention is required are in sync with the objectives of the industrial policy being proposed here. For example, Industrial Competitiveness, Human Capital Development, Energy, Capital Markets, Public-Private Partnership for Infrastructure and Institutional/Administrative reform are some of the relevant areas which would be dealt with in considerable detail in the industrial policy report.

The methodology adopted in the industrial policy report is to derive policies from a three tiered analysis of the industrial sector. The first tier would be a macro level analysis of the structure and performance of the industry. This analysis would highlight the major obstacles to increased investment, productivity and diversity within the manufacturing sector.

¹ 1.8% in 2007-08, [see GoP (2009)].

² The manufacturing sector in 2007 -08 absorbed only 13% of the country’s labour force compared to 11.5% in 1999, a meager 1.5% point increase over the course of almost a decade, [GoP (2009)].

The first tier macro level analysis would be supplemented by a second tier micro level investigation of firm competitiveness through a value chain analysis of selected industries. This will help identify both specific problems affecting the competitiveness of a particular industry and issues that cut across all sectors under study. This analysis would thus result in both general as well as specific policy programs which would corroborate and enrich the policies outlined in the macro level analysis.

Given the fact that the long term objective of the industrial policy is to generate widespread employment and reduce regional income inequality, the third tier analysis would focus on the spatial aspects of industrialization. This part of the report would divulge the determinants of industrial cluster formation and assess the relative performance of the various industrial clusters in the country. The compendium of policy notes which would emerge from the spatial aspects of industrialization would inform the policy makers about the policy environment and economic characteristics which are necessary for the emergence of successful industrial clusters.

Hence the three tiered approach adopted in this report would result in a set of policy programs which are not only consistent but are founded on a rigorous and comprehensive analysis of the industrial sector.

In order to articulate the rationale of government intervention and hence outline the broader principles on which an industrial policy is to be based it is important to contextualize this discussion in a historical perspective. Therefore the following section gives a brief synopsis of the competing ideas on industrial policy in the twentieth century. This is followed by an outline of the broad principles of industrial policy around which there is an emerging consensus within the discipline of economics. The last section of the inception report gives a detailed overview of the envisioned industrial policy project.

2. Raison d'être for an Industrial Policy

2.1 Brief Historical Review

In the course of the economic development of the West and the Newly Industrialized Countries (NICs) of Asia, there is no example of a country following a completely laissez faire policy with regard to industrial development. The nature and the extent of involvement and intervention of the state varied across countries, with each having its particular recipe for industrial development, but in none of these was industrialization achieved through the unfettered workings of the market. The relative success of the Asian Tigers and more recently of China and India in sustaining high growth rates has been on the back of an activist industrial policy. The extent of state intervention in these economies ranged from a variety of input subsidies; tax exemptions; tariff protection to direct public sector investments in large scale projects e.g., steel manufacturing plant in Korea and Japan.

The post 1945 *Structuralist* conception of development considered capital accumulation or industrialization as the engine of economic growth and development. For the *Structuralists* an interventionist industrial policy in conjunction with trade protectionism was imperative for the transformation of an economy from primary low value added production to high value added manufacturing, i.e., *Import Substitution Industrialization*.³ The logic of state intervention was based on the prevalence of economies of scale (agglomeration economies) in manufactures and the inherent coordination failure present in an under developed economy. In the absence of complimentary investments (backward and forward linkages) and the lack of necessary industrial infrastructure the costs of entry for a pioneering firm into a sector were considered exorbitant i.e., coordination failure. Given these structural constraints, industrial development or breaking away from resource and factor based comparative advantage was viewed as next to impossible in a free trade environment, giving credence to the *infant industry* argument for protection and the *big push* model of large scale state planning and intervention for industrial development.⁴

State intervention in its various manifestations was not always successful in achieving efficient industrialization and sustained economic growth. The experience of Latin America stands in sharp contrast to that of East Asia. Although both regions pursued an activist industrial and trade policy, the outcomes achieved were significantly different. In countries like Korea and Taiwan protection in the form of subsidies and tariffs was afforded to firms with a clear state objective of achieving economies of scale in production through explicit export requirements, forced mergers and investment licensing [Chang (2003)]. Latin America on the other hand did not have such a clear focus in terms of achieving economies of scale or creating incentives for firms to be outward oriented. In fact in most countries the industrial policy was essentially inward looking, focusing more on achieving domestic self sufficiency in manufactures rather than creating future export vents. The outward oriented industrial policy of the East Asian countries gave an opportunity to the domestic firms to target regional and international markets allowing economies of scale and efficiency in production. The inward orientation of Latin America, and, the shift of resources from the larger agricultural sector, limited and stifled the source of demand for the nascent manufacturing sector retarding its growth, efficiency and competitiveness, e.g., the Argentinian car industry [see, Bruton (1998)].

Notwithstanding some notable exceptions, such as the aircraft, steel and shoe industry of Brazil, generally the industrial transformation of Latin America was not as successful as in East Asia. According to Rodrik (2004), “the difference between East Asia and Latin America is not that industrial transformation has been state driven in one and market

³ Hans Singer (1950) and Raul Prebisch (1950) showed a secular decline in terms of trade of poor countries. This finding served as one of the critical arguments for structural change.

⁴ Within the economics profession the proponents of a development strategy led by the state were many such as Ragnar Nurkse (1953), Arthur Lewis (1955), Paul Baran (1957), Rosentein-Rodan (1943). In fact with the exception of a few like Albert Hirschman, who viewed development as a more spontaneous – chaotic process, the consensus was towards state led development strategy.

driven in the other. It is that industrial policy has not been as concerted and coherent in Latin America as it has been in East Asia, with the consequence that the transformation has been less deeply rooted in the former than it is in the latter.”

The 1980s brought a major shift in development thinking. The debt crisis and the ensuing macro economic instability which ravaged Latin America for more than a decade was blamed on the ‘villainous’ policies of state intervention and trade protection pursued by the region [Taylor (1996)]. The fact that East Asia remained unscathed from the vagaries of the debt crisis gave support to the Neo-Liberal view which was centered on the concept of market supremacy and trade liberalization. Export led growth was highlighted as the main factor behind the successful transformation of East Asia while its activist industrial policy and initial years of trade protection were essentially overlooked. The alternative put forward was articulated by what came to be known as the Washington Consensus. Under the neo-liberal development paradigm the role of the state in industrial development was limited to correcting market failure and to the provision of public goods. The rampant rent seeking, corruption and inefficiency of the governments in developing countries brought further skepticism on the effectiveness of the role of the state in industrial and economic development. Although, market failure or externalities gave a theoretical justification of state intervention, economists and policy makers of the mainstream became more circumspect of government intervention stressing the greater propensity and prevalence of government failure as opposed to market failure in developing countries.

2.2 Towards an Industrial Policy

As is evident from the above historical overview of industrial policy demarcating the domain of state intervention in an economy has been the source of continued controversy and debate. However, there is an emerging consensus between the heterodox and the mainstream economists on the broader role of Industrial Policy. The importance of structural transformation is realized by all, the differences which remain are on how much or to what extent can a country deviate from its comparative advantage. The notion of comparative advantage in neo-classical trade theory is essentially static; it does not allow the possibility of industrial transformation given current prices and factor endowments present in an economy. As stated earlier the central objective of industrial policy is to diversify the industrial base and move into higher value added activity. While the mainstream economists stress on a ‘step by step’ – gradual transition towards higher value added production in conformity with available technology and factor resources, the heterodox stress the importance of defying comparative advantage by taking ‘leaps’ in certain areas which are considered strategic [see, Lin and Chang (2009)].

Given that the fundamental principle of an industrial policy is to facilitate the process of structural transformation a possible bridge between the two perspectives on Industrial Policy could be to focus intervention to facilitate both ‘new activity’ into the industrial sector and also help existing firms upgrade their products and production methods. In

other words the policies should consolidate and strengthen existing comparative advantage and at the same time harness potential or dynamic comparative advantage resulting in a diversified and internationally competitive manufacturing and export base.

The ‘new activity’ entrepreneurs are those who either introduce a new product in the domestic market or develop a more efficient production technology for an existing product. In fact the formation of a potential industrial cluster is to a great extent dependent on the incentive structures present for the first entrant or the pioneer firm in a new industry. Although the ability of the state to ‘pick winners’ is in any case limited on account of imperfect information on future returns on new investment opportunities, however, through strategic policy intervention the state can increase the probability of a new entrant becoming a ‘winner’[see, Hausmann and Rodrik (2003)]. Such strategic intervention can lead to the formation of an economically viable and vibrant cluster. The policies which facilitate the emergence of new clusters, especially in economically depressed areas, would result in a more equitable and inclusive growth – a broader objective of the industrial policy.

The facilitation a state can provide the entrepreneur is by addressing both coordination and market failures which would otherwise impede the germination and growth of the new product or production technique. Coordination failures might arise due to spatial impediments such as the absence of necessary infrastructure (road network, electricity etc.) or the non-existence of critical complimentary investments in the area. Therefore the costs of entry for a pioneer firm would generally be far more than that of later entrants. In fact these costs would tend to decline with an increase in the number of firms in the cluster – agglomeration economies.⁵ Also, greater competition through entry of firms in the future would reduce the profits of the pioneer or ‘new activity’ firm, impeding incentives to ‘enter’ in the first instance and hence jeopardizing the formation of a potential cluster. This problem might also require a competition policy which could ensure a certain degree of profits for the pioneering firm so as not to inhibit entry incentives.

Similarly, a market failure hindering a new activity or investment could be in the credit market, either because of a lack of collateral or asymmetry in information due to the absence of a credit history. In either of the two cases (coordination and market failure) the state can intervene through the provision of necessary infrastructure and by devising mechanisms such as a venture capital fund which would enhance the prospects of a new entrant or an innovator to qualify for financing. Furthermore, industrial policy can be employed to gradually alter the existing factor resources and thus comparative advantages. For example, investments in education and vocational training would

⁵ An investment by a firm creates positive externalities (benefits) for other firms. Therefore while there are diminishing returns to investment at the level of the firm there exists increasing returns at the level of the industry (cluster). As individual firms do not take into account the positive externality of their investment decisions they tend to under invest. Hence private investment is socially sub-optimal – thus creating the rationale for government intervention.

increase the endowment of skilled labour. This would not only help existing firms move up the value chain but also encourage new investments which are skilled labour intensive.

The key lesson derived from East Asia is that industrial policy is not a ‘one off’ but a process where firms and the government learn about the major impediments as well as opportunities and ‘engage in strategic coordination’. Therefore the broader method or approach towards formulating industrial policy should be through the continued interaction between the private sector and the government. This engagement should be effectively institutionalized so that it can form the basis of a dynamic, flexible and evolving process of industrial policy making. The crucial point about this public-private engagement is a balanced position which is some where between bureaucratic ad hoc-ism and complete embeddedness of the private sector in industrial policy and planning. While the former extreme (ad hoc-ism) would increase the likelihood of inappropriate policy formulation the latter (complete embeddedness) would spawn a state patronized inefficient industrial sector [see, Rodrik (2004)].

An important constraint in industrial policy making which is relevant today is the more restrictive ‘policy space’ available to countries. Leaving aside the debate on the effectiveness of trade policy, developing countries under the WTO world trading system cannot readily use trade policy as an instrument for industrial development as was done by most industrialized countries in the past. For example, export subsidies, local content requirements and quantitative restrictions on imports are all illegal under the WTO. Moreover, the WTO’s TRIPS Agreement ensures that there is no reverse engineering and copying of goods which has rendered technology transfer through learning and imitating difficult. The positive aspect of WTO is the institutional mechanism which allows developing countries to negotiate for increased ‘policy space’. The failure of recent rounds of negotiations which attempted to extend multilateral disciplines to national competition and investment policies is evidence of developing countries effectively protecting their policy space [Rodrik (2004)].

Finally, given the tight fiscal constraints facing most developing countries the extent and ability of state intervention through either public sector investments or subsidy provision is severely limited. In many instances these limitations are part of the conditionalities imposed by multi lateral agencies. Prudent macro economic policy and an increase in domestic public revenue generation would facilitate a more proactive role of the government in industrial policy. In the absence of fiscal space, the feasibility issue of industrial policy is of paramount importance and it underscores the need for strategizing and prioritizing government intervention.

The discussion thus far was meant to contextualize and frame the view on industrial policy which would be forwarded in this particular report. The following section gives an overview of the structure of the Industrial Policy report.

3. Structure of the Report

3.1 Introduction

This report is viewed as a first stage of Industrial Policy formulation. As mentioned before, Industrial Policy is not a one time exercise but an institutionalized process of engagement between the private sector stakeholders and the government. This entails working jointly to identify and remove major obstacles blocking greater product diversification and increased industrial productivity.

The particular methodology adopted in this report is to devise specific programs and policy interventions from a three tiered analysis of the industrial sector. The first tier would be a macro level investigation of industrial performance which would be supplemented by a second tier firm-level analysis of competitiveness. The third tier would be a detailed study on the spatial aspects of industrialization or industrial cluster formation.

The report would be divided into four parts. The first part would give an historical overview of industrial policy making in Pakistan. This would be in context to the changing ideas and conceptions of development throughout the last century. The historical narrative and analysis would be followed by a detailed description and analysis of the structure and performance of Pakistan's industrial sector. It would highlight the major impediments to increased productivity and product diversity within the manufacturing sector. The first part, therefore, would set the stage and give context to the subsequent analysis.

The second part of the report would be a detailed sectoral or micro level analysis of Pakistan's industry. The micro level analysis will be at the level of the firm and encompass several important industries. It will primarily rely on an assessment of Pakistani firms' position in the global value chain, their 'value-added', and an examination of the various factors responsible for a sector's global competitiveness or lack thereof. This will help identify both specific problems affecting the competitiveness of a particular industry and issues that cut across all sectors under study. This analysis would thus result in general as well as specific policy programs.

The third part of the report would take a 'bird's eye view' of industry by focusing on the spatial aspects of industrialization. The analysis in this part would result in a compendium of policy notes based on an in depth investigation of the formation of industrial clusters and their spatial distribution. The mapping measures will reveal the main determinants of cluster formation and identify the determinants of existing locations for various clusters. This analysis would help identify the degree to which cluster formation is dependent on 'historical accidents', government policy or economic characteristics/comparative advantage of a particular region. This section would also look at the impact of disparate infrastructural provision on regional poverty and income inequality. Hence the critical nexus between public policy and inter and intra regional inequality would be drawn through the analysis of industrial cluster formations.

The last section of the report would bring together the policies derived from the three tiers of analysis, i.e., the macro perspective, sectoral analysis of competitiveness and the spatial aspects of industrialization, into a compendium of programs and recommendations for the Government of Pakistan.

The detailed description of the report is below:

3.2 Industry Characteristics and Performance

Pakistan's manufacturing sector is largely concentrated around a few industrial products. The potential of industrial sector growth is substantial when scaled on the basis of prospective diversification, technological development and value-addition in new and existing products [Felipe (2007)]. Before analysing sectoral competitiveness and the spatial aspects of industrial development it is imperative to first map the existing challenges and constraints faced by the industrial sector. After reviewing the characteristics and performance of the manufacturing sector this section will assess the general and sector specific growth impediments which have caused a systemic stagnation of the industrial sector. This section would therefore build upon the Industrial Strategy Report (2005). The section has been divided into three subsections: a) structure/performance of industrial sector, b) public and private investments, and c) spatial and physical constraints. The following discussion is meant to highlight the key aspects of each subsection.

a) Structure and Performance of Industrial Sector:

This sub-section will analyse the structure and performance of the industrial sector using various macro and industry specific indicators across time and in comparison to other countries. The primary focus in this section will be on macroeconomic management and performance with respect to industrial sector growth. Pakistan has experienced over five percent average GDP growth rate in the last four decades. The episodes of high growth rates have mostly been consumption driven leading to frequent 'boom' and 'bust' cycles. The fact that industry has not been the main engine of Pakistan's growth has led to on average a low and variable growth rate.

Till the 1980's Pakistan's manufacturing grew at an average rate of 8 percent. In the 1990's however, this growth rate fell to 3.9 percent. In the last five years, the growth in manufacturing sector is on deceleration path. In 2008-09, an overall negative growth rate (-3.3 percent) was observed in manufacturing with a negative growth rate (-7.7 percent) in the large scale sector. The share of manufacturing in GDP of Pakistan is just 18.2 percent. The GDP share of manufacturing has increased in relation to agriculture in the past five years but the overall share of manufacturing is still small by international standards. In fact, manufacturing's share of GDP in 2008-09 is the same as it was in 2004-05.

As stated earlier, the manufacturing base of Pakistan's economy is quite narrow with a concentration in low technology and low value-added products whose share in the world market is decreasing. Pakistan's economy was built around textile and its current base is still concentrated in textiles [World Bank (2009)]. Cotton textile production is the most important of Pakistan's industries, accounting for about 19 percents of large-scale industrial employment in 2001. The global share of Pakistan in the export market is 0.13 percent and within that textile is the dominant product. The share of cotton textile was 60 percent of total exports in 2000-01.

b) Public and Private Investments:

The demographic trend of Pakistan currently depicts a low dependency ratio. This trend presents a contingent opportunity as well as a potential risk. The opportunity is contingent upon the economy generating enough jobs to absorb the influx of youth in the economy. In order to create more jobs, the economy will have to increase the growth rate of the GDP and to ensure that its structure is inclusive, i.e., that it draws in the bulk of the labor force. Between 1991 and 2009, the GDP is estimated to have grown at a rate of 4.7 percent a year. Studies by international agencies have shown that an increase of one percentage point in the growth rate of the GDP leads to an increase of about half a percentage point in the growth of employment. The countries' labor force is estimated to be growing at about 3.2 percent a year; thus, on the basis of the estimated relationship, the GDP will have to grow at a rate of about 6.5 percent a year in order to absorb the new additions to the labor force. It will have to grow a little faster—about 7.0–7.5 percent a year—in order to reduce the backlog of the currently unemployed. The increase in the required growth rate of the GPP is about 60 percent over the figure achieved in the last decade, and could be quite challenging. In addition, most of these jobs will have to be created in the industrial sector.

Given the current global outlook, significant shortage of electricity and slowly transforming technology, it will be impossible for the economy or the manufacturing sector to produce the required GDP growth or the number of jobs required. Hence, the current investment rate of around 14% of GDP will have to increase significantly to fuel the current deficit in GDP growth and job creation.

This subsection of the report will present the analysis of the historic trends of investments - analyzing its impact on the economy as a whole and in particular on the performance of the manufacturing sector as compared to international benchmarks. The report will draw out its conclusions by clearly articulating the findings of the investment climate assessment of Pakistan. The impediments drawn out will be later addressed in the policy section of the report to come up with clear recommendations for the government to facilitate investment growth.

c) Spatial and Physical Constraints:

The report in this subsection will focus on the constraints related to factor markets, infrastructure, regulatory environment, and security/negative perception of Pakistan. A

study by the World Bank showed that between 1960 and 2005, the growth of Pakistan's GDP relied mainly on additional imports of labor and capital; growth in productivity accounted for only 20 percent of the increase. This figure was significantly lower than in China and India, and was roughly about the level for Bangladesh.

Furthermore, several reports and surveys done by multitude of organizations report that the industry is facing a number of supply side constraints. In particular:

- Power (Electricity in the top constraint) and water shortages present significant challenges to business operations, and other infrastructure (including the logistic network) needs further investment;
- Businesses spend too much time and money dealing with bureaucratic red tape and meeting the “informal” costs of relations with the state;
- Uncertainty about the security situation acts as a deterrent to outside investors from seeking business partnerships in Pakistan;
- The judicial system works slowly and the sanctity of contracts and of land rights can be opaque;
- Many businesses struggle to access high end markets through a failure to demonstrate quality standards and fragmented, inefficient value chains; and
- Exporting industries are facing increasingly stiff competition in traditional export markets, whilst locally-produced items are competing in the domestic market against increasing inflows of imported manufactures, especially from China.
- The high rate of interest is also a big deterrent for expansion, with problem further enhanced by strong informational asymmetries within the SME sector.

The section of the report will compile the existing evidence on the above constraints and will try to identify the real cost to industry. In doing this the analysis will rely on the cost of doing business data collated by World Bank and other similar studies. The analysis in this section will be used to inform policy that will facilitate the overarching growth of the industrial sector by removing cross-cutting bottlenecks.

3.3 Sectoral Analysis

This section will comprise analyses of both large and small manufacturing sectors. In both cases, the competitiveness of each sector will be assessed and policy options proposed to enhance it. This will be done through an investigation that will begin with a simple value-chain analysis of the sector. Value chains are simply a diagnostic tool that identify the range of actors involved in the production of a particular product and importantly of the respective value that each adds (value added = selling price – cost of materials used to produce it). Usually, the higher the technological skill level of workers and greater the capital employed, higher the value that can be added.

Value chain analysis also requires identification of locations that are suited for various stages of manufacturing. Moreover, it allows us to identify the strategic path that firms could follow in order to move into higher-value-added segments. dynamic compare deficiencies In other words, value chain analysis enables firms to assess their competitive

position in the production network and work on competencies that will capture a bigger piece of the domestic or global pie. At the same time, it provides policy makers with insights into dynamic value chains that could in turn serve as a basis for possible interventions.

Mapping value chains involves:

1. Identification of end markets (domestic or international, which determine the attributes of products and services)
2. Trends in end markets
3. Identifying actors and product flows in the VC and any changes.
4. Breaking down the cost structure involved along with margins
5. Identifying underpinnings of costs and margins in terms of competencies, and industry conditions.
6. Exploration of the business-enabling environment
7. Exploration of transaction costs and the ease with which vertical or horizontal integration can take place
8. Identification and analysis of supporting (vendor) industries
9. Identification of social and economic mechanisms underlying the value chain
10. Identification of upgradation opportunities

Value chain analysis, while important, will only be one part of the sectoral analysis. It will be supplemented by a broader industry assessment that will seek to contextualize value-addition that is achieved in a particular chain. Whereas all nations wish to engage in higher value-added activities, a number of factors in their home environment can conspire to prevent this. This section will identify those factors, with particular emphasis on

factor conditions, demand conditions, domestic rivalry, related industries and the role of the government. This broader analysis will provide insights that will become the basis for policy interventions that are both strategic and emergent.

As stated earlier, the analysis will cover selected industries, both large and small. Below, we briefly touch upon the rationale for selection of various industries for the purposes of this study.

b) Rationale for Selection of Large Scale Industries

It is necessary for any industrial policy to stimulate investment and innovation in certain large scale industries which could thrive because of a large domestic market, and availability of a large pool of workforce, along with existing capabilities. Such industries develop competencies that can be leveraged across other sectors and lead to substantial technology spillovers. Moreover, because of the large domestic market, any investment into this industry is not necessarily entirely dependent on foreign markets. In this context, we will be looking at: the Electronics sector, Automotive sector, Food processing and Pharmaceuticals.

At this point in time, no country can afford not to develop competencies in electronics. Electronics have pervaded almost all industries and competitiveness in any industry requires knowledge of electronics both at the level of product and process. Moreover, with increasing affluence a large demand has developed for electronic items such as Televisions, Computers, Washing machines, Air conditioners etc.

Similarly, with the Tata Nano, India has demonstrated that producing competitive automobiles is not the sole preserve of rich, developed nations. Developing countries are just as capable of producing products that will appeal to the global segment which cannot yet afford automobiles but will settle for slightly lower quality.

Food processing in Pakistan needs to be encouraged simply because of Pakistan's natural comparative advantage in it. And finally, without a competitive and robust pharmaceutical industry, Pakistan can neither provide a driver for the chemical and biotech industries nor ensure independence from the big-pharma cartel that keeps prices high and imposes exorbitant costs in the shape of subsidies on the government.

c) Rationale for Selection of Small Scale Industries

The project is proposing to look at the Leather, Sports Goods, Surgical, Light Engineering and Cutlery & Swords as the sample small scale sectors. The rationale for the selection is that all these sectors are key exporting sectors, all of them have established themselves as dense clusters and all are extremely important in terms of employment and poverty alleviation. Another reason for the proposed sectors is that leather like garments is linked to sophisticated consumer market hence will develop point towards a policy stance that supports innovation, product development and linkages with international markets and may be joint ventures.

The sports goods and the surgical industry is strongly linked to the health care and recreation & wellness sectors. These sectors are recession proof and even with world incomes squeezing the demand for such products is always on the rise. In addition these two sectors are the oldest export centers, however, gradually Pakistan has moved down the value chain and only producing basic products. There is a dire need for these sectors to start to innovate and climb up the ladder to stay competitive and maintain any reasonable share in world exports.

Light engineering sector has been selected as it is linked to basic necessities and is one sector where Pakistan has been the weakest with the exception of fan manufacturing. This sectors has immense potential of growth as developed economies transfer out of high cost production and transfer there technologies to low cost countries. Pakistan can significantly benefit from joint ventures in this sector.

The cutlery and swords sectors has been selected as it is still a micro sector and is linked to large amount of employment generation and poverty alleviation. The sector has been a

key exporting hub based around Wazirabad, however, due to lack of any government policy the sector is on the verge of dying. The number of units over the last 4 years has fallen from 800 to around 400. Similarly, exports have fallen by around 60%. The project has picked up this sector as a case study to see why a sector which is capable of supplying to a sophisticated market such as Hollywood is dying. The major target here is to develop policy plans that support and retain specialized skills around Pakistan.

3.4 Spatial Aspects and Industrial Development

This part of the inception report deals with the spatial aspects of industrial development in the light of the agreed ToRs. The section would begin by describing the compendium of policy notes, followed by an account of mapping measures of spatial concentration. In the next step, the cross-cutting questions addressed by the study in the light of the mapping measures of spatial concentration are reported. The section concludes by elaborating on the sectoral policy notes that will be prepared on the basis of the analysis of the empirical results and the available industrial sector data.

a) Compendium of Policy Notes

The first objective of this section is to prepare a compendium of policy notes consisting of various policy instruments that would be helpful in facilitating spatial aspects of industrial development. In this regard, a series of background papers/notes would be completed, which in turn would help in the development of sectoral policy notes. Spatial aspects of industrial development would build on various mapping measures of spatial concentration and cross-cutting questions.

b) Mapping Measures of Spatial Concentration

The policy notes would build on various mapping measures for spatial concentration. The description of the mapping measures, identified in the TORs, is given below.

- **Population density:** Population growth rates from 1998 census of population will be used to generate population density for each district.
- **Poverty density and incidence:** The head count ratio of poverty gives the relative incidence of the poor, or the number of people below the poverty line. If expenditure (income) is denoted by y and subscripts i refers to individuals, and p refers to the poverty line, then head count denoted by H is given by the number of individuals so that $y_i < p$. The head count ratio (p_0) is given by $p_0 = H/n \times 100$, where n is the total population in the reference group. The analysis would use the official poverty line suggested by the cutoff of Rs.723.4

for basic needs poverty in 2001-02 indicating the income/expenditure required to achieve the minimum calories of 2350 per adult equivalent per month [GoP (2007)]. This official poverty line would be inflated or deflated to get consistent series for other survey years.

- **Human capital infrastructure:** The factor component education and health (E&H) infrastructure indices would be constructed, which would be representative at the district level on the basis of 26 district level education and health indicators.⁶ The district level data on these indicators will be procured from the *Provincial Development Statistics* of respective provinces. E&H index will be used to rank the districts and to make comparison of their rank order over time.
- **Distribution of economic activity:** Provincial shares in national employment in manufacturing, agriculture and services sectors (depending upon the availability of data) would be used to compare if these shares are increasing, decreasing or constant. The Labor Force Survey (LFS) reports provincially representative data on employment by sectors.
- **Agglomeration measure (Ellison-Glaeser industry geographic concentration):** The spatial concentration of manufacturing industries presents a murky picture because this aspect has never been explored in the past on a scientific basis. The Ellison-Glaeser index (hereafter EG) will be used to measure the degree of agglomeration of industries in a region, e.g., districts, provinces [Ellison and Glaeser (1997)]. EG index of the degree to which an industry is concentrated is written as

$$\gamma = \frac{\sum_{i=1}^M s_i - x_i^2 - \left(1 - \sum_i x_i^2\right) H}{\left(1 - \sum_i x_i^2\right) 1 - H}$$

where s_i is the share of industry i 's employment located in district s ; x_i is the share of industry's overall manufacturing employment; $\sum_i s_i - x_i^2$ is the sum of squared deviations of employment shares of the industry known as Gini-

⁶ They include number of primary schools, enrollment in primary schools, number of teachers in primary schools, number of middle schools, enrollment in middle schools, number of teachers in middle schools, number of high schools, enrollment in high schools, number of teachers in high schools, number of intermediate colleges, enrollment in intermediate colleges, number of teachers in intermediate colleges, number of degree colleges, enrollment in degree colleges, number of teachers in degree colleges, number of hospitals, number of beds in the hospitals, number of dispensaries, number of beds in the dispensaries, number of rural health centers, number of beds in the rural health centers, number of TB clinics, number of beds in the TB clinics, number of basic health units, number of beds in the basic health units and number of mother-child health centers.

coefficient; $H = \sum_k Z_k^2$ is a Herfindahl-style measure of the industry's plant level concentration of employment, where Z_k is the k th plant's share in industry's employment. In practice, the value of EG index indicates the strength of agglomeration externalities in an industry where γ ranges between minus one (least agglomerated) and plus one (most agglomerated). Usually a γ score of more than 0.05 indicates highly agglomerated industry; a score between 0.05 and 0.02 suggests moderate agglomeration and a score of less than 0.02 shows randomly dispersed industry. Enterprise-level data will be used of three-digit SIC industries from the *Census of Manufacturing Industries* (CMI), and *Survey of Small and Household Manufacturing Industries* (SSHMI). CMI is the source of enterprise level data on registered manufacturing industries while SSHMI covers household and informal sector establishments. Due to commonalities and complementarities between formal and informal enterprises in Pakistan, SSHMI data may play a critical role in explaining why clusters form and dissolve in certain regions. Due to large changes in geographic concentration and high turnover of manufacturing plants, it is important to locate variation in agglomerations by using data of two or more time periods. Therefore, the plan is to use data of at least two time periods to examine how geographic concentrations emerge from the dynamic process. In this regard, the consultants have been able to obtain access to enterprise level data of CMI 2005-06 and SSHMI 1996-97 from the Federal Bureau of Statistics (FBS) with the courtesy of MOI&P. The request for enterprise level data on CMI 2000-01 and SSHMI 2006-07 has also been placed to FBS and the consultants hope to get the CMI 2000-01 data soon. However, SSHMI 2006-07 report may take few months to be released due to which it is unclear if the consultants would have access to this data before the conclusion of this study.

- **Regional specialization:** To examine the pattern of concentration of industry across provinces/districts the study will follow Henderson, Lee and Lee (2001) and construct industry specific normalized Hirschman-Herfindahl index, sometimes also termed as simplified EG index, given by

$$g_j = \sum_{i=1}^I \left[E_{ij}/E_j - P_i/P \right]^2$$

where g_j is the concentration index in industry j , E_j is for national employment in j th industry, P_i is for population in i th geographic unit, and P is for population at the national level. Cross-province and cross-district changes in regional concentration of industries will also be worked out.

- **Localization versus Urbanization Externalities:** If firms in a district/city learn from local firms in their own industry, this is called localization; if firms learn from all firms in a city/district, it is termed as urbanization economies, or diversity (also termed as Jacob's economies) [see Henderson, Lee and Lee

(2001)].⁷ While several urban/metropolitan areas dominate in Pakistan, the relative strength of “localization economies” versus “urbanization economies” is not known. Due to the information revolution, one may expect a greater role for information spillovers leading to greater cross-industry learning economies. These relationships and bonding may explain presence of mega industries around large cities. Moreover, if these externalities are dynamic, then one may expect that presence of industry at a location in the past would affect productivity today. In these cases, industry would be unwilling to move to far off regions where there is no “built-up stock of knowledge” that makes diversification of industries more and more difficult.

The scale of local externalities or “local information spillovers” for input and output markets and technology in respective industries will also be measured. Diversity of local firms is expected to increase local information dynamics. For a city/district, we measure an index for lack of diversity or the degree of specialization for an industry given by

$$g_i^s = \sum_{n=1}^N \left[\frac{E_{in}}{E_i} - \frac{E_n}{E} \right]^2$$

where i and n index city and industry, respectively, g_i^s is the index of localization and urbanization economies in i th city, E_n is for employment in industry n , E is for total national manufacturing employment, and E_i is for employment in i th city and E_{in} is for employment in i th city in n th industry. A lower value of g_i^s (minimum value is zero) would imply that the city is non-specialized (high diversity) while a higher value (approaching two) would indicate complete specialization. In other words, as g_i^s goes up specialization increases and the diversity tends to fall.

- **Firms’ density:** Despite the fact that clusters based on employment have great advantages in their comparability across industries, there are also reasons to consider clusters based on number of firms or plants in a cluster as an alternative base for cluster strength. Therefore, firm level data will be used of each district to construct firm density.
- **Market access and infrastructure gap analysis:** Punjab Highway Department maintains district level data on road density and road traffic in Punjab, which will be used to map spatial concentration in Punjab province. Infrastructure gap would be depicted by the standard deviations. While comparable data of other provinces is not available from any source, the consultants will make all out efforts to find one.

⁷ In a more dynamic setting these are also known as Marshall-Arrow-Romer (MAR) externalities.

c) Addressing relevant cross-cutting issues

The study will use the mapping measures of spatial concentration to address relevant cross-cutting questions discussed below.

Are Regional Infrastructure Disparities Influencing Incidence of Poverty?

Development practitioners and policy makers recognize that the objective of development effort in developing countries is to increase the living standards of the common man. A number of studies in the literature address the questions of pro-poor growth where the argument is that economic growth alone is not sufficient to alleviate poverty and that there are a number of other factors that would critically determine whether or not the growth is pro-poor [see, Ravallion and Datt (2002), Ravallion and Chen (2003), Kraay (2006), Klasen (2008), Suryahadi et al. (2009)]. While Pakistan is a federation where significant economic power rests with the federal government, its four provinces are free to make their independent choices for public policies towards regional economic development. The heterogeneity in inter-provincial and intra-provincial public policies over time and space allows the observation and study of the links between public policy leading to regional infrastructure disparities and its outcomes in the form of poverty. To investigate the nexus between regional infrastructure and poverty, the study will use a linear probability model (or a probit model) given by

$$y_{ijt} = \alpha + \beta(RI_{jt}) + \gamma X_{ijt} + \eta_k \times \tau_t + D_j + \varepsilon_{ijt}$$

where y_{ijt} is an index for individual i living in district j in province k , and t is an index for the year of the survey. The dependent variable y_{ijt} equals 1 if the individual falls below the official poverty line during the survey year, RI_{jt} is a factor component measure of regional infrastructure (measured by education, health and road network variables) in district j at time t . The variable of interest RI_{jt} will allow testing how variation in regional infrastructure affects poverty. Several household and individual level control variables are represented in vector X_{ijt} , the interaction term for period fixed-effect and province fixed-effect $\eta_k \times \tau_t$ captures variation in individual poverty due to changes in macroeconomic indicators over-time and province-specific heterogeneity, while D_j is for time-invariant district fixed-effects. The primary data source for this analysis will be four (or more than four) rounds of HIES. Pooled cross-section data of households will be used to generate individual level poverty (as described above) and other right-hand-side variables. The household survey data will be augmented with external information on infrastructure variables at the district level on education, health and road density.

The Nexus between Regional Infrastructure, Income Inequality and Poverty.

Given investments in regional infrastructure, regions facing inequalities in income may face greater difficulties in reducing poverty. Some empirical papers [see, for example, Ravallion (1997), Ravallion and Datt (2002), Ravallion and Chen (1997)] have already established that for a positive rate of economic growth, regional income disparities may lead to varying effects on poverty. The goal here is to empirically assess how increase in regional measures of income inequality affect incidence of poverty for a given level of infrastructure investments. Toward this end, the following framework is developed that allows the study of these relationships.

$$y_{ijt} = \alpha + \beta(RI_{jt} \times g_{jt}) + \gamma X_{ijt} + \eta_k \times \tau_t + D_j + \varepsilon_{ijt}$$

where g_{jt} measures income inequality in district j at time t , while all other variables are defined as above. The variable of interest $RI_{jt} \times g_{jt}$ is the interaction of a measure of regional infrastructure with a measure of income inequality. Regional income inequality will be measured by the most commonly referred measure known as the Gini coefficient, which will provide us some good benchmark values and written as

$$G = \frac{1}{\mu} \sum_{i=1}^K \sum_{j=1}^K f(y_i) f(y_j) |y_i - y_j|$$

where y_i depicts the value of an indicator in the i th region, μ represents average value of the indicator for the whole country, $f(y_i)$ is the population share of the i th region in total population of the country and K indicates the number of regions. The value of Gini-coefficient range from 1 to 0, where 1 indicates perfect inequality, and 0 is for perfect equality.

What Factors Influence Location Choice?

A number of factors may be affecting the agglomeration of an industry in a region. They include infrastructure advantages (e.g., road density, distance), human resource development, skilled labor force, proximity to major demand networks, population density, link with industrial estates and special economic zones (SEZs), availability of raw material, tax incentives, and law and order, among others. The study will use a simple OLS model to regress EG index at the district level for each three-digit SIC industry on its determinants by taking the available data of relevant variables. Success in getting data of more than one CMI and SSHMI would be a great advantage due to obvious gains in the degrees of freedom. A number of variables will be tried to test the significance of factors influencing agglomeration of industries in respective areas.

Besides, the pattern of location and specialization of districts in particular industries would be worked out by taking the product of each industry's agglomeration index, γ , and the industry's share of manufacturing in each district, i.e., $\gamma \times s$. In this way the

pattern of industrial clustering will be obtained in each district and the top 10 or more districts would be identified where a particular industry is localized.

Increase or decrease in spatial concentration is a key policy issue for regional development. Industrial estates and SEZs have been promoted with this objective in mind. The study will analyze the geography of industrialization by investigating whether manufacturing industries are spreading across districts with the passage of time? Moreover, the study will attempt to divulge the net benefits to Pakistan's industries from the various industrial clusters and SEZs that have been created. It would also identify the steps which could be taken to improve the development of Pakistan's industrial clusters and SEZs such that industries become more productive and competitive.

In this subsection, the study will investigate how patterns of industrial concentration vary across provinces versus the variation across districts. For this, CMI data will be employed to track growth in national employment by industry classification and by employment share in major urban areas. These numbers will be used to comment on concentration or deconcentration of employment over time. In recent years, infrastructure investment in roads and telecommunication networks may have reduced the differentials across urban and rural regions. For example, per capita stocks of roads in Southern Punjab and interior Sindh may have increased relative to major metropolitan areas due to new investments and lower population density. The use of regional concentration measure g_j (discussed above) would be made to comment on provincial and district concentration of industries over time. This analysis will also help in addressing how infrastructure investments may be prioritized and what role infrastructure development and industrial policy are playing in the nature of development, i.e., balanced vs. unbalanced development.

Is Spatial Concentration of Industries Driven by Comparative Advantage?

While we observe spatial concentration and clustering of manufacturing industries, it is altogether unclear if these clusters are based on comparative advantage or they are just "accidents of history." How the location of industrial estates and SEZs has been selected in the past is also unclear. To investigate these and other relationships, the Henderson, Lee and Lee (2001) approach will be followed to specify the following value-added production function

$$y_{in} = A W_{in} f k_{in}$$

where y_{in} is the value added output per production worker in i th district in n th industry; k_{in} is for capital per worker; $f(\cdot)$ represents production technology in n th industry; W_{in} represents a vector of shift factors including variables for externalities associated with localization and urbanization economies (spillover effects) and employment in each district in respective industries; and controlling for sub-industry, time and district fixed

effects. The study will comment on productivity change in each industry from the elasticity of output with respect to capital, or share of capital in value added of each industry in respective districts. Moreover, time dummies would also reflect trend in productivity growth in respective industries. The study will also comment on the impact of externalities due to localization and urbanization economies where it is expected that industries where local scale economies are present are likely to be most agglomerated and concentrated across districts. Based on the prevailing evidence in other countries, it is expected that urbanization or Jacob economies are likely to be highest in industries that are regarded as high-tech and vice-versa. There is the further concern whether industries locate at the most productive sites where they have high comparative advantage or they randomly locate across regions? To answer this question, the use of district-industry fixed effects will be made by examining correlations between industries for each district for a particular industry [on this, see also Henderson, Lee, Lee (2001)].

d) Sectoral Policy Notes

The study will build on this background work to produce policy notes as follows:

Pro Poor Infrastructure Investment:

As summarized in ToRs, pro poor infrastructure investment will entail guidelines to devise infrastructure development policies that are pro poor in nature. Given specific policy interventions, regions facing high income inequality and poverty will experience greater difficulties in industrialization. This policy note would provide guidance on how public sector investments in education, health and road infrastructure can be used to bring about equitable development and increase in the living standards of the common man across spatial divide.

Locational Policy for Industrial Development:

Locational policy will involve framing of specific guidelines for the government to devise effective policies by realigning its priorities for the balanced development of manufacturing industries across regions. The linkage to be established between industry clusters and their determinants would serve as key factors in formulating an informed policy and in determining a new direction that leads to equitable development of regions. Present trends in spatial concentration and the geography of industrialization across provinces/districts would be used to set new priorities for provinces, given their resources endowments. Moreover, this policy note would also provide guidelines on how government needs to realign its priorities towards development of industrial zones and SEZs.

Agglomeration Economies, Comparative Advantage and Growth of Firms:

This policy note would entail insights on the role of comparative advantage, localization and urbanization economies to each industry across districts. The extent of scale

economies in each industry would inform policy makers why some industries are concentrated in certain regions while others are randomly located. This information would help guide the policy makers to determine which industries may benefit from diverse local environments due to spillover. Presence of localization economies, however, would suggest that specialization in specific regions is a virtue that needs to be protected. Moreover, this policy note would also provide guidelines that how over promoting diversity in industries that otherwise exploit localization economies may make them less competitive.

Spatial Guidelines:

As summarized in the ToRs, this policy note would provide spatial guidelines for the spatial plans that will be prepared by provincial and district governments and tehsil municipal governments, which all those involved in their formulation, would be bound to maintain.

3.5 Policy Recommendations and Programs

As mentioned in the introduction the strength of the industrial policy report is its methodology. The policy recommendations which would be forwarded to the Government of Pakistan in the final section of the report would be based on a comprehensive and rigorous analysis of the industry. The broader macro level analysis in the first section would be augmented in the second section by a detailed micro-firm level analysis of competitiveness based on the value chain method. This would assist in determining firm level impediments that is affective value addition and productivity. The third tier of analysis – spatial aspects of industrialization – would put forward a compendium of policy notes which would identify the critical determinants of cluster formation. This would help the government in framing strategic policy interventions which would improve the productivity and performance of existing clusters and lead to the formation of competitive and economically viable clusters in relatively low income areas.

The policy programs which would be derived from the three tiered analysis would be consistent with each other and would mainly address the following key issues:

- Structural rigidity of industry and factors impeding productivity, greater diversity and value addition in manufacturing and exports.
- Improvement in the investment climate in the country.
- Improvement or enhancement of labour skills shifting the comparative advantage of the country towards higher value added products with greater world demand.

- Improvement in existing physical infrastructure (energy and logistical networks) and filling in the critical infrastructural gaps to facilitate industrial development – cluster formation.
- Identification of the key problems in cost of doing business such as regulation, taxation, bureaucratic red tape etc.
- The necessary change in the institutional structure of the Ministry of Industries – from a regular to a facilitator.
- Institutionalizing a continued process of engagement with the private sector in industrial policy formation.
- Improvement of coordination between different branches of government or relevant ministries in the effective implementation of industrial policy.

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