

Making industrial policy work for development

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Economic development is a process of continuous technological innovation, industrial upgrading, and structural transformation – which makes it inherently beset with market failures. Before the 2009 crisis, industrial policy as an instrument to promote industrial upgrading was widely dismissed by economists who were not convinced of its analytical foundations and cited its poor track record. Even those who recognized the presence of market failures and the associated case for state intervention generally rejected industrial policy, as they were concerned that the attempt to pick winners was more likely to fail – and fail at high cost – than to correct perceived market failures effectively. Most economists believed that the State should focus on maintaining macroeconomic (fiscal and financial) stability and on creating a business environment characterized by the absence of distortions, thereby establishing a level playing field for all economic agents.

The view post-crisis has shifted considerably. To a significant extent, both economists and policy-makers have perceived the crisis to be the result of unregulated free markets, causing many economists to take a fresh look at the role of the State in economic management. An idea gaining traction among economists is that broad-based interventions to support industrial upgrading and diversification are crucial to facilitate structural transformation and spur sustainable growth. This chapter discusses the evolution of the understanding of the process of fostering economic growth and, based on a review of economic history, the role that industrial policy has played in facilitating growth in the past. It then derives principles that industrial policy will have to follow in order to be able to effectively support growth and development.

2.1 Fostering economic growth in developing countries: The evolution of development thinking

The development of viable theoretical and practical approaches to facilitate growth in developing countries has been one of the top concerns of policy-makers and economists for some time.

Inspired by the desire to align their countries' economic performance with that of the advanced countries, and given the apparent success of the Soviet Union's industrialization at the time, many developing country leaders in the 1950s and 1960s instituted development strategies built on structuralism. At that time, structuralism was the prevailing economic development framework. Essentially, it contended that developing countries could overcome their underdevelopment or "backwardness" most rapidly by developing the same advanced industries as those in the high-income industrialized countries. The rationale behind this strategy was often noble, as leaders of developing countries wanted the economies of their countries to compete on the global technological frontier as quickly as possible.

However, this turned out to be a fatal mistake. Rather than facilitating economic growth, the structuralist paradigm actually hindered development because it was a strategy that defied the concept of comparative advantage and advised countries to give priority to capital-intensive heavy industries, even though capital was scarce in those economies (Lin, 2009). The strategy implied very high production costs compared with those in countries that developed similar industries but in keeping with their comparative advantage. The firms in the capital-intensive industries that faced such high production costs could not survive in an open, competitive market – unless the government was willing and able to grant them strong protection through large-scale subsidies or other forms of protectionism. The common denominator of these strategies was that the government targeted industries that were flourishing in countries whose per capita income was far higher than its own. Consequently, the developing country was unable to produce the goods at a cost advantage and therefore unable to compete in these industries.

Examples of these comparative advantage-defying strategies include Indonesia launching a ship construction industry in the 1960s, when its GDP per capita was only 10 per cent of that of its main competitor at the time, the Netherlands. Another example is the attempt to build an auto industry in Zaire (now the Democratic Republic of the Congo, DRC) in the 1970s, when the country's GDP per capita was only 5 per cent of the level in the industry leader (table 2.1).

To implement this comparative advantage-defying strategy, developing country governments had to protect numerous non-viable enterprises in the priority sectors. The measures to which they resorted to reduce the investment and

Table 2.1 The economics of unrealistic ambitions

Latecomer country	Industry, decade	Leading producer at time	Real GDP per capita		Income ratio of follower versus leader (%)
			Latecomer country	Leading country	
China	Automobile, 1950s	United States	577	10 897	5
DRC	Automobile, 1970s	United States	761	16 284	5
Egypt	Iron, steel, chemicals, 1950s	United States	885	10 897	8
India	Automobile, 1950s	United States	676	10 897	6
Indonesia	Ship building, 1960s	Netherlands	983	9 798	10
Senegal	Trucks, 1960s	United States	1 511	13 419	11
Turkey	Automobile, 1950s	United States	2 093	10 897	19
Zambia	Automobile, 1970s	United States	1 041	16 284	6

Source: Authors' calculations based on data from Maddison (1995).

operational costs of non-viable enterprises included granting those enterprises a market monopoly, suppressing interest rates, overvaluing domestic currency, controlling prices of raw materials, and imposing high tariffs on imports. Such interventions caused widespread shortages in credit, foreign exchange, and raw materials. Consequently, governments also had to allocate resources directly to those enterprises through administrative channels, including through national planning in the Socialist countries and credit rationing and investment and entry licensing in non-Socialist developing countries. For ease of implementation, many countries also relied on state-owned enterprises to develop the targeted industries.

The protectionist measures that many governments implemented incurred various types of costs. As the prices of imports and of import-substituting goods increased relative to the world price, this discrepancy pushed these economies to consume a mix of goods that was inappropriate in terms of economic efficiency. Markets fragmented as the economies produced goods at too small a scale, again resulting in loss of efficiency. Also, protectionism lessened competition from foreign firms and encouraged monopoly power among domestic firms whose owners were politically well-connected. Moreover, protectionism created opportunities for rent-seeking and corruption, which raised input and transaction costs. Rent-seeking connected with the establishment of non-viable enterprises also made it difficult to end state interventions in support of these industries, including subsidies.

In some cases (mainly in Eastern Europe and the Soviet Union), the industrial development brought about by the comparative advantage-defying strategy appeared to be successful initially because large-scale investment through massive

state mobilization of resources increased the growth rate and improved productivity indicators. But firms in the capital-intensive sectors depended on the government's subsidies and protection for their survival; when the State could no longer mobilize resources for further investment, the economy stagnated. Moreover, investment in the capital-intensive sectors generated little employment, and the labour force remained mostly in the rural sector.

Critics interpreted the failure of the old structuralist policies to deliver structural transformation, economic growth and prosperity as an indication that government interventions in the economy were bound to fail because of the inevitable distortions of prices and incentives and the resulting misallocation of resources. These views, in turn, prompted a shift in development thinking toward the free market approach that became known as the Washington Consensus, which promoted economic liberalization, privatization, and the implementation of rigorous stabilization programmes. In terms of growth and employment generation, however, the results of the policies presented as alternatives to the failed old structuralism were controversial at best (Easterly, 2001 and 2005). Many economists and the public in many countries quickly perceived the Washington Consensus as a set of neoliberal policies that were imposed on hapless countries by the Washington-based international financial institutions. These policies ended up leading many countries to crisis.

Why did the Washington Consensus, which attempted to correct the mistakes of the old structuralist approach, fail to foster structural transformation and sustained growth in low-income countries in Africa and elsewhere? What have been the primary features of processes that *do* help generate successful and sustained growth? How can developing countries create the conditions to facilitate the flow of technology and unleash growth, even in the context of suboptimal microeconomic policies, weak institutions, and sometimes uncertain private property rights? Why do some countries catch up with developed countries and others do not?

The report of the Commission on Growth and Development offers important insights into these questions. Launched in April 2006, the Commission brought together 22 leading development practitioners from government, business and the policy-making arenas, mostly from the developing world. It was chaired by Nobel Laureate Michael Spence and Danny Leipziger, a former World Bank vice president. The Growth Commission's report (2008) concludes that "[f]ast, sustained growth does not happen spontaneously. It requires long-term commitment by a country's political leaders, a commitment pursued with patience, perseverance and pragmatism." According to the report, the key principles of growth are: (i) full engagement with the global economy; (ii) macroeconomic stability; (iii) high

saving and investment rates; (iv) market allocation; and (v) leadership and governance. The report represents an important step forward as it provides new insights that have helped policy-makers to better understand the economic dynamics of catching up and to avoid some of the pitfalls that plague economic development. One of the most important conclusions of the Growth Commission's report is that there is no universal set of rules to guide policy-makers. The Commission recommends less reliance on simple formulas and the search for elusive "best practices" and instead champions greater reliance on deeper economic analysis to identify the binding constraints to growth in each country.

The key recommendation of the Growth Commission, therefore, was for each country to identify and focus on one area that presents the biggest obstacle to growth, much in line with research by Hausmann, Rodrik and Velasco (2008). The approach proposed by Hausmann and colleagues offers a decision-tree methodology to help identify the binding constraints to growth relevant for individual countries. The implication is that different countries require different policy choices to facilitate growth, identified on the basis of country-specific Growth Diagnostics. Furthermore, the overarching principles that support growth (for example, sound monetary policy, property rights, openness, and free markets) need to be calibrated to the country-specific context, including the right institutional framework and policy mix.

While the Growth Diagnostics approach is an important advance, one of its major weaknesses is that it depends on surveys of firms in the existing industries. It is possible, however, that some of these industries in their current form exist only because of the old structuralist policies and are not really consistent with the country's comparative advantage. At the same time, other industries that *are* consistent with the country's comparative advantage may not have developed because the government failed to provide proper facilitation. Consequently, the binding constraints identified in a survey of the existing industries may actually not be relevant as they may reflect a suboptimal structure of the economy. More fundamentally, as discussed in greater detail below, one of the most important roles for industrial policy is to facilitate "first movers", companies that are willing to enter new sectors in line with the country's comparative advantage and that offer significant potential for growth and employment creation. Addressing the binding constraints of growth identified through a survey of existing industries will not include measures to facilitate the emergence of first movers that are new to the economy.

New Structural Economics (Lin, 2012) integrates the insights of structuralism and neoclassic economic analysis concerning the growth process. It starts with the observation that the main feature of modern economic development is continuous

technological innovation and structural change. The optimal industrial structure in an economy – that is, the industrial structure that will make the economy most competitive domestically and internationally at any specific time – is endogenous to its comparative advantage, which in turn is determined by the given endowment structure of the economy at that time. Economies that try to grow simply by adding more and more physical capital or labour to the existing industries eventually run into diminishing returns, and economies that try to deviate from their comparative advantage are likely to perform poorly.

The main goal in the formulation of economic policy is to ensure that the economy grows in a manner that is in keeping with its comparative advantage. In this way the economy will be competitive, profits will be optimized, and capital accumulation will be maximized. As capital accumulates, however, the economy's factor endowment structure evolves, resulting in a gap between the current and the optimal industrial structure. Firms then need to upgrade their industries and technologies accordingly in order to maintain market competitiveness.

Obviously, for firms to make the right decisions regarding investment in industries that are consistent with the economy's comparative advantages, relative prices need to be correct. This requires a competitive market system. In developing countries, where this is usually not the case, it is necessary that governments act to create or improve various market institutions so as to create and protect effective competition in the product and factor markets.

As a case in point, in the process of industrial upgrading, firms need to have information about production technologies and product markets. Often, first movers can be pioneers and provide this type of information, but they may face a set of specific challenges. On the one hand, first movers may fail, but in that process they can provide valuable information to other prospective entrants. On the other hand, first movers may succeed, encourage other firms to enter, and gradually reduce the rent accruable to them. They may also incur significant costs to train workers in new business processes and techniques, and these workers may then be hired by competitors. So, first movers may create external benefits for which they will not be compensated, a result that reduces the incentives for firms to be first movers.

Also, technological innovation, industrial diversification, and industrial upgrading are typically accompanied by changes in capital and skills requirements for firms, as well as by changes in their market scope and infrastructure needs due to the evolving nature of production that is embodied in the process of innovation. In other words, industrial upgrading and diversification are typically accompanied by changes in hard and soft infrastructure requirements. For example, with the change from agrarian production to manufacturing and from simple

manufacturing to advanced manufacturing in the development process, the scale of production and market scope increase. The demand for transportation, roads, and power increases accordingly. Individual firms are not capable of internalizing their provision or deploying the kind of coordination efforts among firms in different sectors needed to meet those increasing demands. Even if some large companies were willing to finance a national road or a power network, coordination through the public sector would be necessary to ensure consistency, efficiency, and prevention of natural monopolies when the economy grows.

In order to operate, low-income country firms in small-scale, labour-intensive agriculture and manufacturing industries need only an unskilled labour force, an unsophisticated informal financial and manufacturing system, and hard infrastructure. But when the economy expands into modern manufacturing industries, firms need highly skilled labour, large funds for lump-sum investments in equipment, working capital and/or export financing, and new marketing arrangements. However, individual firms usually are not capable of internalizing the required changes in soft infrastructure. Here again, there is a need for the State to provide or coordinate some of these changes in different sectors of the economy so as to facilitate upgrading and diversification by individual firms.

Economic development is, therefore, a dynamic process marked by externalities and coordination requirements. While the market is the necessary basic mechanism for effective resource allocation at each stage of development, governments must play a proactive, facilitating role for an economy to move from one stage to another and to overcome the type of information, coordination, and externality issues that are inherent to the development of new activities and sectors. Governments must intervene to allow markets to function properly by:

1. Providing information about new industries that are consistent with the country's comparative advantage as determined by changes in its economy's endowment structure;
2. Coordinating investments in related industries and facilitating the required improvements in infrastructure;
3. Subsidizing activities with externalities in the process of industrial upgrading and structural change; and
4. Catalysing the development of new industries by incubating them or by attracting foreign direct investment to overcome the deficits in social capital and other intangible constraints.

2.2 What are the principal tenets of successful industrial policy?

To derive the principal tenets of successful industrial policy, a review of successes in implementing industrial policy is necessary. There is considerable historical evidence that today's most advanced economies have relied heavily on government intervention to ignite and facilitate their economic take-off, which allowed them to build strong industrial bases and sustain the momentum of growth over long periods.

Chang (2003) reviewed economic developments during the period when most of the present-day advanced economies went through their industrial revolutions (between the end of the Napoleonic wars in 1815 and the beginning of the First World War in 1914). Contrary to conventional wisdom, which often attributes the industrial successes of Western economies to *laissez-faire* and free market policies, the historical evidence shows that the use of industrial, trade, and technology policies was critical to their successful structural transformation. The interventions ranged from the frequent use of import duties or even import bans to protect infant industries, to industrial promotion through monopoly grants and cheap supplies from government factories, to public-private partnerships and direct state investment, especially in Britain and the United States, in addition to various other subsidies (Trebilcock, 1981).

The US government has continuously offered strong incentives to private businesses and academic institutions to discover new ideas that are valuable for sustaining growth and has encouraged making such ideas non-rival. In addition, it has built infrastructure in key economic sectors such as transportation and provided financing to education and training in order to build the country's skills base in many industries. Chang (2003) observes that interventions by the US government have included support to industries such as computers and aerospace and to technologies such as the Internet, where the United States still maintains an international edge despite the decline in its overall technological leadership. He notes that these industries would not have existed without defence-related research and development funding by the US government.

In Europe, active industrial policy has continued to be applied since the end of the Second World War. Examples of the implementation of these policies include the rise of the French space programme Ariane and European collaboration in the aircraft manufacturer Airbus, which have been remarkable industrial successes. Finland is an example of a country that experienced late but successful state-led industrialization. According to Jäntti and Vartiainen (2009), the economic policy that achieved that objective was a mix of heavy government intervention and incentives for the private sector. The main features of the country's growth regime

were a high rate of capital accumulation that often required the use of directed credit provided at government-controlled interest rates, a policy of selective loan approvals for capital equipment investment, and a high rate of investment in targeted areas of manufacturing, particularly the paper, pulp and metalworking industries. State enterprises were established in the basic metal and chemical-fertilizer industries and in the energy sector. As late as the 1980s, state-owned enterprises accounted for 18 per cent of the country's total industry value added.

What have been the key ingredients in the successful implementation of industrial policy?

Modern economic growth is a process of continuous industrial upgrading and structural change. To achieve dynamic growth, a developing country should develop industries according to its comparative advantage, which is determined by the country's endowment structure, and tap into the potential advantages of backwardness in industrial upgrading. The process of upgrading the industrial structure to a higher level consistent with national factor endowments cannot rely solely on the market mechanism. For example, starting a new industry may be difficult because of the lack of complementary intermediate inputs or adequate infrastructure for the new industry, even if the targeted industry is consistent with the economy's comparative advantage as determined by its factor endowment. In their upgrading or diversification decisions, private firms may not be able to internalize the investments for production of those intermediate inputs or for the provision of infrastructure. Thus, the government has an important role to play in providing or coordinating investments in the necessary infrastructure and complementary inputs. In addition, innovation, which underlies industrial upgrading and diversification, is a risky process because it entails a first-mover problem (see page 70).

It is therefore useful to draw on the theories of comparative advantage and of the advantage of backwardness,¹ as well as on the successful and failed experiences of industrial policies discussed above, to codify some principles and policy recommendations that can guide the formation of successful industrial policy. Essentially, the most promising approach for developing countries in designing successful industrial policy is to exploit the latecomer advantage by building up industries that are growing dynamically in more advanced countries with endowment structures similar to theirs. When Britain applied industrial policies to catch up with the Netherlands in the sixteenth and seventeenth centuries, its per

¹ The advantage of backwardness refers to the fact that a developing country can benefit from the technological/industrial gap with the advanced countries by adopting a new technology or entering an industry that is new to its economy but mature in the advanced countries. In this situation, the cost of innovation in the developing country will be substantially lower than in the advanced countries that needed to invent or innovate.

capita income was about 70 per cent that of the Netherlands. When Germany, France and the United States used industrial policy to catch up with Britain in the nineteenth century, their per capita incomes were about 60 to 75 per cent that of Britain. Similarly, when Japan's industrial policy targeted the US automobile industry in the 1960s, the country's per capita income was about 40 per cent that of the United States. When the Republic of Korea and Taiwan (China) adopted industrial policies to facilitate their industrial upgrading in the 1960s and 1970s, they targeted industries in Japan instead of the United States, and for a good reason: their per capita incomes were about 35 per cent that of Japan and only about 10 per cent that of the United States at the time.²

Also, looking closely at the elements of successful catch-up strategies, it appears that the specifics of policy interventions depended on the particular binding constraints for these new industries and on country circumstances. But while the interventions were often different, the patterns of industrial development were similar across countries. They all started from labour-intensive industries, such as garments, textiles, toys and electronics, in the early stage of development and proceeded to move up the industrial ladder step by step to more capital-intensive industries. The newly industrialized economies of East Asia, for instance, exploited the fact that their endowment structures were similar to Japan's to follow its development in a flying geese pattern (Akamatsu, 1962; Kim, 1988). This was possible because the per capita income gaps with their target country were not large (Ito, 1980).

By following carefully selected lead countries, latecomers were able to emulate the leader-follower, flying geese pattern that has served well all successful catching-up economies since the eighteenth century. In the process, governments – through support in information, coordination, and sometimes limited subsidies – facilitated the development of new industries that are consistent with the country's latent comparative advantage as determined by its endowment structure, and hence helped the establishment of firms that turned out to be competitive.

Based on a review of this historical experience, the first step is to identify new industries in which a country may have a latent comparative advantage,³ and the second is to remove the constraints that impede the emergence of industries with latent comparative advantage and create the conditions that allow them to become the country's actual comparative advantage.

² For a discussion of industrial policies in these countries, see Chang (2003); for the estimations of per capita income for the countries mentioned, see Maddison (2006).

³ A country will have a latent comparative advantage in an industry in which it would in principle be competitive based on the factor cost of production, but is currently not competitive due to transaction costs arising from lack of infrastructure and of a conducive business environment.

The Growth Identification and Facilitation Framework, based on New Structural Economics, proposes a six-step process (Lin, 2012, Chapter 3):

The first step consists in identifying tradable goods and services that have been growing dynamically for about 20 years in fast-growing countries with similar endowment structures and a GDP per capita about twice as high as that of the developing country. In many cases, given that wages tend to rise in the growth process, a fast-growing country that has produced certain goods and services for about 20 years may begin to lose its comparative advantage in those sectors, leaving the space for countries with lower wages to enter and compete in those industries. For example, a developing country could produce simple manufactured goods domestically, particularly those that are labour-intensive, have limited economies of scale, require only small investments, and are currently imported. This would not only allow it to identify potential new industries, but may also present promising business opportunities for its private sector.

Second, among the industries identified, the government may give priority to those that some domestic private firms have already entered spontaneously. The government may then try to identify: (i) the obstacles that are preventing these firms from upgrading the quality of their products, or (ii) the barriers that limit entry to those industries by other private firms. This could be done through the combination of methods such as value chain analysis or the Growth Diagnostic Framework suggested by Hausmann, Rodrik and Velasco (2008). The government can then implement policies to remove those binding constraints and rigorously assess the impact of its action so as to ensure effective scaling up of those policies at the national level.

Third, some of the industries identified may be completely new to domestic firms. In such cases the government could adopt specific measures to encourage firms in the higher-income countries identified in the first step to invest in these industries. Firms in these higher-income countries will have incentives to reallocate their production to the lower-income country so as to take advantage of the lower labour costs. The government may also set up incubation programmes to catalyse the entry of domestic private firms into these industries.

Fourth, in addition to the industries identified on the list of opportunities for tradable goods and services in step one, governments of developing countries should pay close attention to successful innovations by domestic private enterprises and provide support to scale up those industries. Due to rapid technological changes, many new opportunities may arise – opportunities that would not have existed a decade or two ago, as those industries did not exist in the rapidly growing comparator countries.

Fifth, in developing countries with poor infrastructure and unfriendly business environments, the government can invest in industrial parks or export processing

zones and make the necessary improvements to attract domestic private firms and/or foreign firms that may be willing to invest in the targeted industries. Improvements in infrastructure and the business environment can reduce transaction costs and facilitate industrial development. However, because of budget and capacity constraints, most governments will not be able to make these desirable improvements for the whole economy in a reasonable time. Focusing on improving the infrastructure and business environment in an industrial park or an export processing zone is a more manageable alternative. Industrial parks and export processing zones also have the benefits of encouraging industrial clustering. The industrial parks would need to be tailored to the specific requirements of the targeted industry.

Sixth, the government may also provide limited incentives to domestic pioneer firms or foreign investors that work within the list of industries identified in step one in order to compensate for the non-rival public knowledge created by their investments. Incentives should not, and need not, be in the form of monopoly rent, high tariffs, or other distortions.

2.3 Concluding remarks

The basic feature of modern economic growth is continuous industrial upgrading and structural change. To achieve dynamic growth, a developing country should develop industries according to its comparative advantage, which is determined by the country's endowment structure, and tap into the potential advantages of backwardness in industrial upgrading.

Industrial upgrading and diversification are essential to allow a developing country's endowment structure to gradually align with that of more developed countries and in that way create the preconditions for better jobs, poverty reduction and higher living standards. To facilitate upgrading in these sectors, developing countries should use industrial policy targeted to alleviate binding constraints to growth in the most promising sectors. New Structural Economics and the Growth Identification and Facilitation Framework offer a practical approach to identifying sectors in line with the latent comparative advantage of a country and guidance on how to remove constraints to growth in these sectors by addressing coordination and market failures.

In recent years a number of countries have embarked on efforts to identify strategic sectors and calibrate industrial policy measures accordingly. In its Vision 2020, Nigeria has identified a number of priority sectors, and – with support from

the World Bank – has launched programmes to promote growth in these areas, including in specific regions. Also, Côte d’Ivoire’s National Development Plan highlights the need to identify strategic sectors in both the agro-processing and manufacturing areas. The country is working with both the World Bank and the United Nations Industrial Development Organization to develop and implement a growth strategy built on its latent comparative advantage. Similar efforts are under way in Rwanda, Ethiopia, the United Republic of Tanzania and Zambia.

In addition, several countries in Latin America, such as Colombia, with its Productive Transformation Program, and Brazil, through its national development bank (BNDES), are in the process of developing and implementing industrial policies intended to make full use of their respective comparative advantages in the global marketplace. Different from the experience under the old structuralism, industrial policy measures inspired by New Structural Economics will be consistent with the principles of free and fair competition, as the sectors are in line with a country’s latent comparative advantage, and will therefore be sustainable.

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