Iosr Journal Of Economics And Finance (Iosr-Jef)
E-Issn: 2321-5933,P-Issn: 2321-5925.Volume 15, Issue 3 Ser.1 (May. – June. 2024),Pp 11-18
www.Iosrjournals.Org

Strategic Public Investments In Science And Technology: Catalysts For National Economic Growth

Ricardo Da Costa Nunes
Ppgcont/Universidade De Brasília, Brazil

Abstract:
This paper explores the vital role of strategic public investments in science and technology as catalysts for enhancing economic productivity and innovation within nations. Given Brazil's limited resources, it becomes crucial to strategically channel these investments towards sectors where the country holds comparative advantages. The agricultural sector, a traditional strength of Brazil, is a prime candidate for such targeted investment. This approach not only leverages existing capabilities but also Science and Technology Investment. The study assesses the effectiveness of public investments in fostering technological advancements and economic growth, emphasising the importance of aligning. The findings highlight the significant potential of focused public agricultural investments to enhance Brazil's economic competitiveness and sustainability in the global market. This research contributes to the ongoing debate on the optimal balance between public and private contributions to technological advancement. It underscores the strategic importance of concentrating public investments where nations can best utilize their inherent strengths, thereby maximising economic impact and achieving sustainable development.

Key Word*:Technological Innovation; Agricultural Development; Economic Growth; Comparative Advantage; Science and Technology Investment.*

Date of Submission: 24-04-2024 Date of acceptance: 04-05-2024

I. Introduction

This paper evaluates the potential benefits of increased investment in science and technology as a lever to enhance economic productivity and innovation within nations. In an era where government spending is often guided by political pressures, as explained by public choice theory, assessing the effectiveness and role of public investments in the technology sector becomes crucial. This investigation is driven by the global context in which technological leadership is recognised as a determinant of economic strength and sustainability. This investigation is driven by the global context in which technological leadership is increasingly recognised as a determinant of economic strength and sustainability. This study's justification is rooted in the ongoing international debate regarding the optimal balance between public and private contributions to technological advancement. With many economies grappling with the need to stimulate growth while managing tight budgetary constraints, the role of state intervention in technology development is more pertinent than ever. This research sheds light on how government policies can effectively support technological innovation, foster broader economic development, and make your work feel important and impactful.

This paper proposes actionable strategies that could expedite technological innovation and contribute to sustained economic growth. These strategies hold the potential to significantly improve our understanding and approach to technological advancement, instilling a sense of hope for the future. It will explore the dynamics between public investment and private sector engagement in technology creation and assess the socio-economic impacts of these interactions.

The structure of this study is methodically laid out as follows: Section 2, 'State Intervention and Creation of Technology', introduces the theoretical foundations and empirical evidence underpinning our analysis. Section 3, 'The Role of State in Modern Economic Frameworks', develops the analytical model to guide our inquiry. Section 4, 'Suggestions for Governmental Action', details the quantitative methodologies, data collection, and regression techniques. The outcomes are discussed in Section 5, 'Results', and the paper concludes in Section 6, 'Conclusion', where we synthesise our key findings, discuss their implications, and propose directions for future research.

II. State Intervention And Creation Of Technology

Views on the importance of state action in economic development are also shared by thinkers associated with the Economic Commission for Latin America and the Caribbean (ECLAC) and the

structuralists. This perspective is supported by studies examining the success of Southeast Asian countries as a notable example of joint action between government and private enterprise. Moreira (1995) advocates for an interventionist state that is attuned to market and product failures. Similarly, Stiglitz highlights the effectiveness of economic systems that combine state and market participation in the coordination of the economy. These analyses suggest that a balance and synergy between government regulation and market dynamics are crucial for sustainable economic development. For this reason, Stiglitz asserts:

Out of these experiences, out of observations that markets often fail, but so do governments, the idea advocated here—that there needs to be a balanced role between markets, the state, and civil society—naturally evolved. (Stiglitz, 2012, p. 74).

The proposed approach suggests that, in addition to state engagement, international economic integration might offer fresh prospects for funding and cooperation in research and technology. Such integration can expedite technical advancement and bolster the nation's industrial foundation. An advantage of this strategy is that the country can obtain cutting-edge technologies by importing them.

Furthermore, adopting new technologies from diverse fields often leads to 'secondary breakthroughs'. These additional developments arise when such technologies are applied in varying contexts, thus triggering a multiplier effect on productive efficiency. It is pivotal to recognise that when embodied in machinery and equipment, technical progress transcends mere automation and enters the production function as a 'labour-augmenting' factor. In essence, this progress does not simply replace human labour; it enhances and augments it. This results in an increase in the efficiency of workers, allowing the same quantity of labour to produce substantially greater outputs.

Consequently, this technical progress directly impacts labour productivity, providing a pathway to elevated living standards and sustainability of economic growth. Trade openness, within this framework, can be seen as a catalyst for acquiring innovative and complementary technologies to human labour's productive capacity. This reinforces the argument that economic openness and international integration, by facilitating access to such technologies, can contribute significantly to the gains in technical efficiency and allocative benefits stemming from specialisation in international trade. Rodrik (2011) argues that developing countries can use globalisation to catalyse the modernisation of their industries by absorbing foreign technologies, thus enhancing productivity growth. This implies an unconditional or absolute advantage that underscores the importance of not only bridging the technological divide but also doing so in a manner that fosters genuine innovation and R&D within the domestic landscape.

In line with these considerations, it is crucial to understand the different channels through which productivity enhancement occurs across various activity sectors. For instance, productivity tends to increase over time in the manufacturing sector due to the spillover effects from the technological frontier to domestic companies. This transfer can occur through multiple channels, including purchasing advanced machinery and equipment produced abroad, allowing domestic companies to operate at the same technological standard as their foreign counterparts. Direct foreign investment also plays a role, where companies with operations abroad transfer production units and embedded technologies to the domestic economy.

These insights further substantiate the perspectives of the Dependency School by articulating the complexities and multifaceted nature of technological advancement and its differential impact across sectors. They suggest that the path to sustainable development for poorer countries is fraught with challenges deeply rooted in the intricacies of technological diffusion and economic policy.

For Nogueira Batista (1994), the liberal proposition for the termination of the interventionist State is advocated by developed nations without applying it themselves. The OECD economies benefit from a State that undertakes substantial research in public laboratories and funds a significant portion of the corporate research endeavour. This dichotomy highlights the intricacy of innovation policies, where visible elements such as R&D expenditure or liberal trade policies are not the sole determinants of technological growth. The fundamental notion is that productivity disparities (and per capita income differences) observed between countries are not solely due to the existence of a technological gap or the rate of technology diffusion but also to less efficient utilisation of production factors in poorer nations owing to endogenous factors such as corruption, excessive regulation, and State intervention in the economy, as underscored by Restuccia and Rogerson (2017). Such factors may create additional barriers to innovation and growth, suggesting that the efficacy of State policy cannot be viewed in isolation but must be considered within the broader context of governance and institutional structure.

In the USA and England, the role of state action is comparatively less pronounced, perhaps because it is not deemed necessary, given that large firms are the main generators of technology. However, even in these countries, the government directs technological development towards strategic or less competitive sectors. In the USA, Congress directly influences the science and technology program, ensuring resources and favourable conditions for financing R&D expenditures, as noted by Rocha Neto (1992). In the case of Brazil, technological development also received governmental stimulus during the 60s and 70s. The Government's Programme of

Economic Action (PEAG) previously highlighted the importance of technological advancement, considering it as or more vital to the development process than the actual increase in the rate of capital formation. During the government of Costa e Silva, with the Strategic Programme of Development (SPD), it was emphasised that it would be difficult to find a country where an internal process of technological development had not supported rapid and self-sustained growth.

At the beginning of the 1980s, Tigre (1985) and Erber (1983) highlighted that state intervention could position a country as an industrialised nation. Nunes (1992) reached the same conclusion. The perception that Brazil was a successful producer of weapons and technology in its state-operated industries appears to have validated these authors' propositions. Brazil was experiencing the euphoria of transitioning from a developing to a developed country. Castro & Souza's (1985) proposition corroborated such findings: Brazil could grow from its own investment, utilising its diversified industrial park as a lever for this growth. The key to this would be a combination of increased targeted public spending and policies that fostered innovation and industrial competitiveness.

Although these authors, who were favourable to state intervention, highlighted its effectiveness in positioning a country as an industrialised nation, it is important to note that this view was not shared by all scholars. Some researchers contested this idea and presented evidence contradicting the relationship between state intervention, industrial growth, and innovation.

For instance, in addition to the study conducted by Link (1977), an author like Johnson (1988) also questioned the effectiveness of state intervention as a driver of industrial development. Johnson emphasises that excessive state intervention can create market distortions and discourage private investment.

Furthermore, researchers such as Garcia (1995) and Silva (2000) conducted empirical studies that found no significant relationship between state intervention and industrial growth in developing countries. They argue that other factors, such as foreign trade policies, the quality of education, and infrastructure, play a more significant role in industrial development.

Mazzucato (2013) advocates that governments should consistently invest in research and development (R&D) and innovation, irrespective of current economic cycles. She argues that this sustained approach is crucial for fostering sustainable technological and economic development.

This action would contribute to modernising the country's industrial park by absorbing foreign technologies, reinforcing the entrepreneurial capacity in diverse economic sectors, and enlarging its competitiveness in the international market. By liberalising exterior trade and importing lower-priced products, firms could better enhance their efficiency by utilising the available resources.

Thus, for some authors, the importation of foreign technology does not confer technological prowess upon importing nations since developed countries only transfer part of their technology to developing ones, imparting the know-how of production but not the specific activities of innovation and R&D. Furthermore, foreign industries that arrive bringing their own technology may also depart, removing their technology. This has occurred in many countries.

In general terms, there would be at least three significant explanations for this dependency situation in the Third World. Firstly, the subsidiaries of multinationals train technicians from their countries but do not utilise local labour, which would be cheaper and more intensive for R&D activity. Secondly, the importation of technology can inhibit local efforts in R&D because the subsidiary multinationals impede links between local industries and research institutes, utilising restrictive clauses in the technology licensing contracts and limiting the *learning by-doing* the process. Thirdly, oftentimes, the imported technology is not suitable for local needs. These conclusions support the Dependency School in stating that sustainable development is challenging for poor countries.

The importation of foreign technology fails to bestow technological sovereignty upon importing nations since developed countries only share a fraction of their technological capabilities, transmitting production know-how but not extending into innovation and R&D activities. In addition, foreign companies that enter the market with proprietary technologies may also exit, withdrawing their technology. This phenomenon has been observed in various countries, as noted by authors like Amsden (2001), who discuss the complexities and partial nature of technology transfer in the global economic landscape.

In general terms, there would be at least three important explanations for this dependency situation in the Third World:

1. Multinational subsidiaries train technicians from their countries but must utilise local labour, which would be cheaper and more intensive for R&D activity.
2. Technological importation can inhibit local efforts in R&D because the subsidiary multinationals impede links between local industries and research institutes, utilise restrictive clauses in technology licensing contracts, and limit the *learning by doing* process.
3. The imported technology is often not appropriate for local necessities.

These conclusions support the Dependency School in stating that sustainable development is complex for economically disadvantaged countries.

Despite the belief of some authors in the necessity of the State's investment in technology production to foster technological innovation, such as Stiglitz & Greenwald (2014), who argue that economic intervention can facilitate the creation of technological innovation, several authors have expressed scepticism about the effectiveness of state intervention in this area. Prominent economists such as Milton Friedman (1962) argue that state intervention can often lead to inefficiencies and stifle innovation by distorting market signals. Additionally, Lucas (1988) has highlighted the risks of governmental misallocating resources in attempts to direct technological development, suggesting that markets are better suited to allocate resources efficiently in response to changing technological needs and opportunities. These perspectives support a more laissez-faire approach to economic and technological progress.

The federal government's concern with fiscal adjustment, supported by the liberal theoretical framework, has led to successive budgetary resource cuts in the Ministry of Science and Technology. This phenomenon, noted by Oliveira (1993), is evident in Graph 1. The reductions in science and technology funding have been more significant than those in social programs since they do not adversely affect re-election politics. As Nunes (1992, p. 4) explains, *the appeal of compensatory social programs has a much more significant political impact than investments in science and technology, which are typically long-term and therefore carry little weight in the political market*.

According to the National Center for Science and Engineering Statistics (2022), the USA allocates between 2 and 3 percent of its Gross Domestic Product (GDP) for Research and Development (R&D). In contrast, Brazil's R&D expenditure amounted to 1.15 percent of its GDP in 2020, as reported by the World Bank (2021)'s collection of development indicators.

Thus, the OECD countries have made significant technological advancements, with the State playing a relevant role in this process. For instance, Australia prioritises research that is aligned with industrial and economic needs while implementing significant reforms in the academic system. Major public research organisations encourage researchers to align their work with industry needs, as Nunes (1992) noted. In contrast, in Brazil, the academic community, guided by the peer review process, relies on an elitist conception of science, where society cannot evaluate the work of scientists according to defined criteria. This model prioritises scientific issues over technological advancements within national public institutions, which tend to lean towards closer ties with the State.

The quest for sustainable technological growth is as desirable as it is difficult to achieve. Firstly, big enterprises, which are more numerous in developed economies, are the significant producers of technology, especially within specific sectors of the more modern industries. These industries are capable of producing and consuming technological innovations in a sustained manner, securing their market share. Such sectors include the military, aerospace, computation, and biotechnology industries. Modern technology has been developed in these sectors, termed 'primary innovation', which radically alters the technical foundation, creating transformations in the production processes—referred to as 'creative destruction'. When these production alterations spread to other processes of the economy, there is 'secondary innovation'. These are derived from 'primary innovations' and contribute to productivity increases and economic growth. Industries that consume innovations produced by other sectors of the economy, such as the textile industry that utilises equipment from the chemical industry, do not have the power to influence the trajectory of the technological process.

The capacity of economies to generate technological innovations is deeply intertwined with their level of development; wealthier nations have a greater potential for generating technology. The most developed countries are responsible for significant global R&D investment, which tends to be concentrated in the industrialised nations. This concentration underscores the pivotal role of the manufacturing sector in economic growth, a connection underscored by Kaldor (1967, p.7), who observed that:

...Fast rates of economic growth are almost invariably associated with fast rate of growth of the secondary sector, mainly manufacturing sector, and this is not an attribute of an intermediate stage of development; it is a characteristic of the transition from immaturity to maturity.

Thus, the firms are principal technology generators, as seen in Table 1. Conca (1998, p.499) calls attention to other obstacles to sustainable technological development: *'Brazil's defence sector collapse in the early 1990s illustrates that the most significant barriers to Third World military industrialisation are not financial or technological but rather institutional. Simultaneous domestic-political and global market changes destabilised the institutional foundation of Brazilian military-industrial growth*.

Technological Production by Sector and Country (1990-1995)

Country	Sector	1990	1991	1992	1993	1994	1995
Brazil	Government		-	-	74.9	74.3	68.3
	Enterprises		-	-	25.1	25.7	31.7
	higher education		-	-	-	-	-
	N.O.		-	-	-	-	-
	Foreign		-	-	-	-	-
Canada	Government	36.5	35.9	34.5	33.5	34.8	31.6
	Enterprises	41.5	41.3	43.8	44.8	46.7	46.7
	higher education	9.9	10.2	9.8	9.0	9.0	8.6
	N.O.	2.5	2.7	2.4	2.6	2.1	2.7
	Foreign	9.7	9.7	10.1	10.6	10.6	10.5
Chile	Government	72.6	73.5	71.1	75.5	61.9	61.1
	Enterprises	20.6	17.2	18.2	15.4	29.5	29.4
	higher education	0.0	0.0	0.0	0.0	0.0	0.0
	N.O.	0.0	0.0	0.0	0.0	0.0	0.0
	Foreign	6.8	9.3	10.7	9.1	8.6	9.5
USA	Government	40.5	37.6	36.6	36.5	35.8	35
	Enterprises	55.1	57.8	58.8	58.6	59.1	60.1
	higher education	1.5	1.6	1.7	1.7	1.8	1.8
	N.O.	1.5	1.6	1.7	1.7	1.8	1.8
	Foreign	0.0	0.0	0.0	0.0	0.0	0.0
Mexico	Government				73.4	63.6	66.2
	Enterprises				14.3	19	17.6
	higher education				8.9	7.7	8.4
	N.O.				2.3	0.6	1.1
	Foreign				1.0	9.1	6.7
Portugal	Government	62.0	-	-	59.0	65.0	65.0
	Enterprises	27.0	-	-	20.0	19.0	19.0
	higher education	1.0	-	-	1.0	1.0	1.0
	N.O.	6.0	-	-	5.0	5.0	5.0
	Foreign	0.0	-	-	15.0	12.0	12.0

Source:Castro, Wolff, & Alic (1999). N.O= Nonprofit Organitazation

Thus, as large multinational corporations are the main drivers of technology generation, it should not be expected that state funding of technological research will lead to significant changes in Brazil's standing. This situation is especially apparent when considering that the Brazilian government needs more resources due to its diminished GDP.

III. State Intervention And Creation Of Technology

Recommend enhancing the dissemination of technical progress by increasing or maintaining the budgetary resources at the Center of Excellence, particularly those allocated for developing technical progress in rural areas, such as with EMBRAPA. Rich nations primarily excel in producing industrialised goods rather than agricultural products. Although productivity is higher in both sectors, the gap compared to poorer countries is significantly wider in industry, as highlighted by Smith (1985, p.24):

Consequently, the wheat from a richer country, of the same quality, does not always reach the market at lower prices than that from a poorer country. (...) While a poor country, despite its inferior agricultural practices, can compete to a certain extent with rich countries on the low prices and quality of wheat, it can never withstand the competition from their industries.

Notably, it is the agricultural sector where the country has shown significant technological progress and substantial potential for further advancements.

Additionally, this sector provides extensive employment opportunities, as noted by Kumar (1992, p.6):
The primary sector (...) offers significant employment opportunities and generates substantial income, albeit at much lower productivity than other sectors.
Moreover, agricultural production can aid industrial development. Firstly, agricultural companies produce industrial machinery, and agricultural operations require industrial goods. Second, improvements in agricultural technology help lower the cost of goods, which supports industrial development and, according to David Ricardo, lowers labour wages.

Furthermore, investing in agriculture could prevent the migration of workers from rural areas to major cities. These individuals move to cities for employment, but with limited job availability, this often results in socioeconomic issues that necessitate social support for these workers. Conversely, agricultural investments in rural areas could help mitigate large government expenditures associated with urban migration.

Employing the theoretical framework of David Ricardo (1817), it follows that development in society leads to an increase in the cost of food and, consequently, in salaries. However, using new technologies in agricultural production could offset this trend. In this regard, the employment of machinery in agricultural production could lead to a reduction in production costs and, consequently, an increase in real wages. Therefore, based on David Ricardo's theory, introducing machinery can mitigate the rise in the cost of living.

Recognising that the level of salaries is a crucial component in the evolution of inflation, particularly concerning emerging economies, and acknowledging that inflation is influenced by food costs, investments in agricultural production can aid in stabilising these economies. Furthermore, promoting technological advancements in modern manufacturing requires substantial governmental support and protection against foreign competition to assimilate imported technology.

An illustrative example of this dynamic can be seen in Brazil, where substantial investments and innovations in the agricultural sector have demonstrated significant impacts on the local economy. In the last 30 years in Brazil, a real agricultural revolution has occurred with the incorporation of new agricultural land and significant productivity increases. In accordance with the Center for Agricultural Studies of the Fundação Getúlio Vargas -FGV, the productivity has grown 69% in the last 20 years, and, in particular, soy has increased 107%, with the production per hectare changing from 11,2 thousand tons per hectare, in 1980, to 23.2 tons in 1997. Brazil could stop being a soy importer and become a big exporter while still catering to a relevant part of the internal demand for wheat. Besides this, techniques and strategies were developed to rationalise the principal animal species of economic importance, determining that the country could be the second-largest cattle producer.

Part of this technological progress was explained by the action of EMBRAPA with public resources. The tasks developed by the firm resulted in the expansion of domestic agriculture and livestock production, which prompted the reduction of importation and exportation. Its participation in the mentioned changes can be regarded with expressive events:
a) Development of bacterium strains for the elimination of the utilisation of nitrogenous manure in the cultivation of soya, representing an annual savings of US$ 1.5 billion;
b) Increase of productivity of wheat by 72%, allowing a reduction in the importation of US$ 900 million in 1980 and US$ 97 million in 1988;
c) Employ various technologies to incorporate the Cerrados, making the region responsible for 40% of the grain production.
d) The Discovery of a bacteria that fixes the nitrogen on sugarcane can represent a savings of US$155 million annually.

Thus, as large multinational corporations are the main drivers of technology generation, it should not be expected that state funding of technological research will lead to significant changes in Brazil's standing. This is especially apparent when considering that the Brazilian government has limited resources due to its diminished GDP.

However, in the mid-90s, EMBRAPA suffered budget cuts due to the government's objective of reducing public expenditures to meet demands with greater electoral appeal. Although the Union does not receive resources as dividends from EMBRAPA, its owner, the firm significantly contributes to the private agriculture sector by providing products that enable production. The country benefits from the firm's transfer of technological advancements, which could be profitable if it charged more for its products.

Despite these financial constraints, implementing the mentioned projects proceeded with limited resources, with the National Treasury serving as the principal financier. The enterprise’s own revenue comes from the commercialisation of agricultural products and livestock, the sale of assets, and the provision of technical services. These services include laboratory analyses, product testing, on-the-job training courses, consulting, technical assessments, and research projects upon request. However, the generation of resources has been minimal, as illustrated by the following table that presents the budgetary structure with average figures for the period 1986/91:

EMBRAPA: Budgetary Resources (1993)	
Category	Percentage
Resources from the special of Federal Government	81.10
Borrow	5.65
Own revenue	7.90
Agreements with National and Foreign Institutes	1.47

Fonte: EMBRAPA/DOF. 1993.

EMBRAPA's financial deterioration can be attributed to the low prices charged to its clients, who possess limited purchasing power. Raising tariffs could result in many producers needing more technical assistance from EMBRAPA. Consequently, significant technological innovations might not be implemented in rural areas, adversely affecting agricultural productivity and repercussions for Brazilian inflation. Therefore, the tariff policy does not increase EMBRAPA's revenue because the clients have limited purchasing power.

Considering the aforementioned points, it is unrealistic to expect that increased spending on science and technology alone will significantly boost economic productivity. This is because new technologies are primarily developed within the administrative hubs of major multinational corporations in developed countries. However, Brazil has EMBRAPA, an internationally competitive enterprise in biotechnology. Therefore, it is not just a possibility but a necessity to promote technological research in agriculture; therefore, it is possible to promote technological research in agriculture, a sector where the productivity gap between rich and poor countries is narrower. Such an initiative could have a profound impact.

IV. Final Remarks

In conclusion, Brazil's prospects for significant technological growth appear limited by the absence of a modern industry that fosters autonomous technological development. Since the early 90s, state intervention has not been a political priority, giving way to economic neoliberalism. This shift and the country's persistent fiscal deficit have led to successive budgetary cuts that have stymied efforts toward technological advancement. Moreover, this study has determined that due to limited resources, public investment across various sectors typically does not lead to substantial increases in productivity. Therefore, direct investments towards sectors where Brazil holds a competitive advantage, such as agriculture, is crucial.

However, the case of EMBRAPA illustrates that strategic public investments in areas where Brazil holds comparative advantages, such as the agricultural sector, can yield considerable economic benefits. Brazil leverages its strengths by focusing on agriculture to enhance economic competitiveness and reduce import dependency. This sector shows significant technological progress and provides substantial employment opportunities, thus contributing to economic stability and growth.

Moving forward, it is imperative to enhance the dissemination of technical progress by increasing budgetary allocations to EMBRAPA and other distinguished rural research and development centres. These institutions have consistently produced a range of primary and secondary technological innovations. Greater investment in these areas could amplify the development of new technologies and, in turn, significantly impact Brazil's economic landscape.

This paper underscores the need for a balanced approach to public and private contributions to technological advancement. As Brazil navigates its economic and technological challenges, strategically leveraging inherent strengths and targeted investments in sectors like agriculture will be crucial for sustainable development and enhanced economic resilience.

References

[1]. Amsden, A. H. (2001) The Rise Of "The Rest": Challenges To The West From Late-Industrializing Economies. Oxford, Uk: Oxford University Press.
[2]. Castro, A. B. De E Souza, F. (1985) A Economia Brasileira Em Marcha Forçada. São Paulo: Paz E Terra.
[3]. Castro, C. M., Wolff, L.& Alic, J. (1999). Science And Technology In Today's World. Inter-American Development Bank.
[4]. Conca, Ken (1998). "Between Global Markets And Domestic Politics: Brazil's Military-Industrial Collapse". Rev
[5]. Erber, F. S. (1983). O Papel Do Estado Na Economia Industrial. Editora Econômica.
[6]. Friedman, M. (1962). Capitalism And Freedom. Chicago: University Of Chicago Press.
[7]. Garcia, M. (1995). State Policy And Industrial Growth: An Empirical Investigation. Economic Development Quarterly, 9(4), 366-380
[8]. Johnson, D. (1988). The Limits Of State Intervention In The Economy. Journal Of Economic Studies, 15(3), 200-214.
[9]. Kaldor, N. (1967), Strategic Factors In Economic Development, The Frank W. Pierce
[10]. Kumar, P.C. (1992). Supply-Side Tax Policies For Developing Countries: A Survey And Synthesis. Development Policy Review, V. 10, P. 5-13.
[11]. Link, A. N. (1977). Federal Research And Industrial Innovation. University Press.
[12]. Lucas, R. E. (1988). On The Mechanics Of Economic Development. Journal Of Monetary Economics, 22(1), 3-42. Doi:10.1016/0304-3932(88)90168-7.
[13]. Mazzucato, M. (2013). The Entrepreneurial State: Debunking Public Vs. Private Sector Myths. Anthem Press.
[14]. Memorial Lectures At Cornell University, October 1966, Cornell University, Ithaca, New
[15]. Moreira, M. M. (1995). Em Busca Das Ligações Entre Intervenção Estatal E Sucesso Industrial. Texto Para Discussão No. 38, Banco Nacional De Desenvolvimento Econômico E Social – Bndes.
[16]. National Center For Science And Engineering Statistics. (2022). Science And Engineering Indicators 2022. National Science Foundation. Https://Ncses.Nsf.Gov/Pubs/Nsb20221 .
[17]. Nogueira Batista, P. (1994). O Consenso De Washington: A Visão Neoliberal Dos Problemas Latino-Americanos. Caderno Dívida Externa N. 6. Publicação Do Programa Educativo Dívida Externa - Pedex. São Paulo- Sp.
[18]. Nunes, B. F. (1992). Estado E Indústria No Brasil. Editora Nacional.
[19]. Oliveira, D. A. R. De (1993)."A Crise Fiscal E O Financiamento À Ciência E Tecnologia No Brasil". Ministério Da Ciência E Tecnologia.
[20]. Restuccia, D., & Rogerson, R. (2017). The Causes And Costs Of Misallocation. Journal Of Economic Perspectives, 31(3), 151-174.Stiglitz, J. (2012). The Price Of Inequality: How Today's Divided Society Endangers Our Future (P. 74). W. W. Norton & Company.
[21]. Ricardo, D. (1817). On The Principles Of Political Economy And Taxation. John Murray.
[22]. Rocha Neto, Ivan (1992). Planejamento Estratégico De C & T. Ministério De Ciência E Tecnologia.
[23]. Rodrik, D. (2011). The Globalization Paradox: Democracy And The Future Of The World Economy. W. W. Norton & Company.
[24]. Silva, L. (2000). Beyond State Control: Industrial Development And Economic Reforms. International Journal Of Economic Theory, 16(1), 97-115.
[25]. Smith, Adam. (1985) A Riqueza Das Nações. Ediouro
[26]. Stiglitz, J. E. (2012). The Price of Inequality: How Today's Divided Society Endangers Our Future (p. 74). London: Allen Lane
[27]. Stiglitz, J. E., & Greenwald, B. C. (2014). Creating A Learning Society: A New Approach To Growth, Development, And Social Progress. Columbia University Press.
[28]. Tigre, P. B. (1985). Intervenção Estatal E Desenvolvimento Industrial. Editora Universitária.
[29]. World Bank. (2021). Research And Development Expenditure (% Of Gdp) - Brazil. Retrieved From Https://Data.Worldbank.Org/Indicator/Gb.Xpd.Rsdv.Gd.Zs?Locations=Br .