On the incorporation of new technologies in a scenario of uncertainties: From the Old to the New Developmentalism

Bruno Farina

ABSTRACT

In the current international economic conjuncture, of tensions, both in the commercial and technological fields, between the two main economies of the world, the United States (USA) and China, the future for the developing economies, like Brazil, are uncertain. Starting from this context of uncertainties and apprehension about the continuity of Brazilian socioeconomic development, the objective of this article is to demonstrate that the new developmentalist theoretical framework does not provide sufficient instruments to support the incorporation of new technologies for stagnant middle-income countries. According to the new developmentalism, led by Bresser-Pereira (2010), economic development occurs through the advance of the most technological productive segments, aiming the export of these goods and services. In order to develop such sectors, most of them belonging or connected to industry, the theory presupposes an economic policy of correcting macroeconomic prices, especially interest and exchange rates, coupled with less interventionist / more regulatory industrial planning, to develop new national technologies to compete internationally. The author will show that such precepts are insufficient, given the current international conjuncture.

The new developmentalist theory would have to reconsider the use of the old instruments of industrial policy, present in the literature of classical developmentalism and that contributed to the rise and consolidation of industry in Brazil and in other Latin American countries. In the classical developmentalism, represented by authors related to the Economic Commission for Latin America and the Caribbean (ECLAC or CEPAL in Portuguese) like Bielschowsky (2000), the conception of growth in a peripheral country such as Brazil (without autonomy of the technological process in most of the productive sectors), starts from a process intrinsically connected to the overcoming of external constraint, through state intervention in the economy, active industrial policies and the development of national production techniques. In this way, the article is divided into three sections. In the first section, there will be a brief exposition of the current

---

1 Master student of the pos-graduation program in Economics at the Federal University of Rio de Janeiro.
international economic scenario, emphasizing the economic tensions between the US and China, especially as Donald Trump ascended to power in the US country in 2016. In the second section, will be introduced the new developmentalist model and its mechanisms of stimulus to the accumulation of capital and incorporation of new technologies. The third section will present the vision of the classical developmentalism about the theme, especially that one focused on the Brazilian economy. Finally, the author presents a brief final consideration on the industrial policy strategies present in structuralism, which could complement the new developmentalist theory.

**Key words:** New technologies, industrial policy, new developmentalism, classical developmentalism.
Introduction

In this work, an exposition was made of the international economic scenario, the change of position of the US government and its unfolding to peripheral economies, as is the case of Brazil.

Next, the new developmentalist model was presented, based on several works, among them the one by Bresser-Pereira (2010). It was exposed the proposal of this model of growth, as well as its operation and how is inserted the question of the incorporation of new technologies.

In the third chapter, we discussed the classic developmentalism lived in Latin America in the twentieth century, the growth turned inward and the incorporation of new technologies.

1. The change in the international scenario after Trump’s election
In November 2016, Donald Trump was elected president of the USA, after eight years of democrat administration. His economical platform consisted, in a very superficial analysis, of a protectionist agenda whose main purpose was to withdraw the country from any kind of deal that the government considered harmful to their economy (for example the Paris Climate Agreement\(^2\)) and prioritize the national production above the importations of foreign goods and services. According to this logic, company’s factories would remain in the US and there would be a noticeable increase in the quantity of jobs to the American people. To execute this agenda, the American president had in his hands a powerful arsenal of possible measures against the nations he considered rivals. Not only economical, but also political strategies, like commercial sanctions or the use of exceptional laws to prevent unfavorable negotiations\(^3\).

Among several countries, the Trump administration chose, since the beginning, China as its most relevant economic opponent. Trump’s commands were always targeted at the Asiatic nation, forcing them to renegotiate trade agreements and reduce their American commercial deficit. Moreover, the American government was also concerned about the technological advance of the Chinese delegation, accusing them of infringing intellectual property laws\(^4\) and causing instability worldwide.

The turning point of the country’s economic and foreign policy with the election of Trump must be seen in a new geopolitical context, as points Fiori (2018), where the Americans are now afraid to lose their hegemony before the world. As part of this new strategy, it has been released, in December 2017, the new National Security Strategy of the USA (Trump, 2017). This document, elaborated by the president’s team with support of several relevant institutions (for example, the Department of State, the Pentagon and the Central Intelligence Agency), exposes the main objectives of the American policy from now on.

Concerning our debate about the incorporation of new technologies, the document exposes guidelines to maintain American ahead of its enemies in the

---


\(^3\) One of this cases happened in September 2017, when Trump forbade the sale of an American technological company to a Chinese enterprise, under the pretext of affecting their national security, available in: [https://www.bbc.com/news/business-41258351](https://www.bbc.com/news/business-41258351)

\(^4\) In March 2018, the US Trade Representative filed a request for consultation in the World Trade Organization in regard to concerns that China was violating intellectual property rights, available in: [https://economictimes.indiatimes.com/news/international/us-drags-china-to-wto-on-discriminatory-technology-licensing-requirements/articleshow/63433503.cms](https://economictimes.indiatimes.com/news/international/us-drags-china-to-wto-on-discriminatory-technology-licensing-requirements/articleshow/63433503.cms)
economic and technological branches. According to Fiori (2018), the American elite does not accept the emergence of any other group or country that could, eventually, threaten their dominance. Therefore, the US plan runs through the maintenance of their military and economic power in relation to the other nations (Fiori, 2018). As it was already said above, they have in their favor a great number of possible measures available, like economic sanctions, the use of international organizations (For example the United Nations, the International Monetary Fund and the World Bank), military pressure and finally a legal framework that protects them against any act that may go against their national security.

In an attempt to change the trade terms to his country, Trump began to threaten the other nations that he considered having excessive benefits at the expenses of Americans. USA imposed import tariffs on Mexico’s and Canada’s steel and aluminum as a way of pushing them for a new agreement, which should replace the North American Free Trade Agreement (NAFTA). The pressure worked and the new deal – named U.S. Mexico Canada Agreement (USMCA) was signed in November 2018, altering several aspects of industrial sectors, especially the automotive.

After renegotiation with their neighbors, the Americans focused their attention at the Chinese. According to Trump (2017), China was selected, along with Russia, as the main threat to the American supremacy. Still, according to this document, the Chinese economic emergence would not happen if previous American governments had prohibited the misappropriation of American technologies to Chinese enterprises (forced by the Chinese government and disrespecting international agreements), allowing them to be able to compete at the same level with the United States of America (catching-up process). Besides, the US government also condemned the trade terms between both countries, claiming China utilizes non-ethical advantages to expand their exportations to America.

During 2018, the American government declared a trade war against China by imposing hundreds of billions of dollars in tariffs on their goods. During this struggle,

---


6 Examples of non-ethical advantages quoted in the document are: “dumping, discriminatory non-tariff barriers, forced technology transfers, non-economic capacity, industrial subsidies, and other support from governments and state-owned enterprises to gain economic advantages” (Trump, 2017, p. 19).

7 If Trump’s threats are validated in practice, virtually all Chinese imports will be overtaxed, available in: https://www.bbc.com/news/business-45899310
other countries were also affected by the American protectionism, including Brazil, more specifically regarding its steel exportations.

The Chinese government, sensing the hostility of America, retaliated with the imposition of tariffs on USA products. After a few rounds of new tariffs, the two governments agreed to negotiate a new term for trade. There has not been a resolution to this conflict yet, although the news points to a consensus between Beijing and Washington in a relatively short time.

During the rounds of increase of import tariffs and commercial threats, there was also an episode that escaped the economic scope. On December 1, 2018, Meng Wanzhou, the chief financial officer for Chinese telecom giant Huawei, was arrested in Canada at the behest of the Americans. Although the official narrative released by Washington, has been one of imprisonment for fraud and illegal relations with Iran (target of various US sanctions), several international analysts have pointed out technological war between both delegations as the main factor considered. Huawei is a Chinese telecommunications company, sales leader in its country and one of the most advanced industries in 5G technology research and development.

Under the geopolitical view and the new North American strategy, this action finds basis in Trump (2017). Fiori (2018) The US will no longer commit to any international rule or multilateral institution that is restricting them in any way, even those that the Americans themselves created. In Fiori’s words: “...the United States is proposing to leave behind its 'liberal cosmopolitanism' and its 'globalist utopia' of the twentieth century, to to the pragmatic realism of the old 'Geopolitics of nations' inaugurated by Peace of Westphalia in 1648” Tradução minha (Fiori, 2018, p. 13). In economic terms, it means that the US is determined to recover the global leadership in the process of technological innovation in all fields of knowledge and is willing to use force to do so.

---

10 A consolidated interpretation, among several analysts, of the imprisonment of Meng Wanzhou is that it was an American warning to the Chinese to not continue to develop their own IT technologies (especially the 5G), available in: https://www.asiatimes.com/2018/12/opinion/huawei-cfos-arrest-a-sign-of-us-world-rule/ and https://www.scmp.com/week-asia/geopolitics/article/3006961/my-way-or-huawei-how-us-ultimatum-over-chinas-5g-giant-fell
Parallel to tensions between China and the United States, the European Union has also announced an increase in import tariffs for products from several countries, including Brazil. In its April report, World Economic Outlook (chapter 1, page 8)\textsuperscript{11}, the IMF reduced world growth forecasts for 2019 (3.3\%, up from 3.7\%) and 2020 (3.6\%, up from 3.7\%), mainly because of the commercial tensions between the two largest economies on the planet. On the other hand, Argentina, strategic partner of Brazil for being a destination of a relevant part of Brazilian industrial exports, is in an economic collapse, showing a decrease with very high inflation rates.

Analyzing the current international scenario as a whole, one can perceive that the conditions for development based on the external market (exports) have become more complex. Of course, conjectural conditions such as the Argentinian situation will be resolved at some point, which proves that they are not eternal impositions. However, as stated above, the new US position towards countries considered as potential threats to its national dominion provokes two basic conclusions about technology transfer and economic development: (i) Transfer of cutting-edge technologies between developed and developing countries will not be made cordial or natural and (ii) Countries that try to implement an autonomous project of economic and technological development, with the goal of reaching the technological frontier and competing in the same as central economies have a high chance of retaliation, even outside the economic field.

Thus, the following section will discuss the new developmentalist model and its process of incorporating new technologies, as well as its growth strategy led by industrial exports.

2. The New Developmentalist model and the incorporation of new technologies

The new developmentalism model is intended for stagnant middle-income economies which states that the development of these countries would depend on the creation of a pact between the State and the market to impose an export-led growth, similar to the well succeeded cases of East Asian countries (South Korea mostly). According to Bastos (2012), the growth would be led by private exports of industrialized goods. Therefore, the market would be entrusted with the allocation of resources, while the State would be in charge of correcting the macroeconomic prices.

Among the macroeconomic prices, the new developmentalist theory focuses on the adjustment of two of them, the exchange and the interest rates (Bastos, 2012).

In relation to the exchange rate policy, it would be mandatory to guarantee the national currency devaluation until an industrial equilibrium, i.e., a minimum rate that would allow the access of the national industries to the internal and external demand (Oreiro, 2014 and Bresser-Pereira, 2014). New developmentalist economists believe that middle-income countries, when they are commodities exporters, may suffer from a process named Dutch Disease, in which the rise of exportations of primary goods attracts a large quantity of foreign currencies, appreciating the exchange rate (Bresser-Pereira, 2018).

The appreciation of the national currency would prevent the development of non-commodities tradeable sectors, especially industrial ones. Therefore, in addition to reducing the exchange rate volatility and maintaining it in a sufficient devaluated level, it would be also recommended to tax commodities exportations, in a way to neutralize the Dutch Disease (Bresser-Pereira, 2018). The devalued exchange rate would make domestic industrial products more competitive in the external market, increasing their exports and stimulating the increase of production. Because of its intrinsic advantages, i.e., higher rates of productivity and technological sophistication, the export-led growth based on sophisticated industrial goods would generate the raise of productivity and therefore speed up the capital accumulation.

In parallel to the exchange rate policy, the government should also reduce the interest rate, through a fiscal adjustment in the government expenses (except for the public investments). The cut of public expenses would allow the generation of a domestic saving capable of financing public and private investments, without the necessity to appeal to the international financial market, lessening a possible source of instability in the long-term (Marconi and Rocha, 2011). As points Nassif et al. (2018), new developmentalist economists support fiscal rules that controls the public current expenses. In Brazil, for example, there is already the Fiscal Responsibility Law, which sets a limit for current government spending according to its revenue (public investments were left out).

Summing up, this economic current of thought supports, on the one hand, an austere fiscal policy regarding current expenses, enabling the achievement of primary surpluses; on the other hand they are in favor of an active fiscal policy concerning capital expenditure. In an economic crisis, for example, the state shall increase the
public investments even if that means incurring in a fiscal deficit. In an attempt to improve the organization of public costs, Nassif and Feijó (2014) propose the creation of two separate budgets, one for the current and the other for capital expenses, based on a keynesian recommendation.

Although the new developmentalism theory supports an export-led growth, practiced through the incorporation of technologies from other countries, nothing is said in relation to difficulties in appropriating such knowledge. On the contrary, the model presupposes that there are not any significant obstacles to the diffusion of technics and technologies among companies. Written in other words, the national enterprises would be capable of emulating the most advanced production techniques, including those at the technological frontier. And, still in cases where it does not occur, the combination between low interest rates and devaluated currency would stimulate the incoming of foreigner industries, bringing with them the new technologies (Bastos, 2012).

In this scenario, of greater flexibility to the incorporation of external technologies to the national industries, Carneiro (2012) stands out that the new developmentalism industrial policy, even though not yet very well defined by its followers, has a more regulatory and less taxing character on the part of the State. Thus, old industrial instruments, like the implementation of tariff barriers, the nascent industry policy and the creation / use of state-owned enterprises to develop strategic sectors are laid aside in the new developmental framework.

In order to fill this gap of instruments and expose an industrial policy guideline for this recent economic theory, Nassif et al. (2018) proposes a set of policies to develop the Brazilian industry. Brazil’s most important intent, according to the authors, has to be the diversification of its exportations in the most technological manufacturing groups. Due to the technical progress of these groups being the highest in the economy, prioritizing the development of these sectors would enable the increase of the aggregate productivity, sustaining higher growth rates.

As examples of possible sectoral industrial policies, the authors cite relevant activities, who present deficits in the trade balance. Those are the chemical and pharmaceutical (belonging to the Scale-Intensive group), electronics and machinery and equipment (Science-Engineering-and-Knowledge-Based)¹².

¹² Nassif et al. (2018) separated the productive sectors based on Moreno-Brid and Caldentey (2009) methodology
Nassif et al. (2018) and the new developmentalist theoretical framework as a whole do not recommend, so far, the indiscriminate use of tariff barriers to protect the national industries of middle-income countries. According to Bresser-Pereira (2018), the use of import tariff is valid only for the nascent industry, that is, those in the beginning of the industrialization process. Middle-income countries have, usually, overcome the nascent industry process, possessing some established industrial sectors. The authors then indicate the use of vertical industrial policies (could be used, for example, in the deficit sectors mentioned above) and horizontal, to improve the infrastructure through public resources.

Therefore, the new developmentalist alternative would be based on macroeconomic prices favorable to exports and industrial production, while the state would act austerely in its current expenditures in order to finance investments. On the other hand, the industrial policy would be based on regulation and incentives rather than on the State firm, as occurred in the Brazilian developmental experience of the 20th century, which will be discussed below.

3. Classical Developmentalism, “desarrollo hacia dentro” and the technological development

It is inevitable not to quote Prebisch 1949 article “El Desarrollo Económico de La América Latina y Algunos de sus Principales Problemas” when we talk about the emergence of the classical developmentalism in Latin America. This article incited an intense debate on the need for industrialization in the Latin American countries (periphery). Prebisch (1949) pointed that, because of the different elasticity income of primary (low income elasticity) and industrial (high income elasticity) goods, the undeveloped countries in Latin America – most of them commodity exporters – suffered from external constraint, i.e., the lack of international currencies to pay the importations.

Therefore, any acceleration in the growth rate would increase the imports of industrialized goods (not manufactured in these countries), because of their high income elasticity. Naturally, the increase of importation would demand a higher amount of international currencies. This would be difficult to obtain by the exportations of primary goods, because of their lower income elasticity and their dependence on the increase of the international demand (central countries). In other words, if an undeveloped country
managed to achieve higher growth rates, its importations would rise faster than its exportations, causing a lack of foreign currencies and making it impossible to sustain growth. Medeiros and Serrano (2001) emphasize that this argument does not rely on the secular trend of deterioration of terms trade observed by Prebisch (although it reinforces the difficulties for non-developed commodity exporters). Therefore, the Prebisch alternative can be understood as a process that, by expanding the industrialization, there is a possibility of increasing exportations, which result in easing the external constraint and allowing the raise of importations.

The way this process is conducted, i.e., if the industrialization is oriented to replace importations or to expand exportations (or both) depends on the characteristics of each country and its geopolitical position. The Latin American countries, for example, initiated an industrialization process to substitute imports, because after the Second World War their exports were suffering from the protectionism of central economies in their own agriculture and also due to the fact that the Unites States, unlike Great Britain, were also great exporters of primary products (Medeiros and Serrano, 2001). In this scenario, some peripheral countries in Latin America saw in the decrease of coefficient imports the alternative to sustain higher growth rates, without stopping at the external constraint.

In Brazil, the substitution of imports reached a complexity level not seen in other countries of the region. From the state intervention, devaluated exchange, import tariffs, public companies, subsidies to entrepreneurs and several other instruments, the country was able, through the Second National Development Plan (II PND), to develop the sectors of industrial inputs and capital goods associated to the Second Industrial Revolution.

However, still in countries like Brazil and Mexico, where the industrialization process succeeded at most among the Latin American nations, their income distribution and heterogeneity of the productive structure remained strongly unequal in the beginning of the 1970’s (Pinto, 2000). According to Pinto (2000), in Latin American countries with some degree of economic development, what has been observed is that the more advanced urban centers of these countries started to represent a kind of center to the poorer parts of these same nations, similar to the periphery-center relationship exposed in Prebisch (1949). Thus, in the same way as the relationship between countries, the poorer regions were inserted as mere suppliers of low-value (mainly
primary) products and of labor for the more advanced nuclei. There was no tendency, in any way, to reduce this inequality.

Medeiros (2011) reinforces this argument by stating that, unlike Brazil and Mexico, successful post-war Asian economies, such as South Korea and Taiwan, led a land reform, supported by the Americans. This distinction made the gains from industrialization better distributed among the population. In this way, it is possible to conclude that the process of industrialization that took place in the countries of Latin America was destined to attend the consumption of a small local elite, rather than to enable an internal market of mass consumption. And, even with the advance of technical progress, there was no interest in spreading it more homogeneously among the regions of the countries (Pinto, 2000).

Fajnzylber (2000, page 869, table 6) highlights the difference between the Korean and the Brazilian case in relation to the degree of participation of transnational companies in these economies. While in Korea there were national conglomerates with state participation in the most dynamic industries, in Brazil this space was mainly occupied by foreign transactional companies, relegating to public and private capital companies the roles of providing infrastructure and dealing with the least technologically sophisticated productions respectively. According to Fajnzylber (2000), this condition of the Brazilian economy (and also of other Latin American economies) is fundamental to explain the persistence of the structural heterogeneity, as well as the frustration of not having achieved technical autonomy vis-a-vis developed nations.

Further, unlike common sense that labels the successful Asian development experience (Asian Tigers – more specifically South Korea and Taiwan – and the southwestern countries, China and India) only as an export-led growth and Latin American successes as imports substitutions (especially Brazil and Mexico), Medeiros (2011) accentuates that the industrialization experience of all these countries actually followed a similar path. In all of them, the State intervened in key industrial sectors, such as mechanical, automotive and chemical metal (heavy industry). The developmental orientation of each country was more due to its initial condition than to a choice of strategy considered superior. In the Asian case, for example, it was not possible to industrialize in the primary sectors, because natural conditions did not allow (Medeiros, 2011). In the countries of Latin America, there was abundance of natural resources and land for agriculture.
Therefore, the industrial policy instruments of successful countries were similar to those used by nations that had their development halted in the middle of the road. In the Brazilian case, the interruption of the developmental project was due to the debt crisis, which lasted throughout the 1980s (Medeiros and Serrano, 2001). Even with all the effort made to increase exports in order to cope with the financial account deficit that had triggered the increase in US interest rates, the country was suffocated by the lack of a dollar to honor its commitments.

In turn, South Korea and Taiwan did not have the same tragic fate as the Latin American economies. In the early 1980s, both countries had a diversified production structure focused on the export of tradable goods (Medeiros, 2011). In addition, Medeiros (2011) points out that, for geopolitical reasons, both counted on US aid, through financing and easier access to the US consumer market. Without these 'privileges', the fate of these countries could have followed the same course of the developing economies of the American continent.

**Conclusion**

As discussed above, trade relations between countries are going through a turbulent phase. More than that, the US-Chinese retaliations show that there is more at stake than trade deals. China, through a long process of industrial policies, planned trade openness and productive diversification has been able to achieve very high levels of technological development, so that its goods and services can now compete on an equal footing with the richer countries.

For countries like Brazil, the challenge has become more difficult. Both by the China factor - increased international competition - and by the direction the central country, the United States, is taking. With this new direction, it has become clear that Americans will avoid any relevant transfer of technologies to the non-developed economies. Therefore, the source of economic development cannot be expected to come from abroad.

In a wise way, new developmentalism suggests that public policies focus on the development of industrial sectors or more technological services, that is, those intensive in research and high value added. However, two facts strike the eye. The first one is that the excessively exporting bias of this model does not meet the challenges of the current situation of international trade, which is low in growth and high tensions among the richest countries. The second one is that, as the classic developmentalism in Latin
America (being Brazil the most successful country of this experience) showed during the second half of the twentieth century, the construction of an internal mass market is the best way to guarantee the socioeconomic development of the countries region. Exports are extremely relevant because they guarantee foreign exchange and stimulate the increase of productivity of local companies, but they are not enough to lead the growth in a country of the proportions of Brazil.

Besides, as pointed out by Fajnzylber (2000), the Latin America developmentalist experience of XXth century left as one of its teachings the fact that the arise of national technologies is a basic condition to obtain the autonomy of technical progress and the long term growth sustainability. Therefore, the challenge that remains is the means by which the state will be able to attract and develop local technologies, together with national private groups, without this process being aborted by international bodies or local actors.

References


