

DOSSIER:

TECHNO-ECONOMIC PARADIGMS AND TERRITORIAL RECONFIGURATION

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PARADIGMAS TÉCNICO-ECONÔMICOS E RECONFIGURAÇÃO TERRITORIAL

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This dossier of studies and reflections on technological changes and territorial reverberations within contemporary capitalism seeks to draw attention to the recent performance of the Brazilian economy and its insertion into the global economy in the face of these changes, whilst considering the possibility, or even the capacity, of Brazil to reorganize itself so as to adopt an agenda that favors its insertion triggered by the technological changes. These are, undeniably, times of accelerated productive and technological changes, demonstrating profound ongoing territorial renewal, the dimension and consequences of which, in certain cases, have not yet become fully consolidated.

The aim of the reflection proposed in this dossier is to help broaden the visions of processes, frequently ongoing and as yet unestablished - in transition, thus, i.e., a situation in which the old has not yet died and the new has not yet defined itself in its entirety. The intention is therefore to clarify the terms of this transition, its characteristic elements, the most visible territorial and sectorial impacts, as well as the elements of public policy associated with it.

The proposal for organizing this project dossier of the current issue of the Anpur journal (RBEUR) has been set out into three central acts or temporalities. Act one deals with the proposals of the set topic approached by the authors. Act two reveals the problematization of the topic in the face of the national debate, based on the articles selected for the dossier. Finally, Act three indicates the lessons learned, with a conclusive balance of the approaches presented herein and perspectives for a new research agenda on the topic.

ACT ONE – PROPOSALS OF THE DOSSIER TOPIC

Accelerated transformations along the pathways of the global economy have become increasingly more frequent and intense over the past three decades. The technological revolution in communications, with accelerating impacts on the means of transportation and the financial system, has modified the mode of capitalist decision-making regarding the forms of investment in tangible and intangible assets. Territories, economic sectors, companies and individuals have begun to act on the continuous scrutiny of global information and assessments in real time on profits, returns and alternative gains.

The establishment of a pattern of economic activity, termed techno-informational, based on information and communication technologies (ICTs), has undermined development models geared towards the production of primary goods, intensive in natural resources, and also to classical industry, traditionally intensive in scale and/or labor.

The historical view on the paths of modern capitalist nations has always affirmed that the stage of development is achieved by the transition of their economies from crop farming or mixed crop and

livestock activities towards industrial production. This was the path taken by Western European countries, such as the UK, France, Germany, Italy and Belgium, as well as the US and Japan. The present moment - which, however, is not so present, since it actually began, at least more visibly, in the 1970s - is a new, accelerated transition towards a process of reducing the participation of the industrial sector in developed economies and a concomitant increase in the share related to tertiary or informational activities.

It should be remembered that the debate on structural transformation or productive restructuring gained tremendous impetus during the post-World War II period with pioneering development studies for developed countries by prominent authors, such as Lewis (1954), Myrdal (1957), Kuznets (1971) and Kaldor (1966, 1970), and by Prebisch (1949) and Furtado (1961) for Latin American countries. Broadly speaking, these authors aligned themselves with the view that national development should be sustained by transforming economies based on agricultural sectors, with low to medium-productivity, into more highly productive industrial economies. Alternatively, it could be stated that productive diversification would lead to the increasing incorporation of more capital-intensive and higher technology sectors. Industry became the growth engine of national economies due to the positive externalities generated by the economies of scale, which are in themselves capable of generating an impetus upon other sectors upstream and downstream, in the form of purchasing inputs, equipment, labor and services.

Unlike in developed economies, in the periphery countries of capitalism, which have not become sufficiently industrialized to increase their per capita income/output to a level closer to those observed in Europe and the US, the insurgency of an early deindustrialization process is shaping up with dramatic consequences. Per capita income has been stagnating along with the ability to generate highly-paid jobs. The external competitiveness of their economies has declined and several countries facing this process, including Brazil, according to certain experts, have been experiencing a process of regressive structural transformation.

The process of productive restructuring, through which Brazil's economy has passed, at least since the beginning of the 1990s, in the form of deindustrialization and sectorial reprimarization, has not only been the reason for extensive scrutiny, but also for academic controversy. Studies such as that of Bonelli, Pessoa and Mattos (2013), have argued that Brazilian deindustrialization would conform in a similar manner to the processes in developed economies. This would not constitute a serious problem, except for the fact that the general productivity of the Brazilian economy, over the last two decades, has remained below international standards. Contrary to this stagist vision is, amongst others, the work by Cano (2008 and 2012), which warn of a decrease in industrial activity associated with a reduction in the technological content of the national export pattern. For Cano, deindustrialization in Brazil is premature and has occurred just when the national per capita income remains at a very low level, compared to the levels observed in international experiences.

Certain more definitive conclusions may already be drawn, although, on the basis of much more recent studies. If, in the experience of developed countries, deindustrialization manifests through being driven by a higher growth of tertiary activities as a proportion of the national product - i.e., by changing the demand patterns of its consumer markets towards progressively more services and goods of

informational content and less of traditional industrialized goods - in the economies of developing countries, such as Brazil, a reduction of the relative importance of industrial output is due more to the loss of structural competitiveness of this sector than to the expansion of its tertiary activities.

In Brazil, as several researchers have indicated, deindustrialization has on account of a reduction in its competitiveness, consubstantiated in: a) a loss of export capacity accompanied by a wave of imported components into the productive process (Cano, 2012, Sampaio, 2016, Morceiro, 2016, Sarti & Hiratuka, 2017); b) a reduction in the mean sectorial productivity (Galeano & Feijó, 2013, De Negri & Cavalcante, 2014 and 2015, Arend et al, 2016); and c) a re-specialization in sectors of lower technological intensity and/or natural resource-intensive (Sampaio, 2015, Morceiro, 2016, Vital da Costa & Neves, 2016, and Monteiro Neto & Silva, 2018).

Recent structural changes, especially those resulting from industrial restructuring, with a relative loss of industrial output within the total national economy, not only reveal the loss of importance in this movement of economic transformations, but also the decline of its centrality such as, regionally, a territorial deconcentration of industry from São Paulo to the Southeast, South and Midwest, and a lesser degree to regions in the North and Northeast. Industrial structure over the last twenty years, in the regional context of the country, has been marked by an expansion of natural resource-based industries in all macro-regions, except in the South. In contrast, the industries of differentiated and/or science-based technologies characterized by being more technical and knowledge-intensive, have presented difficulties in expanding in all regions

In view of the fact that this diagnosis has become established within academic discussion, there is naturally a sentiment of concern regarding the course being taken by the regressive process of productive restructuring, and there is a certain speculation as to the possibilities still open for reversing this disturbing trajectory. On the Anpur website, where an open invitation was placed to submit papers to this dossier, it was stated that: "At the present time, the following question may be posed: Is the nation's economy capable of incorporating this new technological standard, and will the new industry thereby promote (or not) a new cycle of economic development for the country. And if so, what impacts will it bring about on cities and citizens? Within this cycle, what will the territorial repercussions from the productive activities tend to be?"

These questions refer to the reflection that it is questionable whether Brazil is still able to contain or reverse its decline in the production and competitiveness of its most important industrial sectors, such as the territorial implications – regional, metropolitan, the network of cities and environmental - on the prevailing framework of socio-economic disparities, which are a source of concern for the debate on development policy. For no other reason therefore, bar that of general provocation, the invitation also contained the question: "Of what significance are the interregional disparities acquired within a scenario of unstable and unpredictable forces?" Such as those that have prevailed in the current scenario.

Taking into account Brazil's regional economic dynamics, it may be verified that, starting in the mid-2000s, three more outstanding vectors of territorial development were established. One derives from the discovery of the pre-salt oil reserves along the coast of the states of Rio de Janeiro, São Paulo and Espírito Santo, for which the federal government had determined that Petrobras would take a leading role in

organizing a cycle of investments capable of ensuring a significant role for Brazil on the international oil market. Given the high investment resources expected and the stimulus for expanding the productive chains linked to petroleum (chemical, petrochemical, capital goods, etc.), this vector of expansion in the Brazilian economy contained all the elements to promote a fresh re-concentration of the gross domestic product (GDP) in favor of the richest region of the country, the Southeast.

The second vector of territorial development is related to a growth in the international demand for agricultural commodities and meat from the Midwest of the country and has indeed assisted in accelerating the participation of this region in the Brazilian economy and, therefore, in promoting the regional productive deconcentration.

Finally, the third vector is related to federal-level policies to stimulate infrastructure investment in the North and Northeast regions - such as Belo Monte (PA), Santo Antônio and Jirau (RO), Trans-northeastern Railroad and work for the transposition of the São Francisco River - through expanding resources of regional policies (constitutional funds). These policies, in turn, were greatly potentialized by social policies and by transfer payments to the poor, the impact of which was to reduce poverty and inequality and increase income and the generalized product throughout these regions of the country. As may be perceived, vectors of economic expansion were established in the territory with opposite directions, favoring either deconcentration, or reconcentration.

Marks of the economic policy in force during the period 2003-2015 were imprinted across the Brazilian territory, and which, at this moment in time, should be brought to light. While these efforts were not always capable of reversing established, undesirable trajectories within the national productive structure, they nonetheless brought about territorial repercussions that should be included in the explanatory framework of the prevailing economic transformations.

Mention should also be made here of the federal minimum wage valorization policy, increasing the real income of large sections of the Brazilian population (social classes C and D); transfer payment policies to families in extreme poverty, such as the *Bolsa Família* Program, rural pensions and Continuous Cash Benefits (BPC); the expansion of federal public credit for the housing sector, directly stimulating the construction industry and the chain associated with it; plus the expansion of public credit for tertiary, agricultural and industrial activities as in the case of the Banco do Brasil, BNDES and regional development banks, such as the Banco do Nordeste (BNB) and Banco da Amazônia (Basa); and finally, the expansion of federal public investment in transport and energy infrastructure, generating positive externalities for private enterprises in beneficiary regions.

These efforts, which have been analyzed by the specialized academic literature, have resulted in a movement of productive activity associated with non-durable and intermediate consumer goods demanded by the expansion of income and employment of the lower-income classes of the population. The most traditional branches of activity already present in the national productive structure are those that have benefited from the major growth impulses.

A further aspect of the boost to economic growth and productive restructuring has been the growth in international demand for agricultural commodities, meat and minerals, with significant impacts on agriculture in the Midwest, Southeast and South.

With market stimuli towards a re-specialization in primary activities, the Brazilian economy began to grow more because of the expansion of external income and became less based on internal dynamic forces. The national export agenda, which until the mid-1990s involved more industrial products to the detriment of agricultural-mineral products, has changed its composition over recent years with a sharp decrease in the share of industrial goods and/or high value added. In fact, the industrial structure has made a strong move towards importing inputs and intermediate goods with a reduction of the internal component of generating value added, as a number of studies has demonstrated (Cano, Sampaio).

A rich and varied set of economic-territorial phenomena may currently be observed in Brazil. Its future evolution, however, contains high degrees of indeterminacy regarding the trajectory of productive disparities. Will Brazil proceed towards the vector of reconcentration associated with a possible resumption of industrial strength in its more developed region? Or, conversely, will the vectors of deconcentration outweigh the cost of productive reprimarization and establish low productivity in the industrial activity of the target regions of regional policies?

This dossier was designed precisely with the aim of strengthening the debate by questioning the prevailing paradigms and stimulating proposals for new perspectives, reflections and theoretical approaches on existing knowledge. Thus, a number of questions, to guide rather than to impose limitations, have been put forward in order to stimulate:

- What may be said with respect to the current stage of Brazilian development, and its possibilities and limitations for strengthening the techno-informational paradigm both in Brazil as a whole and across its regions?
- Faced with the ongoing productive restructuring, what meanings and directions may be perceived for territorial reorganization and for regional disparities?
- How is the new industrial map of Brazil?
- Restructuring or deindustrialization: what are the territorial impacts and implications for the country?
- How is the regional distribution of the country's economic structure?
- What are the impacts of the so-called commodity boom (agricultural and mineral) in the configuration of the different regional economies?
- Does the recent growth cycle (2000-2015) in Brazil indicate re-significances in the networks of cities?
- Within this context of productive reconfigurations, is the Brazilian Atlantic coastal urbanization still the favored territory for economic and population flows? What new demographic facts have been disclosed?
- How should productive and regional policies be guided, i.e., government planning, in the current context, for a new path of development?

ACT TWO – THE DIALOGUE BETWEEN THE ARTICLES AND THE DEBATE ON BRAZILIAN ECONOMIC AND REGIONAL DEVELOPMENT

A first group of articles undertakes an analysis of the current technological changes and the repercussions within the Brazilian and regional economies. It also

presents a balance of the economic transformations during the period between 2000 and 2015 in the Brazilian economy dictated by the productive changes and their regional impacts.

The article “The science and technology race and productive re-structuring: geoeconomic and geopolitical impacts”, by Clélio Campolina Diniz (Cedeplar/UFGM), provides a significant contribution towards understanding development as a strategy of structural change in contemporary capitalism. Diniz acknowledges the emergence of a new geoeconomy in which countries of Asia (China, South Korea and India), where efforts in technological development in industrial activities have been high, begin to account for an expressive share of the total product, of the industrial product and of the world’s industrial exports. At the other end, countries in Europe, besides the US and Japan, have lost a relative share in the world economy.

Within this framework where countries are repositioning themselves in the world economy, the science and technology race has become a central element in the quest for technological prominence. Progressively, developed countries have increased spending and strategic effort so as to create and consolidate knowledge- and technology-intensive sectors. According to Diniz, this international framework is very challenging for Brazil: on the one hand, there is an ongoing process of early de-industrialization associated with a loss of the external competitiveness of its productive structure and, on the other, R & D spending, which represents the effort involved in promoting innovation, has been effected more by the government than by the national private sector. The article also dresses the territorial implications, emphasizing the difficulties faced by less developed regions - particularly the Northeast region, very populous and with more pronounced socioeconomic deficiencies - to adapt to this context of major technological accelerations.

The author fears that, in Brazil, the regional question will once again encounter a path of economic reconcentration in its more developed regions, more able to attract the most technologically advanced sectors: “As the greatest economic density and science and technology infrastructure is predominantly located in the Southeast and Southern regions of Brazil, the potential impacts of productive restructuring may affect the process of economic and industrial deconcentration within the country, especially for the heavily-populated and economically backward Northeast.” (p.254). The key to the discussion put forward by Diniz lies in his attention to changes in the techno-economic paradigm on a global scale, and to the ways in which countries have come to terms with this in order to maintain and/or seize frontrunner positions in the science and technology race. Understanding Brazil’s position in the face of this race - laggard and inconstant - plus its possible territorial refutations - with a tendency, according to Diniz, towards increasing regional disparities - must be assimilated with an important alert addressed to current development policies in Brazil.

Aiming to particularize the Brazilian context of regional development and seeking to take stock of the transformations, which occurred during the period 2000-2015, there are the articles entitled “Productive and economic changes and territorial reconfiguration in Brazil at the beginning of the 21st century” by Carlos Brandão (Ippur / UFRJ) and “The Productive Deconcentration between 2000 and 2015: A new virtuous dynamic?” by Sílvia Moraes and Marília Steinberger (UnB researchers). These analyses help to reflect, in the first case, on the productive and territorial transformations generated as a result of establishing vectors of public policies

(macroeconomic, social and infrastructure) in the new-developmental period through which Brazil has passed. In the second case, the analysis suggests that, contrary to expectations, “the combination of factors, such as political-institutional reorientation, the economic growth cycle and the favorable international context, amongst others, facilitated the emergence of a new virtuous dynamic of productive deconcentration in the period between 2000 and 2015”.

Let us observe more closely the salient aspects of each of the abovementioned studies. Brandão informs that the territorial changes perceived in the period 2000-2015 were significantly determined by the reconfiguration of neoliberal capitalism from the previous decade: “Thus, at some extent, transformations in the Brazilian regional landscape throughout the 1990s were more effective to boost the evolution and deconstruction of differentiated regional impacts caused by the economic crisis and by conservative options available for macroeconomic policies, than the restructuring processes” (p.263). In the following post-2000 phase, the benign external context for Brazilian commodity exports enabled a certain leeway for advancing credit policies and infrastructures conducive to regional productive deconcentration. Brandão mentions that, “The Brazilian economic geography went through substantial changes, mainly between 2004 and 2014, even when it was not guided by clear industrial strategy, because the private and public decisions were little, or not, guided by Plano Brasil Maior (Bigger Brazil Plan). Massive investments of private capital supported by the State, mainly by BNDES, were made in agribusiness, in the mining sector, in the automotive industry and infrastructure. Massive investments were in course in automotive, steel, oil, naval, refinery and mineral extraction facilities, etc.” (p.266). With so many diversified productive inversions, the territorial impacts of its application still require a more qualified evaluation, capable of promoting an understanding as to which parts of the national territory the productive and technological structures were guided. Brandão has innovatively suggested a typology of territories impacted by orientations, on the one hand, the market forces - both internal and external - that are active in Brazil and, on the other, the vectors of government spending and investment planned by public policy. This typology proposes, on an exploratory basis, the investigation of five specific territories, which could account for the most representative economic dynamics over the national territory during the period.

When suggesting territorial cross-sections, the text signposts significant changes under way on the map relating to Brazilian regional issues. Most notable is the performance of the Midwest economy, due to the stimulus of exportable commodities and, secondarily, the ongoing impacts of macro-operations such as the pre-salt oil reserves (in the Southeast), the Trans-northeastern railroad and the transposition of the São Francisco River (in the Northeast), amongst others. Along with the concern of discerning new possibilities in favor of a pathway of regional productive deconcentration in Brazil, the author enlightens the debate regarding the strength and direction of governmental planning aimed at changing established territorial dynamics.

On the other hand, the contribution to this collection by Moraes and Steinberger (Geography/UnB) demonstrates an important methodological aspect of interest for studies on regional deconcentration in Brazil. This paper opens a direct dialogue with at least two central theses of the recent regional debate: first, with the approach by Cano (1985) and Diniz (1993) and the preference to concentrate in the South-Southeast,

and also with that of Pacheco (1998) on the fragmentation of the national internal market. The authors raise two questions: Did productive deconcentration continue in Brazil during the recent period of 2000-2015? And if in fact it still exists, what is the current most characteristic form that it takes on? Two territorial breakdowns were used to obtain the elements in order to formulate a response: the inter- and intra-state scales of productive deconcentration.

By evaluating data on growth rates and the relative participation of state GDPs, the authors verified the feasibility of a convergence process of state GDPs between 2002 and 2015 by the highest growth rates in small state economies and located in low development regions, i.e., with high cumulative GDP growth. In descending order, these would be the states of Tocantins, Mato Grosso, Piauí, Acre, Rondônia, Roraima, Maranhão, Amapá, Mato Grosso do Sul and Amazonas. They also showed that the five most important state economies (São Paulo, Rio de Janeiro, Minas Gerais, Rio Grande do Sul and Paraná) accounted for 64.7% of the national GDP in 2002, a percentage that fell to 61.2% in 2015. On the other hand, the remaining 22 states rose from 31.9% in 2002 to 35.3% in 2015. Therefore, economic growth would be occurring in states outside the preferred South-Southeast region: «Thus, it may be inferred that the greatest economic dynamism of the 2000s, at least until the recent recession after 2014 erupted, not only signals the advancement of a more virtuous moment of productive deconcentration, but also seems to have curtailed some of the real concerns regarding a resumption of productive polarization in the Southeast of Brazil, especially in São Paulo» (Moraes and Steinberger, p. 287).

The second thesis begins by investigating the existence of a fragmentation process within the national market, in which, according to Pacheco (1998), the weakening of the state and the productive-financial opening of the Brazilian economy should contribute towards the loss of links within the internal market. In this context of globalized relations, Pacheco suggests that the Brazilian regional economies would be more related to world trade than to the national market.

Moraes and Steinberger have organized their intervention in the debate by evaluating the ongoing regional trajectories with a view to identifying state-level processes to interiorize development and productive deconcentration. According to the authors, if there was evidence of the interiorization of development, then state governments, in their own particular manner, would be able to forge growth trajectories within their territories, so that governmental planning actions would not have been entirely lost. In this case, Pacheco's thesis would not be confirmed, at least not completely. In the study, the authors have verified that, during the period between 2000 and 2015, such trajectories were considered benign in academic studies on the state economies of Ceará, Goiás, Pará and Paraná, where the expansion and establishment of productive centers were observed outside the metropolitan regions or state capitals. However, it is pointed out that, in the experiences of other states, such as Bahia, Pernambuco and Rio Grande do Sul, for various reasons, the metropolitan areas still remain heavily polarizing territories within the respective states. Despite the unfavorable results regarding territorial deconcentration within these last states, the general situation across the country does not reflect an exacerbated reconcentration of the economic activities in metropolitan regions and established capitals. It was this fact that led them to pose the following question: «Would the new dynamics of deconcentration in the 2000s actually contain traces of the 1990s, which indicated

the risks of an eminent productive repolarization in the Brazilian Southeast and to an evident fragmentation and reprimarization of the national economy? (p.293).

The article entitled “The Brazilian regional industrial exports: spatial analysis of the first decade of the 2000s”, by Daniela Schettini (IRI/USP), proposes a reflection on the spatial configuration of industrial exports by discussing the role of agglomerations in the industrial exports of Brazilian municipalities, seeking indications on the competitiveness of regions and their impact on economic development.

The article reaffirms that industrial exports, in regional terms, are considerably uneven, with a strong concentration in the Mid-Southern region of the country, with some dislocations towards the Midwest. Using a methodology of exploratory space analysis and a probit model, the influence of agglomerations on the probability of exporting was estimated. The conclusions derived from the adopted method indicate that agglomerations increase the probability of an export region.

The sectorial concentration is also high on the export agenda and particularly occurs amongst products linked to the beneficiation of primary activities. Thus, amongst sectors with the greatest potential for export growth are those with the greatest technological content, such as machines, electrical and electronic materials, and communication and computer equipment, which are concentrated in the Mid-South of the country.

It may be verified that, given the regional disparities, the other states that continue to export do not benefit from the positive externalities generated in these agglomerations, making the activity of exportation more arduous.

In seeking to assess the competitiveness of Brazil’s regions and the impacts on economic development, in addition to a possible trend of convergence in regional disparities, it is highlighted in the text that, “If exporting is a source of productivity growth and stimulates economic growth, it should be the target of policies aimed at encouraging companies to enter and/or remain on the international market” (p. 299).

A second group of articles addresses specific sub-regional dynamics, i.e., the changes that occurred in the Southeast with the establishment of new vectors of territorial development. Of particular note are the specific cases of the sugarcane agribusiness in São Paulo and the petrochemical complex in Rio de Janeiro, as well as the expansion of commodities in the network of Midwestern cities.

The two articles regarding the São Paulo economy must surely prompt reflection of the ongoing transformations in what is the main state economy in Brazil, and which was the dynamic nucleus of the country’s century-long process of industrialization between 1870 and 1980. After passing through a phase of accelerated deindustrialization, associated with a strengthening of the financial and agroindustrial sectors, what are, in fact, the productive forms that have been consolidated within this state throughout recent periods? Moreover, given their relative weight in the national economy, what are the implications for regional development given the current productive restructuring of São Paulo?

The article “The productive restructuring and consolidation of the new vectors of territorial development: the case of the Perimetrical Development Vector of the São Paulo Macrometropolis”, by Anderson Dias de Almeida Proença and Wilson Ribeiro dos Santos Jr. (PUC-Campinas), reveals the change in the territorial planning strategy of the state of São Paulo by abandoning the concept of industrial development poles, replacing them with the idea of vectors of interregional development or «unifying-

complex regionalization», the territory of which, for the purposes of planning, is contemporaneously known as the « São Paulo Macrometropolis” (SPMM).

In the view of the authors, this new conception of territorial planning has broadened the regional asymmetries between the metropolitan and non-metropolitan areas of the state of São Paulo. The SPMM, structured in a system of economic flows with a system of services organized in a network, made possible by key infrastructures for circulation, has generated a spatial organization of the urban network of which it is composed. This territory, in 2010, expressed an unprecedented level of concentration, representing 83% of the GDP and 74% of the state’s population.

The consolidation of this vector stems from the large volume of investment in interregional transport infrastructure capable of providing conditions for attracting and locating the modern segments of contemporary industry. It has resulted in the configuration of a productive corridor, in which the geography of productive structures, logistics networks and urban occupation has been reorganized. The most modern and productive sectors have been concentrated within this expanded territory. It may also be verified that there is a predominance of economic activities based on technoscientific knowledge and information, resulting from the attractive power generated by a greater density of technological infrastructure.

In the territorial reorganization of the SPMM, a new vector of perimetrical development may be identified, with the perspective of establishing a technological axis, which has come about so as to intensify the economic-productive links towards the immediately surrounding metropolitan regions of Sorocaba, Campinas and São José dos Campos. Its vital force is to establish significant amounts of investment in branches of the new economy, which, increasingly, require specific support in relation to transport and communications infrastructure, as well as to generating knowledge and more skilled labor.

Indeed, the text in focus helps to understand the strategic change of planning at a state level, according to which the main wager for the growth of the São Paulo economy was to be anchored in productive sectors linked to the economy of knowledge, in turn located within a great urban sprawl that goes beyond the metropolis of São Paulo (the Metropolitan Region of São Paulo, RMSP) and is linked to other surrounding MRs, equally endowed (and interconnected) with dense transportation infrastructure, communications connections and, mainly, knowledge assets represented by the country’s most developed education and research systems. This planning strategy - the territory of the São Paulo Macrometropolis - would thus respond to the reversal of the de-industrialization process of the MRSP and create an environment for productive restructuring on a consequent basis with the need to enter into the new productive paradigm of information and knowledge technologies.

In our understanding, the authors are warning that this territorial cross-section for planning purposes, by privileging a more representative portion of the state economy of São Paulo and allocating strategies for infrastructural investments and knowledge, will have the tendency of intensifying the economic disparities within the state itself.

A focus on the role of the sugarcane agribusiness in São Paulo is presented in the article “Regional hierarchies in the sugarcane agribusiness: border movement and the centrality of São Paulo” by Fernando Campos Mesquita, Ricardo Castillo, Ivette Luna and Henrique Farias Santos (UNICAMP). The article highlights the different roles of

command in the years after 2000, that the São Paulo sugarcane agribusiness played in the sugar-energy sector in the dynamics of the agricultural frontier directed towards the Midwest, with particular impacts on the network of cities that were formed at the same time in the south of Goiás, eastern Mato Grosso do Sul and the *Triângulo Mineiro* (the Minas Gerais Triangle).

The article describes how these impacts have accentuated the hierarchies of the sugarcane regions due to the political and technical command of production in São Paulo, where the headquarters of the large company conglomerates from the sector are based, thereby centralizing inside the state all decisions that affect the units of the sugar-energy agribusiness that make part of the sector and that are located outside São Paulo. It is also emphasized that the generation of technical knowledge is essential for industrial and agricultural production within this segment. The impacts described demonstrate how more complex technical knowledge and strategic decision-making are new vectors of regional inequalities in Brazil.

The main argument of the article lies in the relationship between power and the production of knowledge and the impacts on regional inequalities, which, are therefore, “not restricted to the distribution of productive activities, but involve the manner in which intangible assets of knowledge useful for the process of innovation and power relations are organized throughout the territory” (p.331) thereby resulting in a heterogeneous, hierarchical movement.

According to the article, if the metropolis of São Paulo loses its centrality in production in relative terms, it gains in political and technological centrality. With this, its importance in the sector has increased as it qualifies its position in the territorial division of labor.

The petrochemical complex in the development of Rio de Janeiro has been analyzed in the article “Boom, Burst, and Doom: The Petrochemical Complex of Rio de Janeiro as Catalyzer of Urban-Regional Development”, by Robson Dias da Silva (UFRRJ) and Clara Irazabal Zurita (University of Missouri). This paper discusses regional development, in the peripheral context of the Metropolitan Region of Rio de Janeiro, based on investments in activities derived from natural resources, in the Rio de Janeiro State Petrochemical Complex (Comperj), which constituted the largest individual investment in the history of Petrobras.

The article addresses how the productive structure, on a subnational scale, has been affected, considering aspects of both the regional and urban economy. It should be noted that this investment was configured as a perspective of productive diversification with urban densification, brought about by changes in the regulatory framework and by the discovery of large oil reserves, when a perspective was then envisaged of transforming the domestic production scenario.

Despite the importance of Comperj as a vector of regional development, due to the different reasons presented throughout the text, the complex was unable to promote and recover the social and economic backwardness of the region. Indeed, it ultimately became a regional debacle.

The starting point adopted by the analysis is the role of Comperj as a strategy to increase Brazil’s productive matrix, to break economic stagnation and as a perspective for social improvements, as the result of a greater outreach of the oil industry’s potential (p 353). This reflection highlights the limits and challenges of industrialization driven by megaprojects in peripheral regions and highlights the need to reflect more deeply

on the role of large industry as a vector of development in peripheral and economically depressed metropolitan areas.

Finally, a third group of articles addresses new knowledge-based sectors and their impacts. In this block, the first article, entitled “Alignment in regional networks: towards new metrics to assess the effectiveness of technology policy”, by Janaina Oliveira Pamplona da Costa (IG/UNICAMP) analyses the potential of the networks amongst economic agents in the diffusion of knowledge and in the production of innovations. More precisely, it seeks to identify the influence of network governance at a regional level on the effectiveness of public technology policies to promote innovation.

For this, a research was conducted in the network of software innovation agents in Recife, Pernambuco. In a sample of 47 interviews, the research was restricted to 17 software companies in Recife, of different ages, sizes and production activities. As stated in this study, there is a recognition of the limited generalization of the research results. However, with regard to the sample space, certain conclusions were obtained.

According to the analysis performed, using the methodology described in the article, the formal network interactions between innovative agents in the area of software in Recife are still at a level of intermediate diffusion, since some subnetworks are less developed and ties between the agents of this network are restricted to the state capital, Recife, with no external links. Although the business subnetwork has been classified as consistent, the subnetworks related to skills and technologies were found to be of intermediate consistency; on the other hand, the financing sub-network was classified as inconsistent.

In the researched environment, the main local actors, interested in supporting the development and growth of local software companies, were active in the network and revealed the existence of endogenous patterns: closed, mainly with links between agents in the region itself (intraregional).

The research demonstrates that the absolute number of innovations produced by the companies studied is substantially large for a region where the software industry is relatively new. However, few of these innovations are on the technological frontier. Only one of the companies interviewed had introduced innovations to the world. Most of the innovations were only new to the company involved, and not a fundamental innovation, which, according to the study, suggests adherence to an imitation strategy. A further suggested interpretation is that since many of these innovative companies were small, their innovation strategies would be based on a response to customer demands, which do not involve sweeping innovations. It was finally concluded that the development of local networks has increased the effectiveness of policies aimed at improving the local performance of innovation.

The great merit of this article lies in suggesting a structure for evaluating performance, both for the productive arrangement and for the individual companies, thereby helping to reflect on the ways in which the capacity of public policies could best be guided towards stimulating knowledge-intensive company systems. It is a well-known fact that regional public banks, oriented towards regional development, have difficulty in accepting credit litigations from software and information technology companies. This situation needs to be reconsidered in view of the necessary requirements for revitalizing the regional productive structure in Brazil.

In the article “The space reconfiguration of the call center segment in Brazil

seen from the implementation of the teleactivity centers in Paraíba”, by Roberto Veras de Oliveira and Ana Carmen Navarro de Moraes (UFPB), the data used for analysis illustrate the territorial reconfiguration trajectory over the past decade for the call center segment, with a greater emphasis in the Northeastern region.

The text reports that the processes of spatial relocation of teleactivity centers in Brazil occurred as a result of searching for lower labor costs and for government incentives, in a process of transferring/expanding call center units to smaller cities and regions, particularly in the Northeast.

The results of the analysis indicate that, although this segment represents 30% of the total active links of telemarketing operators in establishments with one thousand or more employees, the company headquarters and decision-making centers nonetheless remained located in the Southeast. This result is confirmed by the role of public authorities in capturing investments that generate formal employment when various types of fiscal and territorial incentives are on offer.

Due to advances in new technological instruments for interaction, such as Digital-to-Analog Converter (DAC), Customer Relationship Management (CRM), Voice over Internet Protocol (VoIP), data surveillance, web and text analysis, robotic chat, social networking etc., a new opportunity has arisen from 2016, given the perspective that call center companies in the Northeast have continued to invest and implement technological innovations.

Over recent years, the companies installed there have signaled that they have already reached their peak of expansion within the current format, thereby entering a new phase, marked by the use of artificial intelligence (robotization) and the dissemination of self-service applications. Therefore, this would not be the “end” of call centers, since the companies work with expansion plans that extend up to 2020, directing technological investment, with the aim of incorporating technological innovations for its business clients.

ACT THREE – LESSONS LEARNED AND SUGGESTED TOPICS FOR FURTHER STUDY

The collection of texts in this dossier have brought very particular contributions to the debate on the productive and technological transformations taking place in Brazil: from a broader and more panoramic viewpoint of capitalist development across the world, in the article by Diniz, and reflections on recent territorial changes in Brazil offered by Brandão, Moraes and Steinberger, to an analysis of Brazil’s export potential by Schettini. Taken together, they help to position the inescapable difficulties of the national economy’s in adjusting to the techno-productive transitions underway in the global economy. They stand as a warning that the regressive trajectory of productive restructuring, after almost two decades of emergence, has become a permanent element of recent development. It is therefore neither a transient phase, nor one that may be easily overcome. It requires efforts of planning and of re-recruiting instruments and resources both from a medium and long-term perspective.

At the other end of the survey, with a narrower territorial and/or sectorial cross-section, subsequent articles indicate the fact that there are innumerable new productive experiments, planning interventions and wagers on technological vectors.

However, these experiments are usually slow to succeed, are small-scale, and/or remain as constricted attempts to what strategic national interest should/could stimulate.

Moving on from the content presented by the collection of studies gathered together in this dossier, and taking this opportunity, we also understand the need to entice our readers towards certain consensual elements, as well as the remaining crevices and fissures of knowledge regarding the proposed theme, with the necessary future developments on the part of the academic community.

On the one hand, we understand that there are consistent elements for a consensus on the productive transformations in Brazil, which should be judiciously assumed and that fall in line with the research contributions contained within this document. These are listed below as follows:

- The evidence tends to support the existence of an early deindustrialization process involving the loss of international competitiveness. On the one hand, it may be confirmed that the complexity of the industrial production structure has diminished, towards an opposite direction to that expected from a development strategy with increasing per capita income and the country's participation in international trade, whether this complexity is viewed, for example, through approaching the type of economic complexity (Gala, 2017) or through calculating the productive density index (VMI/GVIP) (Monteiro Neto and Silva, 2018), or through sectorial interdependence patterns (input-output analysis) (Vital da Costa e Neves, 2016), or even through the gap between the total sectorial demand and total production (Morceiro, 2016). On the other hand, a reduction of Brazil's industrial complexity may also be observed in the different sectorial cross-sections investigated, either by using the "competitive factor" typology, in which industrial groups are organized "based on natural resources, based on labor, scale intensive, differentiated and knowledge intensive" (Monteiro Neto e Silva, 2018); or by "technological intensity" (as in Sampaio, 2017, Morceiro, 2016 and Nassif, 2008); or by the typology of industrial groups based on processed agricultural commodities, traditional industry, industrial commodities, innovative industry and others (Vital da Costa and Neves, 2016).
- In Brazil, the regression in productivity is combined with a high heterogeneity of behavior amongst the branches of activities and with a reduction or low growth of mean labor productivity (VMI/EP or GVIP/EP). This was confirmed in the studies organized by De Negri and Cavalcante (2014 and 2015) which evaluated the general and sectorial productivity of the Brazilian economy, roughly covering the period between 2000 and 2013. It is clear that there has been a poor evolution in productivity levels in comparison to those presented by several other countries, and also in relation to the technological frontier (the United States). In another perspective, evaluating the general productivity of Brazilian industry during the period between 1996 and 2015, measured by the VMI/Employed Persons, Monteiro Neto and Silva (2018) reported a poor evolution with the 100 Index of 1996 reaching 98 in 2015. Regionally, these authors also encountered low productivity associated with high sectorial and regional heterogeneity, i.e., the same branches of activities with high labor productivity differentials in different regions. In the period 1996 to 2015, the productivity growth rate for total industry (extractive and manufacturing) in the North, Northeast, Southeast, South and Central West regions was, respectively,

-1.8%, 0.3%, -0.1%, 0.0% and 1.3%. On the other hand, the performance observed in the manufacturing industry in the same period was even worse for the same regions: namely, -1.6%, 0.2%, -0.6%, -0.1% and 1.3%, respectively.

- The debate in some academic circles regarding the idea that Brazil is a closed economy illustrates that the numerous, successive economic policy measures implemented, at least over the past two decades, related to both trade and financial opening, the reduction in foreign trade barriers, facilitated tariffs, and an exchange rate policy favorable to integration into global chains, have resulted more in expanding import capacity and less in the national exporting potential. With its productive structure heavily based on transnational corporations (TNCs) in the major capital- and technology-intensive sectors, Brazil has depended on the decisions of parent companies (in developed countries) on the role of the country in the productive structure of the global chains. What has taken place is an expansion of Brazilian international trade through the preponderant means of linking imports to value chains. The export capacity related to goods of high added value and/or high technological content in Brazil was simply not correctly activated during this period. On the contrary in fact, the exports that expanded were those of agricultural commodities and minerals.
- The regional heterogeneity of development as a dominant characteristic. Exhausted by the strength of the two prevailing growth vectors in the regions after 2015 - the international demand for commodities and government policies for payment transfers to poor families and public credit - regional economies have already presented a decline in their domestic markets, unemployment and a fall in tax revenue. In this recessive framework and indeterminacy of growth capacity, the structural elements that guide the debate on productive dynamics return to the catalog of national concerns. Even in regions with a high economic growth, the productive structure continues to be based on areas of activity linked to natural resources and labor availability, such as in the North, Northeast and Midwest. As previously mentioned, the general productivity in each regional economy presented little growth during the period from 1995 to 2015, with this indicator demonstrating a predominance of intense variations amongst the regions.
- The long and precarious productive restructuring in Brazil. This should possibly be the main message brought about by the topic of this current dossier, which is why it deserves to be duly registered. Since the crisis of the 1980s, at least, through the macroeconomic reforms of the 1990s - financial, productive and commercial - and the growth during the years between 2005 and 2014, the technological restructuring of national productivity has been agonizingly slow. The most distinctive characteristics of this have been that the industrial sectors have lost their centrality in the productive dynamics, the export capacity of high value-added goods has been reduced, agroindustrial commodities have depended on external demand, and there has been an inability to create and establish a nucleus of technological development to stimulate a renovation of the productive system.
- The long and weak trajectory of reducing the regional disparities. Several economic and social indicators display the existence of a movement of regional convergence. However, disparities in per capita income remain high and the

perspective of this moving towards an end, according to some calculations and predictions, is decades away (four or five, at best). Together with recognizing the impossibilities, the most telling factor is that the economic expansion of the less developed regions continues to be determined either by the impulses of the regional economy with the greatest centrality - the Southeast -, or by the winds that blow from the global demand for resources. These, therefore, are regions that remain structurally weak. The immediate future for productive evolution tends to be the relative delay in the appearance of positive rates of expansion.

From the consensuses presented, some suggestions become apparent for a research agenda on Brazilian territorial development and its current challenges, as may be observed below.

- First, recognize that over the last decade and a half there has been a set of governmental actions intended to change consolidated territorial trajectories. The successes have not always been recognized, but nonetheless - there were some. Social policies have had a positive impact on the income of poorer regions, boosting local economies, notably in the North and Northeast. The expansion of public credit for private investment, undertaken by BNDES and regional banks, has been able to assist industrial, tertiary and agricultural businesses (including Pronaf, the National Program for Strengthening Family Farming) favoring target regions in regional policies. Thus, in line with the observations on territories impacted by government actions proposed by Brandão (Article 2), a more careful evaluation of the actions that have worked well, their scope and their consequences should be taken into account with a view to their continuity and/or reformulation, wherever necessary. For example, in the debate on Brazilian deindustrialisation, this unsatisfactory result is not related to the low stimuli in terms of public financing for the activity in focus. Indeed, according to official reports from public banks, in addition to BNDES and others, the activities that received most of the resources from the public banking sources were those belonging to the tertiary and agricultural sectors. Credit incentives, therefore, were granted by the official banking policy, despite its intentions to reverse the industry's loss of relevance to sectors and productive sectors with lower economic productivity¹.
- Absent from the discussions in this dossier were reflections on the network of cities and its role in regional development. This topic was dealt with indirectly, by the study on the São Paulo Macrometropolis (Article 5) and in the article by Moraes and Steinberger (Article 3), regarding experiences of economic deconcentration on an intra-state scale. Much research has already been carried out on the network of cities and its role in restructuring the territory, however, a balance of the most recent transformations, together with a concern to evaluate the reasons for the deindustrialization, has not yet been conducted. It is known that the increases in income for the very poorest have resulted in an expansion of consumer markets in medium-sized cities with strategic functions in the network of cities. However, it remains unknown as to which power multiplier exists, or whether there are any comparative studies of the growth of medium-sized cities with similar sizes and functions stimulated by the effects of the income expansion of the poorest. Additionally, we would ask: How did the network of

¹ For a more current reading of debates and proposals for changes in policies for regional development, please see "Territorial development and inclusive growth: policy evaluation and improvement proposals", presented in a recent document by Ipea entitled *Desafios da nação - 2018. (The Nation's Challenges - 2018)*.

cities in the Midwest region expand, stimulated by the commodities boom? And: What interactions do they have with other Brazilian regional networks? And furthermore: How did the network of cities behave in consolidated regions such as the South and Southeast of the country during the recent expansionary cycle? On a more general level, a unifying view of the behavior pattern of medium-sized cities and of the ongoing forms of productive restructuring becomes a crucial element in the design of public policies².

- The idea of support, stimulation, the creation of facilities and externalities for physical capital (factories, industries, highways, etc.) has been a predominant orientation in Brazilian productive and regional development policy. Against this backdrop, little attention has been paid towards the support and development of human capital or labor. Over recent decades, however, some steps have been taken to build a different trajectory within the country through expansion and the interiorization of extension infrastructure and research. Some studies (such as that by Vieira, 2017) have reported such wagers, although this continues to be a subject demanding more research. There is a double interest in this dimension of development: one is the role that medium-sized cities receiving knowledge infrastructures now have over their region of influence, and the other is the necessary links that need to be created between these centers of knowledge and research and the existing productive fabric (companies, families and governments). Productive renewal towards activities of higher productivity depends on the interactions that may be formed in the creation and circulation of ideas.

In an attempt to draw this debate to a close, it is hoped that this thematic dossier may stimulate the academic community and policy makers to recover the centrality of the issue in their work agendas, as well as in the government's. Such a recovery could contribute to new formulations of public policies capable of fostering a renewed national agenda for regional development, facing an increasingly heterogeneous continental country.

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² The doctoral thesis by Adriana Melo Alves, *Policies for regional development and the network of cities in the semi-arid region: concentration, polarization and fragmentation*, brings significant contributions to the case of medium-sized cities in the semi-arid region of the Brazilian Northeast. It gathers evidence of major infrastructure changes in the region and indicates advances in competitiveness and the attraction of investments in the cities investigated.

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