

Productive policies to rebuild the economy with social and environmental sustainability

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Introduction

This essay explores analytical proposals, of recent industrial policies, and their relevance for Mexico, since the content and orientation of sectoral policies affect the entire country's production, international and national exchanges, as well as social and territorial structures. That is why, as a starting point, it is important to analyze previous industrial policies to move forward in the theoretical and political debate, as the basis to formulate content and scope of new productive strategies for Mexico.

It must be noted that those policies, and the economic paradigms on which they are based, are not produced in neutral environments, but are rooted in Latin American political context and power structures, characterized by high property ownership inequality and, therefore, also income inequality.

Since the beginning of the 90s, the study of industrial policies has included reflections on changes in the economic conducting role of the State, as well as around structural change effects, such as for instance, fragmentation of productive processes and global value chain growth, promoting information technology revolutions, reducing transportation costs, almost zero interest rates and climate change. The 2008 financial crisis and, vehemently, the Covid-19 pandemic, as well as the Ukraine war and the genocide in Palestine, revealed problems of abandoning domestic production and supply of important health, environmental, food and economic stability products and privileging short- and medium-term cost benefit principles. All this vindicated Keynes' (1933) national sovereignty postulates.

Theoretical discussion in economic thinking history

The industrial policy theoretical and practical debate dates to over two hundred years. At the end of the XVIII century, in the recently independent United States of America (USA), Alexander Hamilton represented the alternative model to promote the rising manufacturing industry in the face of the liberal model, defended by Thomas Jefferson. Hamilton's ideas were recovered, when it was thought necessary to redesign the US

economic policy, under the Roosevelt, Eisenhower, Kennedy, Johnson and Biden presidencies. All of them, except Eisenhower, members of the Democratic Party, the origin and later development of which has revolved around progressive liberalism in favor of workers, and political freedom for all citizens, without any of them abandoning the imperialist character that country has always exercised. Special mention should be made of President Joseph Biden with his Inflation Reduction Act in which, he has not only explicitly promoted industrial policy but joined the striking workers of the Michigan automotive sector, in their search for higher salaries and assuming stances of intransigent and aggressive protectionism to face Chinese competition, especially intense in the automotive sector, specifically in electric vehicles.

The *infant or incipient industry theory*, the comparative advantage perspective and *dynamic and interdependent linkage effects* concepts are the three pillars that have shaped industrial policy development and implementation, always amid heated debates upon defining their strategic approaches. David Ricardo's comparative advantage theory assumes that only countries, industrialized between the end of the XVII and beginning of the XIX centuries, thanks to the Industrial Revolution, could produce manufactures, whereas colonies could only produce raw materials, implicitly that the latter could also generate absolutely all commodities, as for instance, coffee or oil. A more careful look at Latin American and Asian economic history shows that many countries, the now so-called developing nations, as Mexico, Peru or India, before the arrival of the Spanish and English colonizers, had a thriving manufacturing production, as for instance, textile and apparel.

In the mid-nineteenth century, with his infant industry theory, Friedrich List refuted David Ricardo's comparative advantage stance. Decades after, Kaldor challenged the Ricardian static proposal of adjusting to comparative advantages based on the initial factor's endowment, proposing economic and technological feasibility, to create and develop comparative advantages. More recently, it has been recognized that industrialized countries "climbed the stairs" of manufacturing development with a pragmatic pendular strategy oscillating, according to conditions of the moment, between Ricardian and Kaldorian positions. (Oqubay, 2015) (Schwartz, 2010).

In the first half of the XX century, various factors set productive policy and industrial development on the debate table: a) traditional industry decline in the most advanced nations; b) new competitors' threat and c) new technological developments. Most of the recent growth on industrial policy theories comes as of the 70s of the XX century, with the detailed analysis of policies adopted by economic growth, promoted by the successful substitutive industrialization of various Southeast Asia countries (Oqubay, Cramer, Chang, & Kozul-Wright, 2020). Later, more details.

Industrial policy definitions and debates

Over and beyond theoretical debates, pragmatism is the constant factor that distinguishes industrial policy throughout history. That is why it is not easy or appropriate to propose a single definition that fully satisfies all public and private sector analysts and executives. Oqubay (2020, page 19) proposes an integral definition, according to which industrial policy consists of an important set of selected actions and instruments focusing particular industrial activities in order to promote radical changes in the national economy and induced the disparities in income and productivity

It is also difficult to define the structural change concept in a simple and unequivocal fashion. For Pasinetti, genuine structural changes are permanent and irreversible modifications in the economic structure composition, unlike transient or irreversible alterations without short term transcendence (1993, pág. 1). Structural transformation implies productive apparatus mutation, as well as the need for a production centered framework. In this sense, to understand the economic structure concept, Ocampo, Rada and Taylor (2009, page 7). Taken as a whole, these irreversible mutations imply that industrial policy relies on a specific national vision and long term economic structure. Difficulties arise upon deciding which industries to support, and how to synchronize them with the rest of the economic components. For instance, it is not possible to make short term modifications on labor force education levels, but it is possible to create, and, in fact, training programs are being created, for labor force in new technologies.

Debate on the function of education in all societies is unavoidable. It is necessary for people to acquire labor skills demanded by digital economy, whether it is on the use of Artificial Intelligence (AI) or programming, but labor market-oriented education or mere profit generation, should be set aside. Emphasis should be placed on comprehensive training for critical human beings and citizens with high empathy and sensitivity towards public problems, particularly for low income groups: the poor. (Nussbaum, 2010).

Since it does not seem feasible to implement a new big Rosenstein-Rodan industrialization push type process, the only path left is to gradually move forward through strategic sector impetus, such as energy or infrastructure construction.

Among industrial policy studies, manufacture has deserved special attention as an economic growth and structural change engine. In the Economic Commission for Latin American and the Caribbean (ECLAC), Raúl Prebisch set the basis for regional industrialization framed within exchange terms, dollar shortage, capital formation and industrialization limits. He established that the decisive point, to improve the quality of life of the masses, was the existence of a considerable amount of capital per industrial worker, coupled by transportation and primary production development (Prebisch, 1950).

Another relevant contribution on this subject matter is the three Kaldor laws, according to which there is a strong positive and causal relationship among i) manufactured export growth and GDP expansion; ii) manufactured product and productivity growth, as a result of static and dynamic returns and iii) manufacturing and technological development. However, the fact that capital intensity and its viability depend on the size and nature of demand, as well as on technological development, in brief, a country's degree of development (Kaldor, 1980), means it is necessary for industrial policy to promote certain sectors to break and allow for that circularity to be dynamic.

Industrial chaining and industrial activity complementarities are a key manufacture potential. This is condensed in Hirschman's *backward and forward chainings*.¹ Just as agriculture transformation promotes manufacturing evolution, they promote service transformation and growth (Hirschman, 1958).

This last statement implies that agricultural sector productivity and hectare yields should grow faster than manufactures, to support this sector's growth, since agriculture produces manufacturing inputs and demands its end or intermediate consumption goods, because agriculture has important links to and from manufacturing. Under this alternative perspective, deindustrialization is explained through industrial goods decline, on the part of the agricultural sector and the peasant population, and not exclusively through the exchange rate or relative prices appreciation, as suggested by Dutch disease neoclassical literature (Patnaik & Ghosh, 1991) (Patnaik, 2003).

Pragmatism and social political context importance

It can be established that industrial policy is pragmatic, since its rationality lies in its practical usefulness and efficiency. According to this definition, and over and beyond academic debates on the validity or lack of industrial policy theories, the group that holds power in a specific country or time, designs, legitimizes and implements actions it considers appropriate for the accomplishment of its political and economic objective (Puyana, 2018). Government industrial policies express interests of the group in power and its allies, whose interests it tries to meet. In this context, to reach its political objectives, a government's productive policy actions are inspired on theories that address the identified economic problem and suggest ways to solve them or path to follow. If a theory ceases to show its practical usefulness for the accomplishment of said objectives, it

¹ Backward chainings refer to the substitution made by a producer, through which he stops importing inputs and buys them at local markets. Forward chainings are previously non-existent, or very costly products, that later promote investment, because they are demanded as inputs.

will be replaced by another one deemed to be functional (Puyana, 2018). In this regard, Mariana Mazzucato maintains that a State is defined not only by its objectives, but also by its political capacity to achieve them through various tools and resources. As Mazzucato (2014, page 263) suggests, the capitalist economy is subordinate to the State and has to change when the States do so. Therefore, politicians should make the most of these tools to shape markets and achieve results that would otherwise be impossible.

After the design of a specific industrial policy, implementation and questioning challenges are faced by opposition national and international groups, who see their interests threatened. Political force correlation, among branches of power, (whether it is a presidentialist or parliamentary system) defines the way in which industrial policies are instituted and implemented. Additionally, the government listens and incorporates workers' opinions in the industrial measures to be implemented.

Whenever possible, technological and organizational strategies must be compatible with political limitations derived from the power distribution among social, national and foreign groups, acting in each country (Romero, 2016). The historic premise is that to accomplish its specific objectives, capitalism needs the State, just as other forms of production. These objectives may be granting protection to a specific population sector, guaranteeing property as a commercial transaction intermediary, or supporting legal tender currency value. Thus, the State shapes the market in many ways, according to its needs and preferences. Therefore, it is not possible to conceive an industrial policy isolated from State intervention.

Just as public policies, and politicians implementing them, appeal to certain theories, to explain or justify their actions, inductive theories systematize and simplify, into simple or very complex models, practices observed and in verifiable economic regularities.

Whether it is to account for factors that catalyze economic growth or causes that lead to a financial crisis. As in a feedback spiral, with no definite rupture in the succession of the

different theoretical positions, the various hypotheses that seek to set a direction and order in reality, are fed from old postulates which they update in the face of emerging realities.

Pragmatic dialectics, between policies and theories, can be two-pronged. Politicians may use them as guides seeking a concrete result that can progressively become a reality, as for instance, increasing the real minimum wage based on the theory that assures that said increases will not provoke inflation. But *zombie* theories can also be used, without any validity to explain reality, but can help justify an ideological stance or attract private sponsorship from a major corporation (Krugman , 2022). In two different moments, the same government may be statist or neoliberal. The same political party in power can launch an economic model change, whereas a political party change in the administration may leave the prevailing growth model intact.

Therefore, to a great extent, pragmatism rules the implementation of industrial policies, because it is not possible to carry them out with political and economic interest confrontations. The organic link between the economy and politics, because all economic actions are also political, underlies in the relationship between industrial policies and the State, which leads to clearly exploring the symbiotic link between theory and politics, between theory and praxis.

Going back to theory, three paradigms support industrial policy pragmatism: i) unrestricted free market that abstracts the political and economic context in which local, national and international markets operate. What cannot be avoided is the vision of a society, based on physics metaphors, which assumes that society is ruled by natural laws; ii) market flaws, that accept certain marginal and temporary State interventions to fix said shortcomings and iii) strategic State activism, in which the State leads and heads efforts to develop industrial policies, in an open and explicit manner. Therefore, to be successful in industrial policies, it is essential to understand internal and external political limitations in every stage, from design to implementation.

In practice, the application of different theories has had diverse results. This is the case of the strong contrast between success of industrial policies in East Asia, since the 80s and 90s,

and the less than mediocre performance in Latin America and Africa, with the exception of Argentina, which in those decades and the beginning of the XXI century, was that paradigmatic “success” story of neoliberal policies. There are dissimilar results associated to the various political economic modalities applied, as well as the existing State capacity in each of them (See Table 1).

Table 1. Annual average growth rates (1980-2000)

| Country | Population | GDP | GDP per capita | GDP per person employed (1991-2000) | Capital per worker (1991-2000) |
|--------------|------------|------|----------------|-------------------------------------|--------------------------------|
| Argentina | 1.4% | 1.6% | 0.2% | 2.66% | 3.66% |
| Brazil | 1.8% | 2.1% | 0.3% | 0.80% | 0.23% |
| Korea | 1.1% | 8.6% | 7.4% | 5.11% | 3.01% |
| Ethiopia | 3.3% | n/d | n/d | 0.48% | n/d |
| Hong Kong | 1.4% | 5.3% | 3.9% | 2.45% | 2.57% |
| Mexico | 1.9% | 2.7% | 0.8% | 0.56% | 0.64% |
| Nigeria | 2.6% | 0.6% | -2.0% | -0.98% | -0.29% |
| Singapore | 2.6% | 7.4% | 4.7% | 3.26% | 4.51% |
| South Africa | 2.3% | 1.7% | -0.7% | 0.22% | 1.23% |

Source: Own elaboration with data from WDI, 2023

Ideological pragmatism has been identified as the key to success in Korea, Taiwan and Hong Kong, among other Asian countries, that implemented reforms in the 80s to strengthen and accelerate their industrialization process (Palma, 2019). This contrast has also constituted a green light on myths around industrial policy. For instance, industrial policy is wrongly compared to State intervention, while State domination in a targeted economy does not guarantee implementing an active industrial policy that energizes the private sector (Oqubay, 2020).

For economist John M. Keynes, liberalization and the opening of economies to international competition are not an end in themselves, but rather the path that broadens or limits governments’ action space to accomplish their political objectives. The greater the internationalization, the less space for social objectives and broader spaces for capital accumulation (Keynes, 1933) and (Oqubay 2022). Keynes supported those that aimed at weaker chains between national economies. For him ideas, knowledge, the arts, hospitality and traveling are international activities nonetheless production is domestic wherever and whenever it is reasonable. For him above all, the financial sector has to be mainly national

(Keynes, 1933, pág. 2). Perhaps the most powerful reason argued by Keynes in favor of national self-sufficiency is the need of preserving peace, altered by the First World War and in danger of a second conflagration. The existing war in Ukraine, due to NATO's Eastern European expansion, is another wakeup call on the risks of globalization.

Autarchic thinking and national self-sufficiency policies are long-standing. In the XIX century America, leaders such as José Gaspar Rodríguez in Paraguay and Edmund Paul in Haiti, as well as Kobina Sekyi in Eastern Africa, promoted autarchy through strategies to promote local production, limiting imports and favoring economic independence. In the East, outstanding nineteenth-century thinkers reflected on the advantages of autarchy for their countries, within a context of European empire expansions. Shizuki Tadao, Aizawa Seishisai, Sada Kaiseki in Japan and Lee Hang-ro in Korea, defended the idea of autarchy as a form of protecting their country's cultural and economic autonomy and highlighted the importance of economic policies adapted to their culture and needs, based on agriculture and local artisanal production methods, and opposed foreign products that depended on fossil fuels and commercial opening. In India, Gandhi established a rural small scale economic self-sufficiency vision (*swadeshi*), in which West embraced material wealth literally takes the backseat, whereas the moral and spiritual sphere organizes village economic life. (Helleiner, 2021). In a debate with Tagore, Gandhi advocated for the artisanal textile industry, while Tagore argued that it made fabric more expensive and punished the poor, who used national fabric.

Evidently, liberal reforms of the 80s and 90s, particularly reluctance to define selective productive policies and opening to international trade, intensified inequality and deterioration of labor income, on one hand and, on the other, environmental damage and global warming also increased considerably. That is why now there is an increasingly growing number of neoclastic, non-ultra-orthodox economists, calling for an international economic relations redesign (Dani Rodrik, Daron Acemoglu, Thomas Piketty, Paul Krugman, Ocampo).

Four seasons of industrial policies

The following section analyzes industrial evolution in four stages, since the second postwar period, and emphasizes their objectives. Stages are as follows:

- i) *Substitute industrialization (1945-1979)*: protecting and promoting manufacturing sectors with the greatest growth potential.
- ii) *Industrial policy replacement by competition policy (1980-1989)*: fixing market flaws and aligning factor prices, domestic and external.
- iii) *Cluster innovation and construction policy (1990-2003)*: promoting technological change, through development and adaptation, or adoption, of new technologies and promoting human capital development.
- iv) *Structural change and social and environmental objectives (2004-2019)*: reindustrializing and strengthening social and environmental sustainability.

In this experience of the last seven decades, industrial policies changed their focus, priorities and statements, which define their evolution stages, each one with their political elements and conceptual and methodological frameworks.

Background: industrial policy direction

STAGE I → Substitute industrialization (1945-1979)

For the purpose of this essay, the first industrial policy stage takes place between the end of the Second World War and 1979. That 45-year period, covers what is called the “Gold Age of capitalism”, although it is usually limited to the 1945-1973 period, when the oil price crisis breaks out in the first oil chock in October 1973. A second determining element of this stage is the predominant growth model inspired by the ideas of economist John M. Keynes, who was domestic market oriented and favored active State intervention in the design and implementation of the postwar economic policy, that includes the “Cold War” period or East-West confrontation, due to the split of the world in two antagonist fields: the capitalist

and the socialist one, the former headed by Washington and the latter by Moscow. This stage also includes the period of the Import Substitution Industrialization (ISI), implemented by all developing countries or the then denominated Third World, most of which was aligned with the Western capitalist block and a few others, with the Socialist or neutrals, grouped in the set of the Non-Aligned Countries.

For analytical purposes, these complex phenomena will not be discussed in detailed. It is only an outline of the main characteristics that allowed advanced nations, and those that had just taken off to modern development, reach high growth and wellbeing rates for their populations, through the deployment of an industrial policy conceiving manufactures as their economic engine.

Table 2. Real per capita GDP growth rates (1950-1973)

| Western Europe | USA | West Germany | Japan |
|----------------|-----|--------------|-------|
| 4.1 | 2.5 | 5 | 8.1 |

Source: Authors' compilation with (Chang, 2017) data

This table shows the important real per capita GDP growth rates of the main industrialized economies during 1950-1973. Reconstruction after the Second World War allowed Europe, Germany and Japan to have these expansion figures. Together with GDP growth, unemployment was virtually eliminated in advanced capitalist countries. Stability is reflected in low inflation, whereas public expenditure acted as an economic accelerator or brake, depending on the expansion or deceleration cycle (Chang, 2017).

In that period, there was a prevailing consensus that the State could and should intervene in the economy to regulate markets, for the previous free market phase had shown its limits in the 1929 crisis. Results obtained by governments, during both world wars, proved their efficiency in managing and conducting their nation's fate. Various functions were allocated to the State, such as, creating social peace, promoting investment, allowing for social mobility and fostering technological innovations. Its mediator role was important in negotiations among companies and unions, so that they would get greater benefits for their members. In this context, countries set in motion selective industrial policies, that

promoted sectors considered as strategic. With generous resources, the US administration funded advanced industry research, such as computing, semiconductors, aircraft, internet and pharmaceutical and biological sciences (Chang, 2017) (Palma 2019) (Mazzucato, 2024)

When orthodox economics obscures the strategic role of the state in the creation collective value overlooks the great contribution it makes to innovation and to the common good, which is not always achieved immediately like the dividends of a international corporation. The government's \$31.9 billion public investment of the USA in recent decades in mRNA vaccines, and that contributed to saving the life of millions of people in the past covid-19 pandemic, shows the need to reconsider traditional research and development funding models development (Mazzucato, 2024, Palma G. 2019)

The beginning of the import substitution policy implementation took place in the recently liberated colonies of Asia and Africa, as well as in countries, as the Latin American ones, that already had a long history of political independence, but continued exporting raw materials. The objective of the substitute industrialization model (ISI) was to develop a domestic market, and, for that, national industrialization was promoted through two mechanisms: protecting the industry with importation tariffs and quota, to shield it from imported products, and generating enough foreign currency to purchase intermediate and capital goods aimed at domestic production (Bértola and Ocampo, 2022). Results have *shown* the importance of the domestic market for population growth and wellbeing, as well as the strong public-private investment link with GDP. Proof of this is that the real per capita GDP in Mexico grew at a 3.1% annual rate (De la Rosa Mendoza & Contreras , 2012).

Industrialization took place in some Latin American countries, like Brazil, Argentina and Mexico, before the import substitution model, perhaps because of the effect of the crisis in the 30s, both world wars, or their domestic markets size and strength. However, import substitution formally started after the end of Second World War. As already mentioned, at this stage it is not possible to talk about industrialization, in the less developed countries, without referring to the Keynesian growth model. It is at this stage where modern instruments were developed for macroeconomic management, as for instance, monetary

and fiscal policy. It was a period of great labor union strength and the expansion of the so called *New Deal* that created and consolidated social security institutions (Palley, 2005).

During President Lázaro Cárdenas' six-year administration (1934-1940), Mexico made great progress thanks to prosperity and high demand in the US, generated by the Second World War. Economic growth allowed for the emergence and consolidation of a group of small sized Mexican entrepreneurs, who had survived the 1910 Revolution, and created the new national manufacturing industry. In later six-year administrations, public investment played a central role. Initially, it concentrated on infrastructure and education that opened new accumulation channels and increased productivity. As public investment increased, private investment followed suit, even at higher rates. For about four decades, synchrony between both investments constituted complementarity between both sectors, so much so that this collaboration is key in explaining the great Mexican economic boom in that period (María, Romero Sotelo, 2016).

The year 1947 was key in Mexico, because it was the official adoption of an imports control system, as a protectionist instrument for development policy. That same year, specific tariffs were substituted by *ad valorem* tariffs, to protect revenues from inflationary effects. In the 50s, trade protectionism increased to promote any new Mexican industry with the potential to substitution end product imports (Moreno-Brid & Ros, 2010).

STAGE II → Industrial policy replacement by competition policy (1980-1989)

Proposals ruling the second stage of liberal productive policies *circa* 1980-1989, can be summarized as follows: *the best industrial policy is no policy at all*. It implied substituting sectoral policies of picking winners, discouraging declining activities and promoting "rising stars", with those that promoted competition and opened the way to globalization (Arena & Dutraive, 2016). These authors make a differentiation between theoretical origins of liberal and neoliberal positions, and industrial policy ones (Romero Sotelo 2016). Liberal perspective does not accept competition policies, because since they are "policies" State intervention is implicit. The origin of this is the Austrian School, as well as Walras and Pareto's position, for which there is a spontaneous order derived from the free market

functioning, the optimal allocator of scarce resources available by societies. (Fama, 1970). Free competition leads to general balance, which is the necessary condition for social optimum. They consider the monopoly emergence possibility, but believe it is only temporary, and there should be no structural obstacle hindering their natural evolution to general equilibrium. Furthermore, they believe crisis equilibrium emerges spontaneously, provided there is no intervention whatsoever.

On the other hand, from the neoliberal perspective, certain State intervention is acceptable but, at any rate, its role should be limited to promoting market competition. Neoclassical growth economists tend to favor single sector growth models, arguing that none had any special properties. Pro and con debates on industrial policy, as a strategy for economic development, sustained growth and competitiveness, became increasingly ideological.

Nonetheless, even in that phase when industrial policy was not seen with good eyes by orthodox economics, industrial policy continued being present in some sectors. For instance, Oqubay and collaborators point out that the US energy and defense sectors were under military responsibility and have always been designed as an industrial policy, due to their strategic national security character (2020). Similarly, during the Augusto Pinochet military regime in Chile, practically all of the national economy was liberalized, but the State maintained mining and military industry ownership.

Competition policy promoted foreign markets opening, as well as productive factors placement, according to resource allocation. In this stage, progress was made to a certain degree of State intervention, to harmonize competition objectives with some political goals, such as growth and strengthening of some industries, the promotion of scientific and technological capacity in countries, as well as human capital development. Competition policy prioritized search for productive efficiency over social equity, since it assumes that free market development tends to maximize consumer wellbeing (OECD, 2009, pág. 12). Since the mid-70s, economists that would be predominant a decade later, were stating that economic efficiency should prevail over equity, since the winners would compensate for the losers. Arthur Okun called it “the great compensation” (1975).

However, without adopting competition policy as the only guide, another giant appeared in Asia, who gave way to a new industrialization comprehension (Amsden, 1989). Unlike Japan of the mid 70s (Patrick & Rosovsky, 1976), Korea was consolidating its industrialization and increasing its competitiveness internationally, through a strategy that efficiently combined a strong militarized State with a diverse and dynamic business sector (*chaebols*). Economist Alice Amsden’s book grants more weight to the State in the conduction of the industrialization process through learning and absorbing foreign technology, but at the same time, the debate was opened on how much the private sector was responsible for capturing and assimilating foreign technology.

In the mid-90s, Alwyn Young debated the hypothesis on Asian Tigers’ fast growth (Korea, Hong Kong, Singapore and Taiwan), based on total factor productivity growth. He proposed that these countries’ high per capita GDP growth rate was due to labor force share growth rate and increase of population education levels (1994) (1995) (See Chart 3). In Dornbusch’s interpretation, and following Young, the “special trick” of the above-mentioned Asian nations, was really something very old: hard work and sacrifice of a growing working population (Dornbush, Fischer, & Startz, 2011, pg. 88). In short: acute labor exploitation

Table 3. Asian tigers’ annual average growth rates 1966-1991 (%)

| | Hong Kong | Singapore | South Korea | Taiwan |
|--|-------------|-------------|-------------|-------------|
| GDP per capita | 5.7 | 6.8 | 6.8 | 6.7 |
| Total factor productivity | 2.3 | 0.2 | 1.7 | 2.6 |
| Workforce participation | 38 → 49 | 27 → 51 | 27 → 36 | 28 → 37 |
| Population with secondary education or higher | 27.2 → 71.4 | 15.8 → 66.3 | 26.5 → 75 | 25.8 → 67.6 |

Source: Alwyn Young, "The tyranny of numbers: confronting the statistical realities of the east asian growth experience", Quarterly Journal of Economics, august 1995

While Western economies adopted the new competition policy, another theory with increasingly growing attention was that of *late industrial development*. The original approach holds that *late industrialization* of backward countries does not show the same development stages of industrialized countries.

In various important historic examples, as Germany and Russia, their late industrialization processes show differences in speed and composition of their productive structures. They were promoted by different institutional instruments than those in the first industrialized nations, as well as by very different ideologies or expectations, to those promoted by industrial classes. This hypothesis confirms that industrialization requires a deliberate policy and strategy, as well as active State intervention (Gerschenkron, 1962).

STAGE III → Innovation policy boom and clusters (1990-2003)

This stage is characterized by greater emphasis on high tech intensive technology, as well as a more active State role, in scientific and technological development and education, for human capital training. Changes were incentivized to place production in clusters and regional centers, to take advantage of external, agglomeration or economies of scale. Experiences in the United States, and many European countries, marked models to follow. *Pari pasu* with regional clusters that made progress, because of new technology information, transportation cost reduction, productive cost fragmentation, global chain value strengthening and globalization progress signs.

Before continuing with this stage's characteristics, it is worth remembering the international framework that condensed new economic liberalization policies and their technological innovation policy and clusters, aimed at the world market. We refer to the 1989 John Williamson Decalogue, which he baptized as the Washington Consensus, or road map for stabilization policies, that international financial bodies, such as the World Bank and the International Monetary Fund (IMF), recommended to developing countries seeking to get out of the debt crisis at the beginning of the 80s. The policy package was based on macroeconomic prudence or austerity, external orientation and free market. Policies are as follows (Williamson, 1990):

1. Fiscal discipline: it referred to small or zero deficit.
2. Reducing public expenditure: it has to do with eliminating subsidies and reducing public sector salary mass.
3. Tax reform: it suggested a broad base, simple application rules and moderate marginal or nonexistent rates.

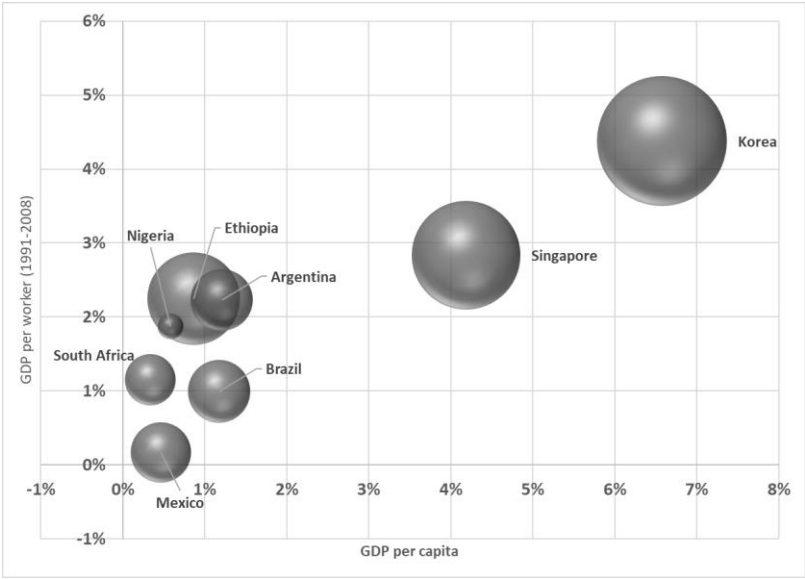
4. Financial liberalization: it proposed that interest rates should be positive in real terms and markets determined, and that the exchange rate should not be controlled.
5. Exchange rate: it should be positive in real terms and determined by the market to favor external oriented recovery.
6. Trade liberalization: it means liberalizing imports, through the establishment of a small homogenous tariff and the elimination of all other restrictions.
7. Direct foreign investment: it means allowing incoming capital without restrictions.
8. Privatization.
9. Deregulation.
10. Property rights: the necessary laws and regulations to guarantee the satisfactory functioning of the capitalist system.

As mentioned, the industrial policy implicit in technological innovation policy received renewed attention by sustained and accelerated industrial growth of Southeast Asian countries (Oqubay, Cramer, Chang, & Kozul-Wright, 2020), headed by South Korea, as anticipated by Amsden. Once learning and innovation were determined as key for industrialization, it was necessary to identify causes and mechanisms fostering a company's learning environment. Absorption capacity came about as a new perspective, key for growth and competitiveness, in the rising global scenario (Cohen & Levinthal, 1990).

Innovation, the new growth engine, did not work equally for all countries, due to factors called the "middle income trap", for situations in which nations cannot get out of economic stagnation and reach a stage in which they remain as middle-income countries, without being able to transit to high income economies. Experience of Asian economies, able to overcome the "middle income trap", has made people think that other economies, as in Latin America and Africa, could also do it, if they establish the appropriate institutions (Acemoglu et al 2018). For instance, in the electronics and semiconductor Asian industry, local companies have gone from manufacturing original equipment throughout the initial industrialization phase, to designing and manufacturing their own brands (Oqubay, 2020).

In the smaller circles, Graph 1 shows nations that have not reached higher income levels. Industrial value added growth rate (represented by sphere volumes) seems to be key for a country to have higher income levels.

Chart 1 Average Annual Rates of Growth of Selected Countries, 1981-2008 (Volumes: Industrial Value Added)



Source: authors' compilation with WDI, 2023 data

Evolution of the technological learning and economic recovery debate, through the “catching up” with the latest scientific developments, has supported an evolution vision, as the appropriate strategy to ensure a successful industrial policy. The few countries that overcome the “middle income trap”, constitute an additional impetus to study the link between industrial policy and technological learning (Oqubay, 2020) (Palma, 2019).

The relation between technological change and economic development has given way to discussions on the origin of economic science. Schumpeter’s evolutionist theory, and its *creative destruction* concept, is construed over the centrality of technological change, as a capitalism promotor and points at the importance of skills development and learning, as key for company competitiveness. According to Kaldor, innovation implies new knowledge introduction, where absorbing technological changes is of the utmost importance. Absorption capacity has been defined as the capacity to identify, assimilate and apply

knowledge. It is different from learning and problem-solving capacity. It emphasizes the importance of multifunctional teams, knowledge and experience diversity in companies, as well as openness to the external environment of buyers, suppliers and research centers. (Cohen & Levinthal, 1990).

In the innovation policy framework, the role of exports was the topic of a major debate on implicit industrial policies. For the structuralist perspective, exports are a source and promotor of international learning, since international trade positioning requires competitiveness in terms of quality, delivery time and cost. They constitute the most sustainable response to balance of payment restrictions that can slow down economic growth and prevent quick industrialization, which in the last instance, delays structural change and may trigger macroeconomic crises. This perspective advocates complementarity between export-led industrialization (ELI) and import substitution industrialization (ISI), usually considered as opposites (Amsden, 1989).

Aside from innovation, the spatial economic theory that nurtured policies was the notion of clusters and their economies of agglomeration and scale. The clusters' theory has a static non dynamic character. The first one tries to explain how a group of companies of the same sector is organized, their key to success, exploiting location and closeness advantages. The dynamic aspect tries to explain how it all came about, obstacles to overcome, and agents that served as change catalysts. It is believed that dynamic clusters have more advantages, because they permanently absorb knowledge and innovation, and better adapt to changing business climates.

Another important aspect is the connection of industrial policy with the of human capital and the formation of a specialized high skilled labor, capable of mobilizing capital with high technological level, and actively participating in innovation processes, through research and development. Likewise, infrastructure plays a decisive role in the design of any industrial policy seeking structural change and economic recovery. The so called Diamond of Porter is an analytical instrument, which the author uses to explain the role of agents and forces in conflict, that promote competitive advantages (Porter, 1998), (Oqubay, 2020).

STAGE IV → Structural change and social and environmental objectives (2004-2019)

The beginning of the fourth industrial policy stage may be found with the 2004 publication of Dani Rodrik's article *Industrial policy for the twenty-first century*, which recognizes that there was an increasingly growing consensus over the necessary State and market balance. The key argument is that industrial policy task consists of obtaining information from the private sector over significant externalities and their remedies, as well as applying appropriate government policies. According to free trade approach changes, industrial policy should not focus on policy results –*a priori* intrinsically unknown-, but on political process definition, so governments and private companies may negotiate and mutually know their needs and limitations (Rodrik, 2004).

In this context, the role of the State is discussed in terms of conducting actions to accomplish social and environmental objectives, through a comprehensive policy strategy that links industrial policy with other policies, such as innovation, education, health, employment, monetary and foreign ones. Nonetheless, it is first necessary to close conceptual gaps among industrial, sustainability and political economy theory policies and practical and efficient tools management (Ferranini, Barbieri, Biggeri, & Di Tommaso, 2021).

In this stage, economists Antonio Andreoni and Ha-Joon Chang revisited Amsden's new development agenda legacy. Just as, at the end of the 80s, Amsden pointed out the importance of the State in the conduction of industrial policies in late industrialized Asian countries, Andreoni and Chang state that it is necessary to again place production and employment, at the center of the developmental debate (2016).

To nurture the debate on XXI century industrial policy, the above-mentioned authors proposed that, under the liberalization and financialization² model prevalent in most of the developed economies, the lack of investment in productive capacity and the ensuing

² Noemi Levy says that "financialization background is found in deregulation and globalization processes that gave life to the neoliberal model; highlighting that the term financialization has the limitation of not having a specific definition and particular measurement that indicate the presence of this category in the economic system" (Levy, 2016). For the purpose of this paper, by financialization we understand "a growing importance of financial motivations, financial markets, actors and financial institutions, in domestic and international market operations" Epstein (2005, pg. 4) quoted in Levy, 2016.

innovation and learning development, result in less value creation, reduce capital accumulation and slow down economic growth. To ensure industrial policy success, the State should guarantee certain macroeconomic conditions and adequately manage industrial policy conflicts, so that structural change is politically viable and socially inclusive. Managing this difficult political economy equation, should take into account that all policy changes generate benefits for winners and costs for those affected. Setting this off is not always easy, that is, reducing gains from the former to transfer them to the latter, to reduce losses.

Recent analysis of the new world reality, of individual or set of countries, assess industrial policy impact and say that, to understand new forms of creating and capturing value to support accumulation patterns, it is necessary to analyze the combination of three processes: vertical disintegration with world company horizontal concentration, the growing blurring of standard sectoral boundaries, and the increasingly growing need to understand production in terms of skills domain, instead of end products.

The XXI century industrial policy would be deployed in a world economy increasingly dominated by financial capital, over which governments do not have the necessary capacity to control or guide financial flows, due to the fact that corporations have developed new channels to practice and transmit financialization (Ugarteche, Puyana, & Madi, 2015). At a national and world level, the problem is that the global financial system not only has been incapable of transferring available resources to where they are needed, but that countries have been exposed to financial capital flow instability and macroeconomic shocks. Given the catalyst function of public investment vis-a-vis private one, limited government investment capacity pushes economies towards a capital divestment and decumulation spiral. It also threatens future economic and social reproduction (Chang & Andreoni, *Industrial Policy in the 21st Century*, 2020). Here, what is also at stake is development funding, because financial fragility and low financing to Latin America, do not allow for the necessary resources to invest in productive capacities (Bortz & Kaltenbrunner, 2018).

In a similar argumentative line, focused on China and USA technological competition, Lazonick and Li point out that the Chinese technological development path has been based on three key pillars: i) the endogenous innovation model for global competition, on which the government creates synergies, between an active investor State that sows “patient capital”; ii) a broad gamut of company governance structures (beyond property ownership type) and iii) a business class financial commitment to reinvest gains in organizational and productive capacity. However, since 2022, exactly the opposite has been happening in the United States, where the prevailing corporate financialization model does not allow US companies to reach a leadership position in the development of new technologies, as 5G or the Internet of Things, IOT, because they use between 98 and 33 per cent of their net income to repurchase stock and pay dividends. This is the case of Apple, Boeing and green technology companies that opted to maximize share value, a niche where China is the leader and overtakes the USA (Lazonick & Li, 2022).

5G Chinese technology moves forward faster than in the US, in AI development for end users (who are using free and paid access AI, such as ChatGPT or Midjourney to create texts, images, videos and music), as well as in industrial applications, a leading AI sector. A good example are coal mines, for remote inspections and process automation, as for instance, remote drilling (Strumpf, 2022). The 2021 United States Innovation and Competition Act, authorized using 1.5 billion dollars only in 5G mobile networks by 2026, when already that year (2021) China had invested 50 billion dollars building its 5G network, and planned to spend 100 billion more dollars in the following five years (Graham & Schmidt, 2022).

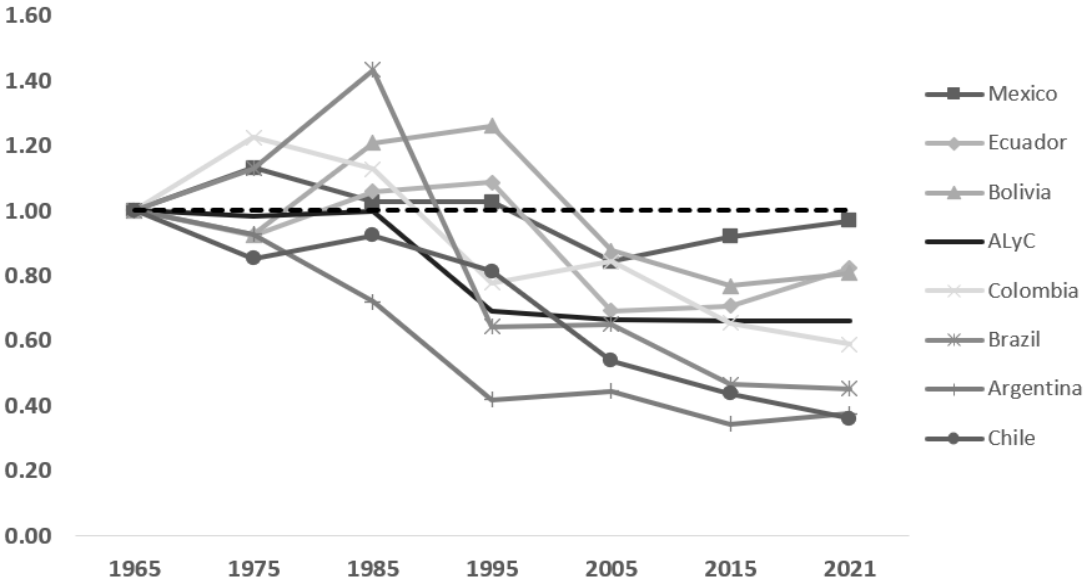
In the case of Mexico, and other developing countries that, since the mid-80s or beginning of the 90s, cut industrialization short, through the institutionalization of liberal reforms, denominated or synthesized in the Washington Consensus, it is worth asking about the type of industrialization they could deploy, as of their high economic informality, profound productive duality (Puyana & Romero, 2012) (Puyana & Romero, 2013), and the decaying per worker capital endowment (Puyana 2018). Even if in less industrialized countries, premature service progress is also seen, they are all directly related to production and serve as an unemployment or informality shelter (Puyana & Romero, 2013). Which would be the

nature of a new industrialization stage for Mexico, and similar countries with an atrophied productive structure along the lines of Dutch Disease, that implies the premature backward movement of the tradable sectors? What changes should be introduced in current productive and labor structures?

Practically, in the last three decades, the biggest Latin American economies experienced declining manufacturing value added, as a percentage of their GDP. It is as of that state of the things that new industrialization paths must be imagined, where manufactures play a key economic role (See Chart 2).

As the importance of revitalizing industrial policy was being recognized in developed nations, in Latin America as of 2004, the arrival of leftist or progressive governments, as for instance, Brazil, Ecuador, Bolivia, Uruguay, Argentina, Mexico and recently Colombia (succeeded by rightist presidents in Brazil, Ecuador and Uruguay), responded to social demands, for definitive solutions to low economic performance, with free market trade policies prevailing in the region, since the mid-80s structural reforms.

Chart 2: Manufacturing value added change index as a GDP percentage (1965=1). Latin American countries and regional average (1965-2021)

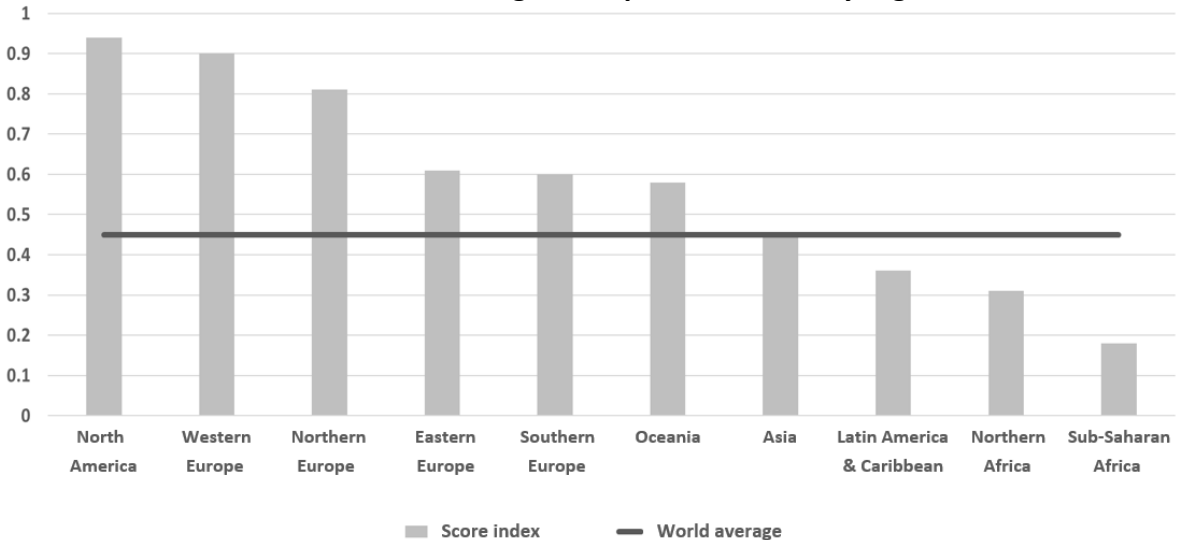


Source: Authors' compilation with World Development Indicators data, 2023

In *Más allá de las Reformas*, José Antonio Ocampo (2005) emphasizes the importance of overcoming market reforms and integrating other forces generally neglected by the economic development debate, as for instance, the historic, social, institutional and even geographic context, which is crucial to “overcome the disappointing economic performance that has characterized many countries in the economic liberalization context” (Ocampo J. A., 2005, pág. xii).

In effect, the Latin American neoliberalism crisis gave way to productive development policies, enacted by the group of progressive governments, that in 2004 and afterwards, constituted what was called *the pink wave*, that promoted systemic research and development (R&D) sectoral policies, for which they used more financial resources for the belated creation of a profuse state capacity network. However, these initiatives were surpassed by the predominance of horizontal productive policies, that favor economic and political elites, as well as by end of the commodity super cycle.

Chart 3. Scientific Technological Preparation Index by region, 2021



Source: taken from UNCTAD, 2021

The lack of fiscal resources put an end to these aspirations of midterm productive structure transformation and social programs through transfers (Bértola & Ocampo, 2022). The same happened with the scientific-technological index (See Chart 3), that combines the use of new information and communication technologies (NICTs), digital skills, R&D investment,

and funding for these activities. Latin America is below the world average, only above North Africa and Sub Saharan Africa (UNCTAD, 2021).

New productive policies under debate (2020-...)

This last section explores preliminary characteristics for new productive policies, in today's debate. After reviewing industrial policy theories and practices of the last seven decades, ups-and-downs are seen in pursued objectives and strategies to reach them. The economic crisis caused by the Covid-19 pandemic brought new impetus in the discussion on the need to return to industrial policies, the need to rebuild domestic productive capacity, and strengthen domestic self-sufficiency in the most relevant productive activities. The war in Ukraine and the Middle East conflict act similarly and so do the return to the White House of Donald Trump who is threatening the world by imposing tariffs on all USA imports, specially to those coming from Chinese and Mexican companies in Mexico.

The sanitary crisis strengthened trends that emerged as the 2008 financial crisis, when proposals to return to industrial policies flourished, especially manufacturing ones, in view of the dependence on complex products, such as medical equipment and vaccines, or easily produced objects, as face masks. More recently, the war in Ukraine, revealed dependence on a single fertilizer and pesticide supplier, aside from food and energy. The Middle East conflict is caused by oil market instability (Wheatley, J. 2024). Self-sufficiency requests run *pari passu* with the domestic production increase of essential goods, frequently supported with sovereignty and national security arguments. Trade policy resumes its political nature, as an instrument of national cohesion. Mexican president Claudia Sheinbaum, has announced an important policy to protect Original Native White Mexican from the imports of hybrid genetically manipulated corn imported from the USA. A new agriculture policy will be enacted to support national food sovereignty. In that vein Mexico will abandon some of commitments agreed in USA-MEXICO-CANADA Agreement UMSCA.

Contrary to what Acemoglu believes on the paradox of globalization, Dani Rodrik suggests that, more than ever before, world free market needs the strengthening of countries' national sovereignty and self-determination, to address their internal affairs, because the

true global economic enemy is the US and China geopolitical conflict, not protectionism (Rodrik, 2023).

Particularly, the Covid-19 pandemic increased interest on industrial policy to face the pandemic and mitigate virus propagation, because it was made clear that most countries, including developed ones, did not have the medical personnel or equipment to care for the infected population, nor enough appropriate hospitals and laboratories to do tests and produce vaccines. Once the initial emergency was controlled, need arose for economic recovery strategies and adequate productive policies, to reestablish economic dynamics, through structures different from the pandemic, and with greater focus on basic social needs, with strategies that overcome the free market and human rights paradigm, based on individualism over social rights.

In 2020, Rodrik and Aiginger placed four affirmations on the debate table. In principle, they are clear transformations to reactivate the economy, strengthen the manufacturing sector and, in general, all industrial activities:

1. Industrial policy is not limited to the industry or goods manufacturing. Since the world economy is increasingly run by services, it is necessary to broaden the industrial policy conception, to include other manufacturing activities, but not exclusively.

This statement poses various important unknowns and contradicts the meaning of deindustrialization, discussed in this document. Is the trend towards service predominance irreversible? Would reindustrializing mean the proportional advance of the service sector? When and how can it be known that a country has reindustrialized? Something else that would also have to be clarified is if this affirmation refers to all services or only those linked to production and technology. On the other hand, the service sector is not the same in developed as in developing countries, for in the latter it coexists under a context of high labor informality. Something else to consider is that services have a high demand income elasticity, because as technology intensive manufactures grow, more specialized finance, research and innovation services are demanded.

2. The new approach implies the conception, institutionalization and practice of an industrial policy, with close and sustained public-private collaboration around issues related to scientific and technological development, productivity and employment,

salaries, surplus distribution, as well as strict regulations to prevent monopolistic, rent-seeking and corrupt practices.

However, this sustained collaboration could very well not be balanced or balancing. Mazzucato (2014) has defended the idea that the last instance innovator should be the State that invests in new, not known, high risk activities. Proof of her proposal is the role played by the US administration in technology development, like internet³, and of major technological companies, as Google or Apple, as well as in the promotion of solar and wind renewable energies, which are now generating high profits.

Opposing Mazzucato's position, mention is made of enormous government scheme failures to invest in innovation policies but, if they are specific and targeted as Mazzucato proposes, they should be broad and general, focused on general conditions for companies to operate. Instead of providing specific support to certain companies, industries or even technologies, State intervention should approach and eliminate obstacles to innovation, even with proactive interest group management, derived from said strategy (Wennberg & Sandström , 2022).

3. Industry policy cannot be isolated or in tension with other policies, as competition, regional and long term growth policies. Objectives of short term competition and industrial policies should maximize and protect consumer benefits, even at the expense of productive diversification and accelerated growth policies. On the other hand, it is necessary to address conflicts between regional and industrial policies, in favor of explicit labor division.

This is a laudable approach, only if it is ignored that the US Inflation Reduction Act (IRA) counterposes productive and environmental objectives. In practice, this will be one of the major challenges of the new industrial policy. In energy transition to mitigate global warming, it is productive transition that sets limits and parameters to future industrial policies.

Structural change and productivity growth support can no longer serve as a political objective, without taking into account technological change direction and environmental preservation, as well as the solution or management of inequality and poverty, employment

³ To address the need for quick communication between the government and the army waging the war in Vietnam

and labor remunerations. For instance, the net employment balance of the transition to electric vehicle production is not yet clear.

In summary, new industrial policy definitions and their weighing process for the XXI century, are now in the debate. Most have a systemic approach that coordinates innovation, regional and trade policy, with the manufacturing sector in the middle of the strategy, as a catalyst for structural and sectoral change, in which clusters and networks acquire a new functionality. This surpasses market flaw correction, in a search and innovation process benefited by a dialogue with experts, interest groups and citizens, as an attempt to avoid policy kidnapping by special interest groups (Aiginger & Rodrik, 2020).

On the other hand, in Ricardo Hausman's view (2023), industrial policies are back, because in the current context they have nothing to do with picking winners, as thought a few decades ago, but with ensuring supply of public goods, to increase productivity as much as possible. However, although in the US and in Europe the government's economic intervention trend predominates, but only to fix market flaws, the post pandemic crisis environment and declining labor productivity, press for a policy change.

New research sheds light on industrial policy effect on historic and present scenario to asses it integrally, not only with isolated indicators, as tariffs or the failure of companies that received more State support. They also point at the fact that industrial policies have been implemented throughout centuries, not only in recent years. This has revived the debate, showing that developed countries apply sectoral policies more frequently and with more generosity, than developing nations (Rodrik, Juhusz, & Lane, 2023)

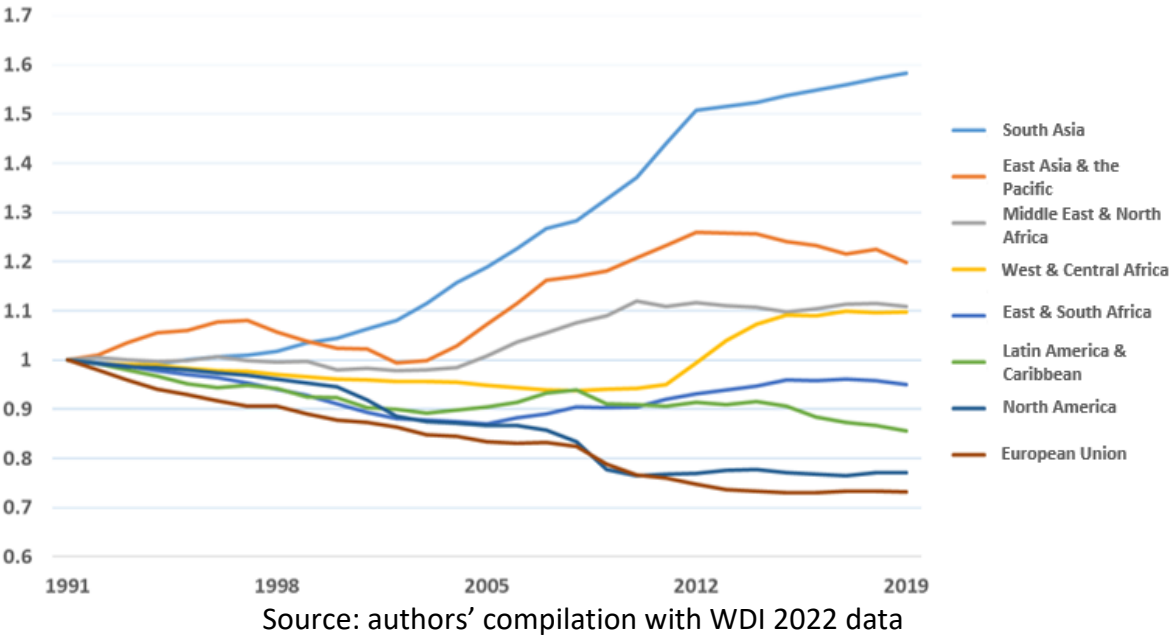
Premature deindustrialization

The new debate also brought old challenges that are deepening. One of the items being discussed has been that of premature deindustrialization in some countries, as well as national industry links with Global Value Chains (GVC). With an imperative tone, the International Monetary Fund has suggested that countries in that situation, for instance, some African countries and practically all the Latin American ones, should not try to implement industrialization, due to the advent of a postindustrial era (International

Monetary Fund, 2018), whereas others say they should limit themselves to being a part of simpler GVC links, given that global industrial hierarchy has practically become impenetrable for new competitors (Baldwin, 2016).

Both approaches cancel the possibility of developing countries obtaining industrialization benefits or mean that they are limited to participating in GVCs, but only performing simple manufacturing activities. Since 1990, in the European Union and North America, industrial employment fell vis-a-vis total employment and Latin America lost three percentage points in three decades. Therefore, it is contradictory that even in 2019, the IMF holds the hypothesis of the postindustrial era, when developed countries have recognized the need to launch actions in the opposite direction, in the face of their Asian competitors (See Chart 4).

Chart 4 Industrial employment change index as a percentage of total employment (1991-2019)



In this context, the technological change debate has conflicting positions: it is possible that it's more difficult for some countries to participate in higher productivity manufacturing or industrial activities, imposed by productivity and employment innovations (Cramer & Tregenna, 2020), but at the same time, it is argued that technological development provides

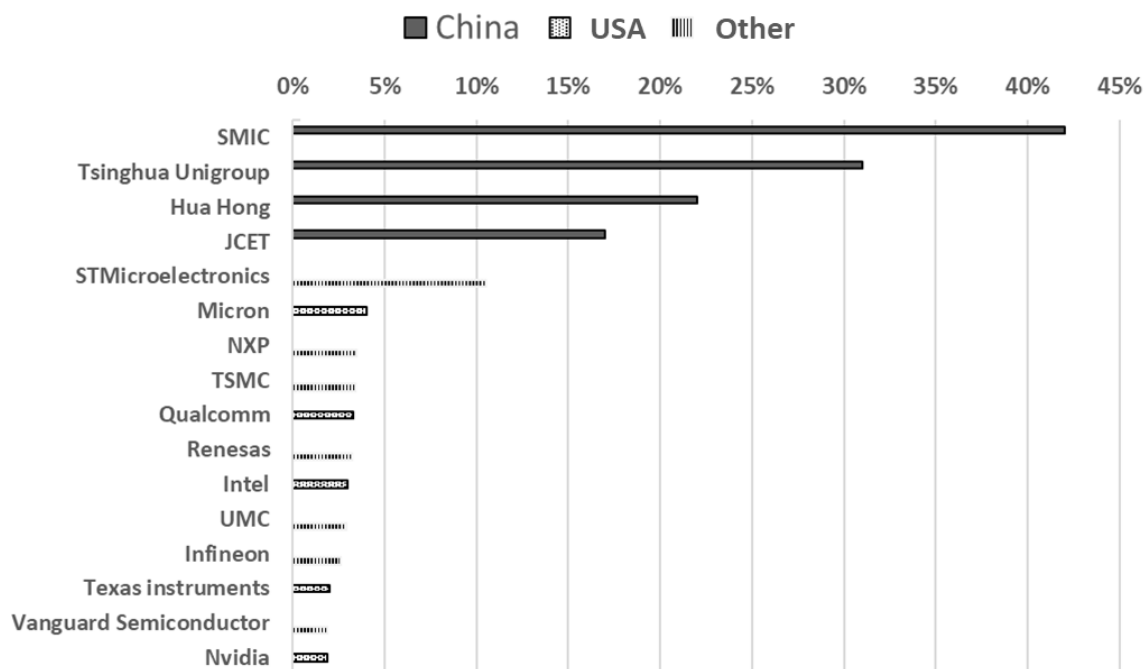
broad margins for industrial policies, to take advantage of new innovation waves to “catch up faster” (Naudé , 2019).

Despite acceptable optimism, technological disparity in Chart 3, as well as historic technological differences among technologically developed countries and the rest, do not contribute with the necessary elements to assume a narrowing of the technological gap in the next decades.

In terms of industrial policy and technological competition pragmatism, the recent IRA enacted by President Biden, was passed by the US Senate with a rare bipartisan consensus, to promote microchip production in US territory. The objective is to change this industry’s world structure, increasing US production by 30% and European by 20%. Currently Asia produces 80%, USA 12% and Europe 8%. The justification for this industrial policy is that if it is not done, the US would lose 5 million jobs and inflationary pressures would increase, if microchip production lags behind demand. Regardless of this policy’s rationality and efficiency, the plan does reveal a change in US policy that abandons characteristic liberalism, proposes a Developmental State, and sets the basis to recover ground it has lost in industrial development (Tett, 2022).

The question is if IRA resources for microchip production are enough to accomplish said goals, and if they can compete with incentives received by Chinese semiconductor companies, between 2014 and 2018, which amount to 20-40% of their income. In that same period, US companies received less than 5% (See Chart 5). Furthermore, it is also necessary to consider other problems that risk compliance of goals set forth in the USA reindustrialization plan, as for example, contradictions with government environmental goals and labor force aging that point at potential problems for the necessary skilled labor, which according to Ocampo and collaborators (2009), is part of productive structures. Lack of labor cannot always be solved with migration. This issue is now being debated.

Chart 5 Government support to semiconductor companies, 2014-2018 (% of revenue)



Source: authors' compilation with (OECD, 2019) data

Nonetheless, new technologies have opened controversy on unwanted social effects of automation provoked by Artificial Intelligence (AI) and machine learning. Daron Acemoglu argues that automation is a major cause for growing inequality in the US, as well as a reduction of labor power in relation to capital. The problem which comes with the current automation phase is that inequality can be increasingly exacerbated. On the other hand, if it is well used and guided as of public policies, it could contribute towards resuming the path of shared growth.

The key to doing this is for AI to be complemented with other technologies that make labor more productive and promote job creation. The new technological platform cannot only be used for automation (as it has generally been done until now), but to create new human tasks and competences in education, health care, engineering and manufacturing.

According to Acemoglu et al (2018), the government not only can, but should increase support to fundamental and strategic research, aimed at developing technologies to

increase labor productivity and generate jobs. Education, health and manufacturing production sectors can be good examples of automation application aimed at accomplishing those goals. Reorienting government action becomes increasingly necessary, because in recent decades, capital has been more subsidized than labor and existing government support creates incentives for companies to decide to invest in automation before investing in productivity increases. To strike a balance, this bias has to be fixed. AI entry in the production scheme reinforces this argument and adds complex elements that are not yet fully understood.

Acemoglu's argument is that not all automation increases productivity. The one implemented with AIs is aimed at substituting humans by algorithms, but that does not increase productivity. Major technological consortiums, like Amazon, Alphabet, Facebook and Netflix have spent two out of 3 dollars in IAs, but are not increasing productivity.

In summary, if States intervene to redirect automation and IA towards job creation and labor productivity increases, it is possible to use new technologies to close income distribution gaps (2021).

Likewise, the debate on global political economy, and greater multinational corporation power, have taken place over the range of actions national governments have, in order to participate in Global Value Chains, involved in international relations of economic and political power. The current context of the world economic crisis and instability may be more restrictive, but also more permissive, to design industrial competition or investment attraction strategies.

This is the origin of the strong component for the political economy of industrial policy, the resurgence of which responds to poor economic performance in developing countries and stagnation in many developed ones, notably, Germany, previously the example of productive growth and development, with policies outlined by the Washington Consensus and promoted by multilateral bodies, in the asphyxiating double conditionality strategy (Meller, 1989).

After many years of implementation under the free market and globalization paradigm, and in the face of weak results in terms of GDP growth and job generation, developing countries and many developed ones, for instance, the USA under Biden, turned their attention to industrial policy and the place nations occupy in the international arena (Oqubay, Cramer, Chang, & Kozul-Wright, 2020).

If what is sought is for new industrial policies to be socially sustainable, they could integrate measures to reduce inequality, with special attention on those affecting historically discriminated groups. Horizontal inequalities are one important dimension of individual wellbeing, since belonging to a group grants identity to its members and constitutes a determining factor for collective wellbeing and social stability, but generally acts as a group discrimination factor (Steward, 2004). As an example, it must be remembered that, in one first state of women's participation in developed countries' industries, the total ratio of women in manufacturing jobs grew, but low salaries prevailed in comparison to men, among other things, because by prioritizing woman's reproductive function, her work is considered secondary, not essential for family maintenance, which is a responsibility attributed exclusively to men, the *paterfamilias*. Currently, attention has been set on the exclusion of women in knowledge intensive industries, despite the increasingly growing number of women with a professional career. An effect of men's predominance in these industries is that women's needs have been set aside in product design and manufacture (Seguino, 2020). Furthermore, calls are being issued to update industrial policy vis-a-vis the growing cultural diversity in developed countries, where the creation of heterogeneous working groups may be beneficial for knowledge economies (Page, 2017).

In the context of climate change, exacerbated in recent years, industrial policy is directly linked to energy transition towards reducing fossil fuel use.

To understand and promote this change, the concept of *exnovation* has been used to refer to the gradual elimination of unsustainable environmental technologies, or value chain transformation, focused on fossil fuel intensive sources, as the ones in an internal combustion engine (Pichler, Krenmayr, Schneider, & Brand, 2021). This restructuring

process faces big challenges, expressed in doubts of business leaders, public and academic officials, on energy transition towards low coal sources in Germany, the United Kingdom and Denmark (Johnstone, Rogge, Kivimaa, Fratini, & Primmer, 2021).

Finally, it has been suggested that this direction shift is gaining ground and dynamism, from what has been traditionally known as industrial policy, towards an economic policy framework focused on production, labor and localism, in opposition to the neoliberal paradigm that evolves around finances, consumerism and globalism. Previously called productivism, this new paradigm seems to be breaking through among Democrats and Republicans in the United States who, for different reasons, support a new productive policy impetus, to rebuild supply chains, generate quality jobs, and are highly technology sector oriented. As it has happened on previous occasions, theoretical paradigms serve as a beacon guiding economic policies, usually accepted by their advocates, as well as old detractors (Rodrik , 2022). Pragmatism, based on political party agreements, helps both sides, to obtain desirable results or legitimation before their voters' base.

Conclusions

For over two centuries, industrial policy has oscillated between letting market forces act or designing and implementing State strategies to guide economic production. Neither stance has proven to be truer than the other, for their efficiency has been shown in their specific application. The truth is that the free-market paradigm is associated to world economic global trends, opening country borders and allowing for free capital circulation, according to their corresponding scales, whereas State designed industrial policy tends to embrace a sovereigntist and autarchic vision, aimed at protecting national industries and selecting strategic sectors.

All that has been synthesized in infant industry theories, comparative advantages and backward and forward linkages, which have guided government and company actions to organize economic production. Definite definitions have been almost impossible to determine, but the industrial policy spirit, as a long-term strategy aimed at consolidating structural changes in the productive apparatus, as of the protection of manufactures and

promotion of certain exports, may be a good approximation to an industrial policy definition.

Pragmatism has been a resulting variable in the interaction of forces between economic and political groups with dissimilar interests, fighting for State control and, from there, defining priority and mechanism agendas that favor the flourishing of certain sectors.

In the last seven decades, productive policy analysis shows that the most recent result is the exhaustion of the free-market model implemented by the Washington Consensus and its competition and innovation policies, focused on promoting economic opening and allowing for the free flow of capitals, as well as each country's resource allocation. Substitute industrialization strategy (1950-1979), and results obtained in terms of economic growth during that stage, allow us to conclude that now the redesign of an industrial strategy based on promoting manufactures and protecting strategic sectors, may open a new growth and job creation path, in countries stagnated in higher income generation.

Nonetheless, new challenges are now part of old problems, inherited from the free trade model that has not fully disappeared. Nations face a finance *worldization* context, where the action margin for sovereign initiatives is considerably reduced. Laudable attempts, made in Latin America by progressive governments, have met structural obstacles to transform their productive bases, because it is complicated to get away from raw material upward price trends, that provide them with the necessary resources to finance development, or because of the relative technological backwardness, that does not allow for the opening of a local innovation path linked to the productive sector, so as to be able to add value to abundant raw materials and place their manufactures in the world market. Fourth technological revolution advances headed by China in AI, 5G and IOT, seem very far from most of the middle-income countries, where not even the USA and Europe have the immediate conditions to narrow the gap with the Asian giant.

The economic crisis precipitated by the Covid-19 pandemic intensified the existing debate on the return of industrial policies, and their strategic role, to rebuild national value chains. Health care and security systems fully depend on countries having the capacity to be self-

sufficient, in case international trade channels are interrupted, as it happened in the pandemic. The danger of a new pandemic, and the repetition of its effects, cannot be discarded, as neither can effects of apparently regional bellicist conflicts, as the war in Ukraine or the Middle East, be neglected. The new productive paradigm has the potential of facing all these issues.

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