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Labor Market and productive complexity in the manufacturing industry of the City of Rio de Janeiro in a comparative perspective

Mercado de trabalho e complexidade produtiva na indústria de transformação da Cidade do Rio de Janeiro em perspectiva comparada

El mercado laboral y la complejidad productiva en la industria manufacturera de la Ciudad de Río de Janeiro en perspectiva comparada

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Abstract

This article examines the qualitative transformations within the manufacturing industry of the city of Rio de Janeiro. To this end, a Productive Complexity Index (PCI) is constructed, grounded in the volume of formal employment relationships. The analysis encompasses the various subsectors of the manufacturing industry and establishes comparisons with the municipality of São Paulo, the state of Rio de Janeiro, and Brazil as a whole. The findings reveal a more pronounced simplification of industrial activity in the municipality of Rio de Janeiro, suggesting a process of declining centrality of the city's economy both nationally and in relation to the broader state of Rio de Janeiro.

Keywords: manufacturing industry; development; Rio de Janeiro; comparative analysis; social indicators.

Resumo

O texto analisa as mudanças qualitativas na indústria de transformação da Cidade do Rio de Janeiro. Para tanto, é construído um índice de complexidade produtiva (ICP) baseado no volume de vínculos de trabalho formal. São analisados os diferentes subsetores da indústria de transformação e feitas comparações com o município de São Paulo, o estado do Rio de Janeiro e o Brasil. Os resultados apontam uma simplificação mais intensa da atividade industrial no município do Rio de Janeiro, indicando um processo de perda de centralidade da economia carioca no país e em relação ao restante do estado fluminense.

Palavras-chave: indústria; desenvolvimento; Rio de Janeiro; análise comparativa; indicadores sociais.

Resumen

Este artículo examina las transformaciones cualitativas en la industria manufacturera de la ciudad de Río de Janeiro. Para ello, se construye un Índice de Complejidad Productiva (ICP), basado en el volumen de vínculos de empleo formal. El análisis abarca los distintos subsectores de la industria manufacturera y establece comparaciones con el municipio de São Paulo, el estado de Río de Janeiro y Brasil en su conjunto. Los resultados señalan una simplificación más pronunciada de la actividad industrial en el municipio de Río de Janeiro, lo que sugiere un proceso de pérdida de centralidad de la economía carioca tanto a nivel nacional como en relación con el resto del estado de Río de Janeiro.

Palabras clave: industria manufacturera; desarrollo; Río de Janeiro; análisis comparativo; indicadores sociales.

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1 Introduction

Studies on Brazilian economic development have been marked, since the end of the 20th century, by the observation of a loss of participation of manufacturing sectors in the Gross Domestic Product (GDP) and in the stock of jobs, generating debates about the process of "deindustrialization" and "re-primarization" of the economy (Oreiro and Feijó, 2010). In this context, this article aims to analyze the potential effects of this process on the labor market of the City of Rio de Janeiro, seeking to identify, beyond quantitative changes, qualitative transformations in the profile of industrial employment, especially regarding the value added and the technological intensity of the goods produced by it.

For this, an index (Figueiredo Filho et al., 2013) is constructed that measures the average complexity of productive activity and allows for comparisons with other state capitals, the state, and Brazil. The main metric is given by changes in the distribution of the employment stock among subsectors of the manufacturing industry. Each subsector is classified by its productive complexity based on data on the value of produced products and the weight of the research and development sector in relation to its value added. The final result is the weighted average of employment in subsectors of a given complexity, here called the Productive Complexity Index (PCI).

The hypothesis is that the industrial activity of the municipality has lost sophistication more significantly than other capitals, than the state, and than Brazil. This hypothesis derives from the observation of the loss of centrality of the municipality for the Brazilian economy and the existence of a recent process of industrial deconcentration in the southeast region (CNI, 2021). Thus, the PCI is used to make comparisons relative to the period from 2006 to 2023.

It is worth noting that the social phenomenon investigated here concerns a part of what is called "economic development," a term that, despite its normative character, is relevant as it is a native term to identify the perception of a set of social actors about desirable transformations in the economic structure (Santos, 2016). This normative dimension, however, needs to be relativized sociologically, in favor of a view of development as social change (Santos, 2016). Understood then as one of the variations of this phenomenon, the deindustrialization process is usually measured by the reduction in the participation of industrial sectors in the gross domestic product (GDP) and in the stock of employment, especially in the manufacturing sector (Tregenna, 2009). Within the "industry" category, a privileged place is given to the so-called "manufacturing industry." In general, this is associated with "greater" economic development, measured in real GDP growth, and seen as an important element in the dynamics of economic growth, especially for the diversification of productive activity (Oreiro and Feijó, 2010; Oreiro and Marconi, 2014).

In turn, the idea of "economic complexity" lacks consensus but is part of the repertoire of economic and managerial theories. Here, a derived concept is used, that of productive complexity, which seeks to measure the supply of employment relationships in a territory by its capacity to generate value gains and incorporate technology and knowledge. Its use therefore carries a certain normative weight, by understanding that employment relationships in certain sectors are more "desirable" than in others. This approach, however, is based on the empirical assessment that industrial activity tends to produce more valued jobs – with higher wages, social protection, unionization rates, and formality – and, therefore, are more capable of inducing a process of social upgrading in conjunction with the process of economic upgrading (Barrientos, Gereffi and Rossi, 2011; Rossi, 2013).

The discussion about economic and social upgrading processes is an important theoretical framework, as it encapsulates discussions regarding the effects of economic development. The main point to be taken to the debate is that processes of economic upgrading – for example, growth and better positioning of a territory in

global value chains – do not necessarily lead to improvements in the quality of life of workers and their communities, i.e., social upgrading. For this link to be complete, an institutional framework is needed that allows for the capture of value by the territories and their residents (Barrientos, Gereffi and Rossi, 2011).

Notwithstanding the above discussion, the PCI focuses on the capacity for capital accumulation, via value added and technology. Thus, it primarily measures processes of economic upgrading. This choice is justified because, despite the importance of the discussion on social upgrading emphasized above, it is the process of economic upgrading that provides the basis for the creation of value to be captured by the various actors in the network. In this sense, economic upgrading is seen as a partial function of productive complexity and connects it to the possibility, but not the certainty, of social improvements, as a necessary condition of this process. Hence the theoretical importance of understanding the structural capacity of the territory to support the production of this value.

This work also takes a theoretical step forward by proposing a qualitative assessment of the employer sectors within the industry itself, and the manufacturing industry. For this, it constructs the average PCI of territories based on the composition, in economic activity sectors, of employment relationships over time. Below, the process of composing the index and the methods used to classify economic activities according to higher or lower productive complexity are described.

Besides this introduction, the article presents the methodology used, including the proposition for calculating the productive complexity index, followed by the results of the data analysis and, finally, a discussion regarding the findings.

2 Methodology

As mentioned above, this work employs a quantitative method for analyzing statistical data from official sources and for constructing its own index (Figueiredo Filho et al., 2013), the Productive Complexity Index (PCI). This index is composed of social indicators, which aim to group into a single number data capable of revealing a specific analytical category related to a social process, such as economic development, social progress, etc. For this, indicators that are both relevant to the phenomenon and possess availability and reliability for the desired temporal or geographical scope are considered as possible components of the index (Figueiredo Filho et al., 2013).

Here, the desired data concern the number of formal jobs available in the manufacturing industry according to economic complexity. However, analyzing the manufacturing sector as a whole can obscure qualitative variations. It is for this reason that the analysis in this work focuses on the volume of jobs associated with economic activities within the manufacturing industry, the subsectors, according to their complexity.

The National Classification of Economic Activities (CNAE) was used to identify industrial subsectors, which classifies the economic activities of each establishment, in compatibility with the International Standard Industrial Classification of All Economic Activities (ISIC). The CNAE, like the ISIC, is organized in a hierarchical structure format (CONCLA, 2023), so that the results presented here concern only the second highest level of aggregation, called the division of economic activity (IBGE, 2006). Furthermore, only activities of the manufacturing industry were considered, which do not include, for example, activities of the extractive industry.

The work of classifying the divisions of the manufacturing industry by level of value added required its own method, using statistical data from Brazilian foreign trade in goods, provided by the Comex Stat system of the Ministry of Development, Industry, Trade and Services (MDIC). Foreign trade data are relevant as they provide a picture of the value of produced products in relation to the international price. It also allows an assessment of the characteristic, in terms of sophistication, of the

products of a given subsector. Thus, for example, the production of the automotive sector can be largely different from one territory to another – buses, luxury cars, or popular cars can be produced, for instance. Export data allow for a weighted analysis of the characteristic of that subsector in relation to its reality in the national context.

The levels of value added associated with the subsectors were calculated from the weighted average of the participation of sub-activities in the CNAE, found by dividing the total value (free on board, in dollars) by the total net weight of goods exported by the country in that year for that division. Then, the Fisher-Jenks algorithm was used, a statistical method "indicated for grouping one-dimensional data" (Acca, 2021), which made it possible to order the data into four categories: high complexity, medium-high complexity, medium-low complexity, and low complexity. The objective of this component is to capture the specificity of the economic activity within the Brazilian context.

Complementarily, a classification from the Organisation for Economic Co-operation and Development (OECD) of economic activities into five groups according to the level of research and development intensity was used, of which four concern the manufacturing industry (OECD, 2016). This component aims to capture the estimated technological intensity, thus allowing a better differentiation of activities that add a lot of value due to the rarity of a certain raw material – activities linked to mineral extraction, for example – from activities that add value due to the use of technologies and knowledge – value extracted from dead labor, in the Marxist conception (Marx, 2013).

Thus, each economic activity received two classifications, one regarding the value added to the products and another regarding the degree of incorporation of scientific knowledge. As stated, these categories seek to capture two relevant elements: the capacity of that job to add value to a given commodity and the incorporation of dead labor in the form of knowledge and technologies. Thus, the complexity of the economic activities of a territory concerns the capacity of the available jobs to contribute to the process of capital accumulation – leaving in the background the discussion about the capture of this value, discussed in Barrientos, Gereffi and Rossi (2011). In this sense, it strongly distinguishes itself from other productivity-oriented metrics that emphasize the individual character of the worker, and directs the discussion to the social structure that allows the worker to perform value increment (Marx 2013).

Table 1: Result of the complexity assessment by division of economic activity (CNAE 2.0).

CNAE	Division of Economic Activity	Complexity
10	Manufacture of food products	Low
11	Manufacture of beverages	Low
12	Manufacture of tobacco products	Medium-Low
13	Manufacture of textiles	Medium-Low
14	Manufacture of wearing apparel	Medium-Low
15	Manufacture of leather and related products	Medium-Low
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	Low
17	Manufacture of paper and paper products	Low
18	Printing and reproduction of recorded media	Medium-Low
19	Manufacture of coke and refined petroleum products	Low
20	Manufacture of chemicals and chemical products	Medium-High
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	High
22	Manufacture of rubber and plastic products	Medium-Low
23	Manufacture of other non-metallic mineral products	Medium-Low
24	Manufacture of basic metals	Medium-High
25	Manufacture of fabricated metal products, except machinery and equipment	Medium-Low
26	Manufacture of computer, electronic and optical products	High
27	Manufacture of electrical equipment	Medium-High
28	Manufacture of machinery and equipment n.e.c.	Medium-High
29	Manufacture of motor vehicles, trailers and semi-trailers	Medium-High
30	Manufacture of other transport equipment	High
31	Manufacture of furniture	Low
32	Other manufacturing	Medium-High

Source: Authors' own elaboration based on RAIS/MTE data.

For the calculation, each of the two categorical classifications was associated with a score and then an average between the two was taken. In both cases, the classifications were high, medium-high, medium-low, and low, converted into scores of 1, 0.75, 0.50, and 0.25, respectively (Appendix 1). The average of the two scores resulted in the productive complexity of the activity, with values above 0.75 classified as high complexity, above 0.5 to 0.75 as medium-high, above 0.25 to 0.5 as medium-low, and up to 0.25 as low. The result of the classification of economic activities is shown in Table 1.

Data on the number of jobs in each economic activity were identified using the

statistical data on employment records from the Annual List of Social Information (RAIS) of the Ministry of Labor and Employment (MTE). RAIS brings together administrative records provided annually by employers and provides a kind of annual snapshot of the stock of formal jobs (IBGE, 2025). Although the temporal coverage of the database is from 1985 to the present day, methodological changes in data collection and systematization make the construction of a single time series problematic. Given these limitations, the period from 2006 to 2023 represents the best scope for the objectives of this work. It is important to note, however, that methodological changes in the collection of RAIS data may imply an overestimation of employment volume growth in the years 2022 and 2023, as highlighted by the technical note from MTE (2024), which warns of the "occurrence of an important break in the RAIS historical series." This break, however, does not affect the final result of the PCI, as the latter considers the participation of each activity in the stock of jobs, as described below.

This calculation is made from the data on the quantities of active employment relationships in each complexity level – the group of economic activities classified at that level – and thus the participation of that complexity category in the stock of formal jobs is calculated. Each category is scored 1, 0.67, 0.33, and 0 points, from the most complex to the least complex. Thus, the index ranges from 0 – all jobs in the territory are in manufacturing industry activities considered of low complexity – to 1 – all manufacturing industry jobs in the territory are considered of high complexity.

The mathematical expression (equation 1) below summarizes the operation performed, where PA means participation of high-complexity activities; PMA represents the participation of medium-high complexity activities; PMB, participation of medium-low complexity activities; and PB, participation of low-complexity activities.

$$PCI = PA * 1 + PMA * 0.67 + PMB * 0.33 + PB * 0 \quad (1)$$

3 Results

First, in order to make the context of the analysis clearer, a quantitative analysis of the annual evolution of the labor market for the selected manufacturing industry activities is important, as presented in Figure 1. It is possible to see a peak in 2013, when they totaled 155,277 formal employment relationships, which represented 5.9% of the total stock of formal jobs in the City of Rio de Janeiro that year. This number gradually decreased until reaching 99,537 relationships in 2021, the lowest point in the historical series. This represents a 35.9% drop in the 2013-2021 period. If we consider the initial level of the historical series, of 119,714 formal employment relationships in 2006, there is still a decrease of 16.9%. The growth observed in 2022 and 2023 can be explained by the methodological changes in RAIS, as highlighted earlier.

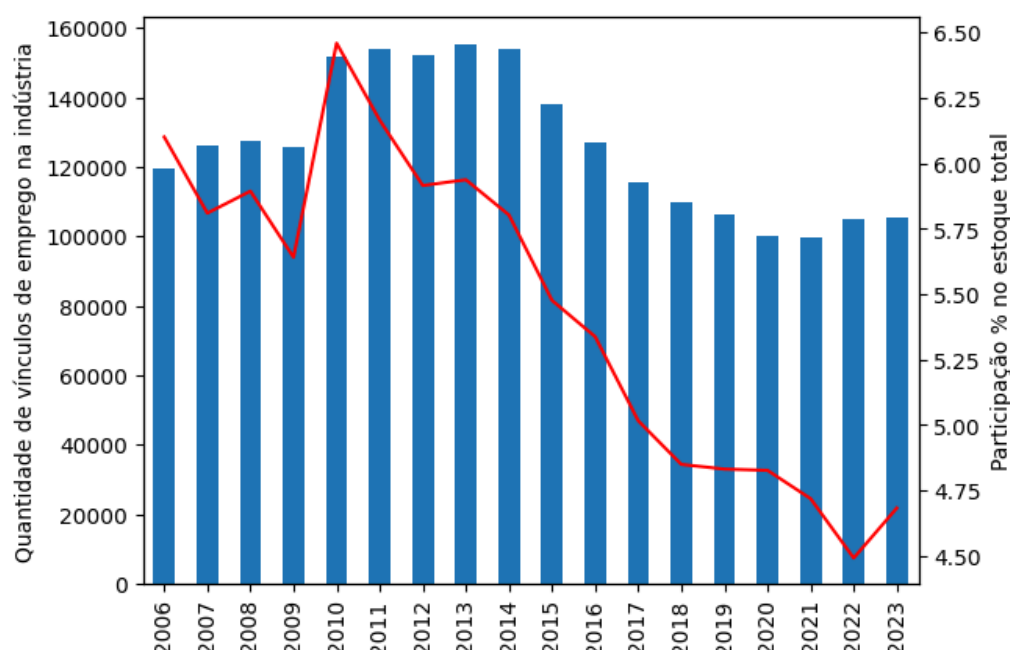


Figure 1: Annual evolution of the number of formal employment relationships in selected manufacturing industry activities and percentage share in the total stock of formal jobs. City of Rio de Janeiro, 2006 to 2023.
Source: Authors' own elaboration based on RAIS/MTE data.

However, even more important is the evolution of the percentage share of these industrial activities in the total stock of formal jobs in Rio: a leap is observed between 2009 and 2010, which, as can be seen in Figure 2, was mostly composed of jobs in low-complexity activities, reaching approximately 6.5%, followed by a decreasing trajectory, until reaching the lowest point in the historical series, of 4.5%, in 2022.

Analyzing the employment data by the four complexity categories, in Figure 2, it is noticeable that most jobs are concentrated in medium-low and low complexity activities. It is also noted that the largest quantitative drop occurs in sectors classified as medium-low complexity. However, low-complexity sectors showed an increase in the volume of jobs compared to 2006, even if below the 2013 peak, reducing the total drop in the volume of jobs. This situation exemplifies how changes in the composition of economic activities can mask the impacts of the deindustrialization process, as the maintenance or even growth of the total number of manufacturing industry jobs does not allow one to see gains or losses in productive complexity.

To better evaluate the timing and proportional drop in the volume of jobs in each category, Figure 3 shows the proportional changes in jobs in each category, taking the year 2013 as a reference (2013=1). The curves clearly show a drop in the volume of activities that, while starting for some categories between 2011 and 2012, intensifies and becomes generalized from the period of 2013 and 2014, concomitantly with the Brazilian and Fluminense economic slowdown.

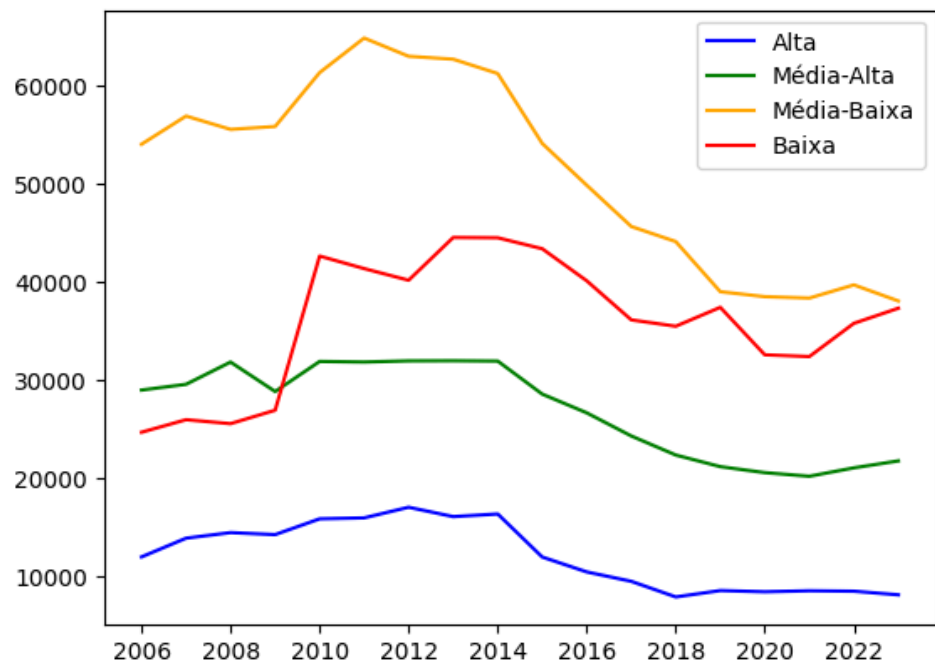


Figure 2: Annual evolution of the number of formal employment relationships by level of productive complexity of the economic activity. City of Rio de Janeiro, 2006 to 2023.

Source: Authors' own elaboration based on RAIS/MTE data.

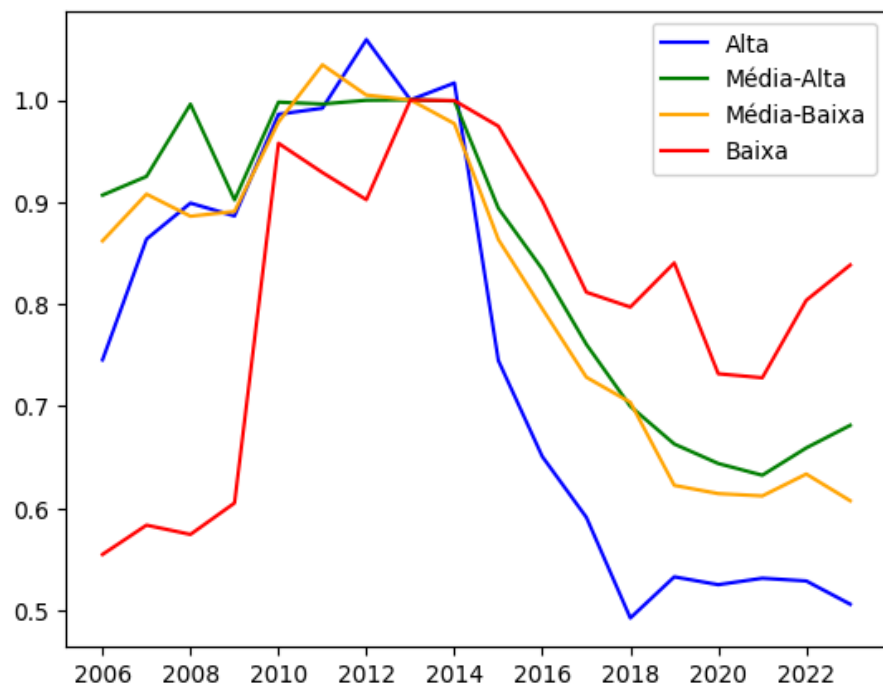


Figure 3: Variation in the number of formal employment relationships relative to the 2013 level by level of complexity of the economic activity. City of Rio de Janeiro, 2006 to 2023.

Source: Authors' own elaboration based on RAIS/MTE data.

The aggregate result of these changes, in the form of the proposed Productive Complexity Index (PCI), is presented in Figure 4. The PCI, which reached a peak of about 0.43 points in 2009, fell to 0.33 in 2019. After a brief positive oscillation in 2022, it fell again in 2023. Two considerations need to be made in this regard. First, the "improvement" in 2020 seems to result from a sharp loss of low-complexity jobs,

probably associated with the COVID-19 pandemic. Despite the negative scenario, the positive variation occurs because the PCI captures variations in the participation of categories in the stock of jobs and not the total volume of jobs. Thus, a faster drop in less complex sectors implies an "improvement" in overall complexity. Second, and for the same reason, the methodological changes in RAIS, which make the employment series for 2022 and 2023 not comparable a priori, do not impact the assessment of the PCI. In fact, the reduction of the PCI in the period indicates its capacity to capture qualitative losses in industrial activity, despite the methodological changes pointing to an overall gain in jobs.



Figure 4: Annual evolution of the Productive Complexity Index (PCI) - City of Rio de Janeiro, 2006 to 2023.

Source: Authors' own elaboration.

Finally, some exploratory comparisons were also made to contextualize the decline of the PCI in the territory of Rio. Figure 5 presents the PCI compared between the municipalities of Rio de Janeiro and São Paulo, the state of Rio de Janeiro, and the country as a whole. In the first case, while São Paulo already exhibited higher productive complexity, the difference was substantially smaller and seemed to be reducing the distance until approximately 2008. After that year, marked by the context of the international subprime economic crisis, the City of Rio de Janeiro began to lose productive complexity much more rapidly. Thus, if the difference in PCI between Rio and São Paulo was about 0.02 points in 2008, it became 0.10 points in 2023. This data is notable because São Paulo is precisely one of the most critical points of the Brazilian deindustrialization process, due both to the reduction of jobs and their relocation to the interior of the state (Sampaio and Etulain, 2021) and outside the southeast region (CNI 2021).

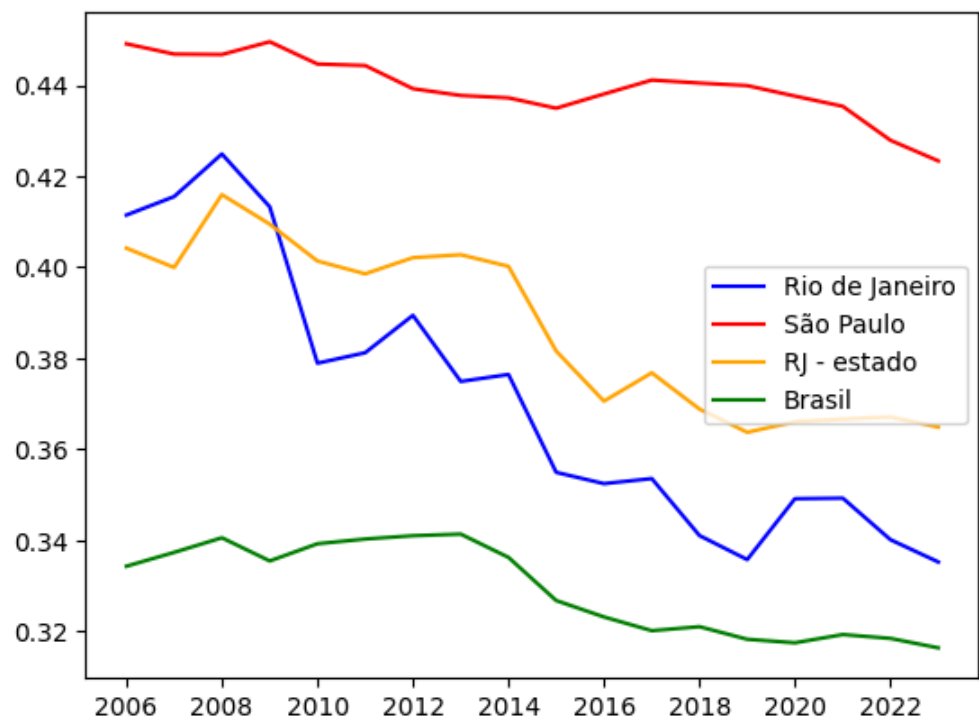


Figure 5: Annual evolution of the Productive Complexity Index (PCI) - selected geographical regions, 2006 to 2023.

Source: Authors' own elaboration.

Secondly, it is also notable how the productive complexity of the municipality regressed to levels below that of the state of Rio de Janeiro. This change is significant, since for a long time the capital of Rio de state played a role of attracting economic activity, even creating a productive void in nearby regions, such as the Baixada Fluminense (Sobral, 2016; 2017).

This reality has transformed in recent decades, partly associated with the growth of traditional economic sectors in the state, such as the petrochemical sector in Northern Fluminense (Piquet, 2021) and the attractiveness of new economic activities, such as the automotive sector in Southern Fluminense (Ramalho, 2015). Thus, while the municipality of Rio de Janeiro continues to be very important for the state's economy, qualitatively its manufacturing industry no longer seems to lead in terms of capacity to add value and incorporate technology.

Finally, the comparison with Brazil reflects the same scenario. Here, while the City of Rio de Janeiro had a more complex manufacturing industry, the distance to the national average is substantially reduced. It is important to note that, while this change seems a direct result of the industrial deconcentration process that occurred in the Southeast, the municipality of São Paulo does not exhibit the same pattern. Thus, while from the point of view of the quantitative reduction in the volume of jobs the decline of the municipality of Rio de Janeiro could be associated with the same causal mechanisms as São Paulo, from a qualitative point of view there seem to be particular elements of the case of Rio that cause a loss of complexity within the manufacturing industry concomitant with the loss of its participation in the economy and the general stock of jobs. This factor may suggest a greater fragility of industrial employment, particularly that linked to more complex activities, in the municipality of Rio de Janeiro.

4 Discussion and conclusions

The results presented in this article highlight a loss of importance of the manufacturing industry in the formal labor market of the City of Rio de Janeiro between 2006 and 2023, both in absolute numbers and in percentage share of the total stock of jobs, corroborating theses of deindustrialization at the local level. Quantitatively, just between 2013 and 2021, a reduction of 55,740 industrial jobs is observed, representing a drop of 35.9%.

However, the analysis of the statistical data using the proposed Productive Complexity Index (PCI) reveals that the municipality lost participation in activities with higher value added and technological intensity, consolidating itself in low and medium-low complexity activities, mainly from 2014 onwards. The calculation of the PCI per year shows a decreasing trajectory, moving from 0.41 in 2006 to 0.33 in 2023.

In a comparative perspective, this trend contrasts with the trajectory of the municipality of São Paulo, which, despite also suffering a decline in PCI, maintained a higher level of sophistication in industrial production. In comparison with the country and the state of Rio de Janeiro, it is clear how the decline in the index was more pronounced in the Fluminense capital. This decline shows that, even in the general context of deindustrialization, there are significant regional variations that make it necessary to adjust the diagnosis, and the proposed solutions, to local realities.

These findings support the hypothesis of a loss of sophistication in Rio's industrial production. From a historical perspective, this loss is a continuation of a process of the City of Rio de Janeiro losing importance throughout the entire 20th century. Thus, it is not possible to dismiss the weight of political disputes in shaping this scenario. In particular, the period from the 1990s onwards coincides with fiscal disputes between states (Arbix, 2000) and significant changes at the level of federal development policy (Fonseca et al., 2020), which may indicate that the municipality of Rio de Janeiro ended up losing out in the institutional rearrangements.

In this sense, this work emphasizes that public policies aimed at reindustrialization need to keep in mind the differentiation between the economic activities that make up the manufacturing industry. A focus on knowledge and technology-intensive sectors, aimed at reversing the structural decline of industry in Rio de Janeiro, needs to consider their specificities, as well as relational aspects between the economic structure of the municipality, its metropolitan region, and the state. Future research could explore the institutional and regional determinants of this process, as well as strategies to reintegrate the city into higher value-added productive networks. It is also important to expand and deepen the comparisons, both to encompass more capitals and to build aggregated views regarding the metropolitan region, which were beyond the scope of this work.

Finally, this article also points to the multiplicity of effects that processes of social change, i.e., economic development, can have. In particular, the deindustrialization process seems to have distinct trajectories in different territories, with social effects that are more virtuous (social upgrading) or harmful (social downgrading) which, as Barrientos, Gereffi and Rossi (2011) point out, may or may not be linked to processes of economic upgrading. In this sense, the proposal of a Productive Complexity Index (PCI) presents itself as an important tool for analyzing these processes and can be refined in future developments.

Appendix 1 – Detailed classification of economic activities

CNAE	Economic Activity Description	Adjusted Value per Weight	Value Level	Value Score	R&D %	Technology Level	R&D Score	Complexity Score	Complexity
10	Manufacture of food products	1.985710738	low	0.25	1.44	low	0.25	0.25	low
11	Manufacture of beverages	0.8381606722	low	0.25	1.44	low	0.25	0.25	low
12	Manufacture of tobacco products	5.799034607	medium-low	0.5	1.44	low	0.25	0.375	medium-low
13	Manufacture of textiles	11.26334041	medium-low	0.5	1.73	low	0.25	0.375	medium-low
14	Manufacture of wearing apparel	46.70726661	medium-high	0.75	1.4	low	0.25	0.5	medium-low
15	Manufacture of leather and related products	16.93662838	medium-low	0.5	1.65	low	0.25	0.375	medium-low
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	0.9531029827	low	0.25	0.7	low	0.25	0.25	low
17	Manufacture of paper and paper products	0.6741314144	low	0.25	1.58	low	0.25	0.25	low
18	Printing and reproduction of recorded media	58.44250305	medium-high	0.75	0.67	low	0.25	0.5	medium-low
19	Manufacture of coke and refined petroleum products	0.5329945215	low	0.25	1.17	low	0.25	0.25	low
20	Manufacture of chemicals and chemical products	8.065609487	medium-low	0.5	6.52	medium-high	0.75	0.625	medium-high
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	109.6611409	medium-high	0.75	27.98	high	1	0.875	high
22	Manufacture of rubber and plastic products	5.868422214	medium-low	0.5	3.58	medium-low	0.5	0.5	medium-low
23	Manufacture of other non-metallic mineral products	1.616033391	low	0.25	2.24	medium-low	0.5	0.375	medium-low
24	Manufacture of basic metals	5141.581154	high	1	2.07	medium-low	0.5	0.75	medium-high
25	Manufacture of fabricated metal products, except machinery and equipment	23.30305167	medium-low	0.5	1.19	low	0.25	0.375	medium-low
26	Manufacture of computer, electronic and optical products	200.3816339	medium-high	0.75	24.05	high	1	0.875	high

27	Manufacture of electrical equipment	15.94559178	medium-low	0.5	6.22	medium-high	0.75	0.625	medium-high
28	Manufacture of machinery and equipment n.e.c.	16.69068112	medium-low	0.5	7.89	medium-high	0.75	0.625	medium-high
29	Manufacture of motor vehicles, trailers and semi-trailers	9.431455318	medium-low	0.5	15.36	medium-high	0.75	0.625	medium-high
30	Manufacture of other transport equipment	1342.247014	high	1	5.72	medium-high	0.75	0.875	high
31	Manufacture of furniture	2.684497675	low	0.25	1.17	low	0.25	0.25	low
32	Other manufacturing	238.1946483	medium-high	0.75	2.85	medium-low	0.5	0.625	medium-high

Source: Elaborated by the authors based on OECD (2016) and MDIC's Comex Stat system.

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The author declares no conflicts of interest.

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