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# REPRESENTATIVE DEMOCRACY IN BRAZIL: AN ANALYSIS OF THE PERFORMANCE OF CONGRESSIONAL REPRESENTATIVES IN LIGHT OF THE DEVELOPMENT INDICES OF THEIR STATES AND REGIONS

## *A DEMOCRACIA REPRESENTATIVA NO BRASIL: UMA ANÁLISE DA ATUAÇÃO DOS DEPUTADOS FEDERAIS FRENTE AOS ÍNDICES DE DESENVOLVIMENTO DE SEUS ESTADOS E A REGIÃO GEOGRÁFICA QUE OCUPAM*

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### ABSTRACT

**Purpose** – This study seeks to verify whether the performance of Brazilian Congressional Representatives is related to MHDl and GDP per capita indices and the regions they represent.

**Methodology** – Regarding the performance of the parliamentarians, the data used were those made available by the Transparência Brasil portal and analyzed using the multivariate exploratory non-hierarchical cluster analysis technique K-means. Federative Units were divided into clusters according to the similarities they presented with respect to the variables that made up the analysis.

**Findings** – After the analyses, we were able to determine that there is no relation of equivalence between the performance of representatives in Congress and the observed research development indices (MHDl and GDP per capita) with states of different regions and quite distinct conditions of development making up the same group of analysis.

**Originality/value** – The researched data, or even the identification of transparency actions demonstrates the wide variety of analysis possibilities that are available in terms of discussions of the performance of political agents and their respective returns for the population. We would suggest that future studies can use other data or other reports displayed in the transparency portals of various spheres of government. Other research possibilities can be developed based on qualitative analyses of the effective representativity of the projects proposed by these representatives of the people.

**Keywords** - Democracy; Representative democracy; Representative democracy in Brazil; Municipal Human Development Index (MHDl); Gross Domestic Product (GDP) per capita.



## RESUMO

**Objetivo** - O estudo a seguir tem por objetivo verificar se a atuação dos Deputados Federais das Unidades Federativas brasileiras guarda relação com o IDHM, com o PIB per capita e com a região geográfica em que elas estão localizadas.

**Metodologia** - Com relação à atuação dos parlamentares, os dados utilizados foram os disponibilizados pelo portal Transparência Brasil e analisados a partir da técnica exploratória multivariada de análise de conglomerados não hierárquicos *K-means*. As Unidades Federativas foram divididas em clusters segundo às similitudes que apresentavam com relação às variáveis que compunham a análise.

**Resultados** - Após as análises, foi possível constatar que não há uma relação de equivalência entre a atuação dos parlamentares da Câmara e os índices observados no desenvolvimento da pesquisa (IDHM e PIB per capita), de modo que Unidades Federativas de diferentes regiões e com condições de desenvolvimento bastantes distintas compuseram o mesmo grupo de análise.

**Originalidade/Valor** - Os dados pesquisados ou mesmo a identificação de ações de transparência passam a demonstrar a diversidade de possibilidades de análise que surgem quando das discussões acerca da atuação dos agentes políticos e seu respectivo retorno à população. Sugere-se que estudos futuros possam percorrer outros dados ou relatórios disponibilizados por outros portais da transparência de várias esferas do governo. Outras possibilidades de estudo ainda poderão ser desenvolvidas a partir de análises qualitativas acerca da efetiva representatividade dos projetos propostos pelos representantes do povo.

**Palavras-chave** - Democracia; Democracia representativa; Representação democrática no Brasil; Índice de Desenvolvimento Humano Municipal (IDHM); Produto Interno Bruto (PIB) per capita.

## 1 INTRODUCTION

To begin with, we would like to note that the Brazilian political system is democratic, which means that the people are in power (Lordêlo & Pontes, 2009). Thus, democracy can be understood as a regime of government in which popular sovereignty prevails (Bobbio, 2000). However, the Brazilian democratic regime is exercised in a mixed form. Article 1 of the Magna Carta states that “All power emanates from the people, who exercise it through elected representatives or directly under the terms of this Constitution” (Brasil, 1988). In this sense, democracy can be exercised by the people in an indirect or representative manner through elected representatives, or directly by the population through referendums, plebiscites, or popular initiatives.

The legislative branch is composed of the Senate and the House of Representatives. These two chambers make up the Congress (Brasil, 1988). Representatives request resources and projects which meet the needs of their constituents, in order to ensure that the interests of the population are represented. The performance of these representatives should thus improve the human development of the states they represent through their proposals for local growth in economic, social, cultural and other spheres.

However, factors such as the absence of representatives at legislative sessions, the presentation of insignificant projects, and a lack of commitment can harm the development of a state, through the impossibility of raising the financial resources which make the implementation of public policies effective in the regions they represent. Moreover, it should be noted that Brazil is a country with a high level of corruption among political representatives, which leads to a constant collective feeling of outrage and impunity.

The NGO Transparency Brazil has been created to measure political actions in Brazil in order to monitor the government, seeking transparency in an independent manner (Transparência Brasil, 2017). In addition, the Municipal Human Development Index (MHDI) and Gross Domestic

Product (GDP) per capita also make it possible to compare development in different states and verify in a practical manner their situation in comparison with other locations.

Thus, this study seeks to analyze the performance of congressmen and the development indices in Brazilian states to understand the relationship between policy performance and the Municipal Human Development Index (MHDI) and the Gross Domestic Product (GDP) per capita of the states they represent. To accomplish this, the next section will present this study's theoretical references which deal with concepts of democracy, representative democracy and democratic representation in Brazil, the Municipal Human Development Index (MHDI) and Gross Domestic Product (GDP) per capita. The third section will present our research methodology and this case study. The fourth will present our results and discussion, while the last section will present this study's conclusions.

## 2 THEORETICAL REFERENCES

### 2.1 Democracy

According to Bobbio (2000), democracy can be understood as various forms of government, especially those in which the power is not in the hands of a single person or a few, but rather in the hands of all or the majority of the people. The idea of democracy arose in the fifth century B.C. in Ancient Greece, with the understanding of a form of government which would represent the overall will of the citizens, which was transformed into an innovative practice which came to be identified with the Greek ideals of justice and virtue (Lordêlo & Pontes, 2009).

In this sense, Baptista (2010) asserts that the term "democracy" acquired a much broader and vague popular meaning representing a "generically just society". However, classifying a society as democratic or not based on justice or injustice may weaken the concept of democracy, given that it is not linked to the concept of justice or injustice, but "has to do with the preservation of the political equality of citizens during the decision-making process" (Baptista, 2010, p. 505).

In general, democracy is the preferred political regime of most people (Inglehart, 2003), however, Brazilians do not trust the democratic institutions of the political parties, of Congress, or the judicial system (Moises, 2010). This is due mainly to recurrent corruption in the country, which has led the population to lose faith in politicians and governmental administration. Moises (2010) also states that democracy is a relatively new phenomenon in Brazil, and it is important that there be advances in the Brazilian public's knowledge of democracy.

It should be emphasized that even though there is wide discussion of democratic concepts in academia, the widespread incorrect appropriation of the term has led to fewer and fewer citizens who really understand it (Barrueto & Navia, 2013). However, even in the midst of disagreements about this subject, democracy still is viewed positively in comparison with the other existing political regimes (Villas Boas, 2010).

In comprehensive terms, Cheibub and Przeworski (1997) clarify that democracies are not all alike, and that the main difference consists of the existence of parliamentary and presidential democracies. According to the authors, parliamentary democracies are those in which the legislative branch can change the executive, while presidential democracies are those in which the executive cannot be deposed except under special circumstances. The authors also point out the existence of mixed systems, in which the president is elected, but depends on the confidence of the legislative branch to survive.

In relation to the expectations of the citizen in respect to democracy, Moises (2010, p. 278) clarifies:

(...) it is expected that this regime will be capable of satisfying the expectations of the citizens in terms of the mission that they attribute to the government (the quality of results); they trust that it will assure citizens and their associations broad freedoms and the necessary

political equality so that the people can achieve their aspirations or further their interests (quality of content); and expect that institutions through elections and checks and balances will permit citizens to evaluate the performance of the government and its representatives (quality of procedures).

Within this context, Rousseau (1995, p. 99) argues in favor of participative democracy, in affirming that “(...) laws are the conditions of civil association. The people submitted to laws should be the author of them, only those who are associated with them can rule the conditions of society”. On the other hand, Locke (1973) argues for representative democracy, emphasizing that the legislature should be composed of representatives of the people for a given period, and the power to select them will also be exercised by the people.

## **2.2 Representative democracy**

John Locke (1973) argues that legislative power should be exercised by representatives of the people, elected democratically for this function. Bobbio, Matteucci and Pasquino (1998) mention that representative democracy is opposed to absolute and autocratic regimes which take away political control from the people, emphasizing that the meaning of political representation is in the possibility of controlling political power, attributed to those who cannot personally exercise this power.

Representation, as a political institution, has come to be understood as legitimate to the extent that it manifests itself as being democratic (Baptista, 2010). Representation, therefore, is directly related to democratic theory (Corval, 2015), given that representative democracy makes it possible to faithfully reflect the ideologies of the citizens (Urbinati, 2006). In this sense, Locke (1973) proposes the election of representatives to exercise political power, with prerogatives to prepare laws to protect and regulate the right to private property and individual freedoms through the state.

To Corval (2015, p. 266), representation creates another space of power which is “not conditioned by the diffuse forces of society, but rather politically organized on top of it, influencing it”. In this manner, complaints and demands become more and more complex, with it being necessary “to guarantee greater interaction between the government and society, or in other words, between the representatives and the represented” (Lordêlo & Pontes, 2009, p. 88).

Representative democracy, therefore, constitutes an original form of government, and is in no way similar to electoral democracy to the extent that there exist “conditions which make representative democracy a form of political participation which can activate a variety of forms of control and supervision of its citizens” (Urbinati, 2006, p. 191). In a more specific way, Mill (2006) affirms that representative government is that in which the entire public (or the majority of it) exercises extreme controlling power through its representatives which should exist in some form under any constitution. In a certain way, this makes it possible to understand the reality of our national context, in accordance with the discussions which will follow below.

## **2.3 Democratic representation in Brazil**

The Constitution in its first Article conceives of the Federal Public of Brazil as a Democratic State of Law, whose federal entities are the country, the states, the municipalities and the Federal District (Brasil, 1988).

The government consists of three independent harmonious powers: The Executive, the Legislative and the Judiciary. The head of the Executive Branch and the members of the Legislative Branch are elected by the people, through direct elections, and should be affiliated with a political party for at least six months in order to run for political office (Brasil, 1988).

The members of the Senate are elected directly according to the majority principle. Each state and the Federal District has three senators with eight-year mandates (Brasil, 1988). It should be added that the number of representatives of each of the states and the Federal District cannot be less than eight or greater than seventy as established by Article 45 of the Constitution (Brasil, 1988). Complementary Law nº 78/1993, regulates Article 45 of the Constitution and establishes that the number of representatives in the lower chamber of Congress cannot surpass 513 (Brasil, 1993).

As mentioned above, unlike the president, governors, mayors and senators, representatives on the federal, state, and district levels as well as councilmen are elected using a proportional system. For this system, the voter can opt to vote for a given candidate or opt to vote for a party slate, even if it has formed coalitions with other parties. Once the voting is finished, all the valid votes are counted whether they are for a slate or for a candidate. The number of valid votes is divided by the number of seats to be filled, which in the case of the House of Representatives can vary between eight and seventy according to the population of the state represented. The value obtained is termed the electoral quotient.

The number of seats that each party or coalition has a right to in the House of Representatives (or in the legislative assemblies or city councils) is designated by the party's quotient. This value is obtained by dividing the number of votes for each party or coalition by the electoral quotient, considering just integers and ignoring decimals with the minimum necessary number being 1. If seats are vacant due to the ignoring of the decimals, they will be apportioned one by one by calculating averages, in which the total votes of a party or coalition which has obtained seats is divided by the number of seats obtained plus 1. The party or coalition that obtains the largest average will be awarded one of the vacant seats. This procedure is repeated until all of the seats have been occupied (TSE, 2017).

Once the electoral quotients and party quotients have been defined and the average calculation has been made, the votes for slates and coalitions are ignored and each party or coalition will fill in the seats to which it has a right with its candidates which have individually received the largest number of votes. Thus, candidates of parties or coalitions which have more seats will have greater chances of being elected compared to those belonging to parties and coalitions which have received fewer seats, even though individually the candidate may have obtained a larger number of votes (TSE, 2017). To sum up, in accordance with this dynamic and considering the number of inhabitants of each Brazilian state and the Federal District, the composition of the House of Representatives is depicted in Figure 1.

**Figure 1: Number of Representatives per State**

|           |    |           |    |
|-----------|----|-----------|----|
| <b>AC</b> | 11 | <b>PB</b> | 15 |
| <b>AL</b> | 12 | <b>PE</b> | 28 |
| <b>AM</b> | 11 | <b>PI</b> | 13 |
| <b>AP</b> | 11 | <b>PR</b> | 33 |
| <b>BA</b> | 42 | <b>RJ</b> | 49 |
| <b>CE</b> | 25 | <b>RN</b> | 11 |
| <b>DF</b> | 11 | <b>RO</b> | 11 |
| <b>ES</b> | 13 | <b>RR</b> | 11 |
| <b>GO</b> | 20 | <b>RS</b> | 34 |
| <b>MA</b> | 20 | <b>SC</b> | 19 |
| <b>MG</b> | 56 | <b>SE</b> | 11 |
| <b>MS</b> | 11 | <b>SP</b> | 73 |
| <b>MT</b> | 11 | <b>TO</b> | 11 |
| <b>PA</b> | 20 |           |    |

Source: Adapted from the House of Representatives (2017)

## 2.4 Municipal Human Development Index (MHDI)

The Municipal Human Development Index (MHDI) consists of a number ranging from 0 to 1. In this case, the closer it is to 1, the greater human development is. This indicator considers three dimensions already measured by the Global Human Development Index: longevity, education and income, but has been adapted to the Brazilian context and indicators. The importance of MHDI is that it: (1) popularizes the concept of development based on people, in contrast to GDP, whose development is limited to economic growth; (2) makes it possible to compare municipalities in a synthetic manner using a single number; (3) encourages placing a priority on improving the lives of people (Atlas Brasil, 2017).

In this sense, the indicators taken into consideration in the MHDI are more appropriate for analyzing the development of the municipalities and metropolitan regions of Brazil. The Longevity MHDI, the Education MDHI, and the Income MHDI tell the story of these municipalities, states and metropolitan regions in three dimensions of human development (Atlas Brasil, 2017), and also make it possible to create a panorama of the locations under examination.

The Longevity MHDI calculation is measured by life expectancy at birth, calculated by the indirect method, based on Demographic Census data from the IBGE. This indicator shows the average life expectancy of a person in a given municipality at birth, maintaining the same patterns of mortality. To calculate the Education MHDI, two indicators are considered, the education of the adult population and the educational flux of the young population. Income HDMI is calculated based on the municipal income per capita and includes the sum of the income of all of its residents, divided by the number of people who live in the municipality – including children and those without income (Atlas Brasil, 2017).

## 2.5 Gross Domestic Product (GDP) per capita

The Gross Domestic Product (PIB) consists of the most used measurement of a country's total production during a given period of time (ADVFN, 2017; Gomes, 2012; Brasil, 2014). The correct evaluation of GDP, therefore, makes it possible to understand economic activity and the level of wealth which is being produced by a country, state, municipality or region.

The GDP corresponds to a monetary value and the calculation of these values consists of the sum of finished goods and services in the production chain, excluding all the intermediate inputs such as raw materials, labor, taxes and energy, in order to avoid the double counting of values generated in the production chain, which may cause an error in the calculation of GDP (ADVFN, 2017; Gomes, 2012). In Brazil, since the year 1990, the GDP has been calculated by the Brazilian Institute of Geography and Statistics – IBGE, a federal body within the Treasury Ministry (ADVFN, 2017).

In technical terms, the value of GDP may be obtained from three points of view, namely: (a) production: where this value is found through the sum of the gross added value of each economic activity; (b) expenses: where GDP is the sum of a group of components which correspond to a relevant macroeconomic variable; (c) income: this could be disaggregated salaries (or income) from work and the gross value spent on exploration (or income from other productive factors which do not consist of work) (Gomes, 2012). In any event, the value of GDP cannot be altered due to the methodology used in the calculation, given that the three methods should present the same result (ADVFN, 2017).

GDP per capita is the quotient between GDP and the population, calculated by dividing total GDP by the number of inhabitants in the analyzed location. This indicator was the first to be used to analyze the quality of life in a country, and therefore, a high GDP value does not guarantee that GDP per capita is also high, given that the distribution of GDP among many inhabitants will result in a low GDP. Thus, GDP per capita is not a measure of personal income, nor does it consider the level of equality of social income (ADVFN, 2017).

Even though GDP is a good indicator of growth in a location, it cannot be considered a growth index, given that it does not include data such as income distribution, life expectancy, and educational level, among others (ADVFN, 2017). It is in this sense that we have the possibility of establishing cross-references between various indices as a way to promote the discussion proposed at the beginning of this study.

### 3 METHODOLOGICAL PROCEDURES

Based on the discussions presented here, it should be noted that this study seeks to apply quantitative research techniques to achieve our proposed objective and validate the obtained results. Thus, we have used secondary data obtained from the NGO Transparência Brasil – the Legislator (Excelências) Project to exclusively analyze the performance of the congressmen in the House of Representatives. The data used is related to legislative productivity, citations in courts, and absences from legislative sessions, which we use to analyze the performance of representatives comparing these statistics to the development indices of Brazilian states in order to understand the relationships between these aspects.

To analyze the data that makes up this study, we have used a multivariate exploratory technique called cluster analysis. Thus, we have sought to group the Brazilian states and the Federal District in accordance with the performance of the congressmen who represent these regions in the House of Representatives. The selected cluster analysis is non-hierarchical and is termed K-means which is provided by the SPSS software. For this analysis technique, the data is divided into homogeneous groups called clusters, in accordance with their similarities in terms of the variables that compose this analysis.

In this way, the elements that make up the same cluster will be as similar as possible. Meanwhile the similarity between the elements that make up different clusters will be as small as possible. “K” is a number of clusters which is previously determined. By K-means, each generated cluster will result from the union of data which has the closest centroid. Centroids are average values contained in each of the cluster variables. The final centroids are obtained based on iteration until there are no more alterations in the averages (Hair, Anderson, Tatham & Black, 2005).

#### 3.1 Data population, collection and analysis

##### 3.1.1 The Legislator Project

Transparency Brazil is a non-profit entity which monitors the government in the search for an independent form of transparency. One of its main objectives is to offer tools so that society can monitor public institutions through projects which make public access information available on the internet. During the realization of this study, there were three active projects in Transparency Brazil, namely: The Clarity (Às Claras) Project, the Justice (Meritíssimos) Project and the Legislator (Excelências) Project (Transparência Brasil, 2017).

This article uses data available in the Legislator Project, which presents data regarding congressmen who are currently in office in both houses of Congress: The Senate and the House of Representatives. This project presents the life story of each of these congressmen, including current lawsuits, fines that they have received from the Accounting Courts, declarations of assets, patterns of electoral financing, frequency of work, etc. (Transparência Brasil, 2017).

The data is collected by each legislative house, judicial bodies, the Accounting Courts and the Clarity Project, which is also maintained by the Transparency Brazil portal, which makes information available to ensure the integrity of government, especially in regard to corruption, and also focuses attention on themes related to corruption and the integrity of institutions through its participation in Transparency Boards, media participation and data research and publication.

Given the available data, it is possible to use the entire population of our object of study and not just a sample. For each state and the Federal District, we considered the following variables: the total number of representatives, the number of representatives that have occurrences in court (ongoing lawsuits or fines from the Accounting Courts), the number of absences from legislative sessions, the number of relevant proposals presented, and the number of irrelevant proposals presented (Box 1).

According to the Legislator Project, proposals “that are without relevance are: homages, naming of streets, dedication ceremonies, etc.; symbology; city symbols; twin cities; requests to open solemn sessions for commemoration and homage; commemorative dates, and the creation of honors”. Proposals which are unreasonable or have a negative impact are not necessarily irrelevant. In fact, they may be especially relevant because they generate a negative impact (Transparência Brasil, 2017).

In relation to absences, the Federal Constitution in Article 55, Item III, establishes that any congressman who does not attend a third of the normal sessions<sup>1</sup> of each legislative session of the member’s house will lose his or her mandate. However, according to the Legislator Project, it is common for congressmen to justify their absences due to illness or obligations inherent to their duties. To clarify, this study does not consider absences from commission sessions, because not all congressmen are members of a commission.

**Box 1 – Court Occurrences, Number of Relevant Proposals Presented, Number of Irrelevant Proposals Presented, Proportion of Absences in Legislative Sessions**

| UF | Nº DE DEPUTADOS<br>FEDERAIS | OCORRÊNCIAS<br>EM<br>TRIBUNAIS | PROPOSTAS<br>RELEVANTES | PROPOSTAS<br>IRRELEVANTES | FALTAS<br>EM<br>PLENÁRIO |
|----|-----------------------------|--------------------------------|-------------------------|---------------------------|--------------------------|
| SP | 70                          | 37                             | 1561                    | 153                       | 0,086                    |
| MG | 53                          | 25                             | 953                     | 78                        | 0,071                    |
| RJ | 46                          | 22                             | 1103                    | 84                        | 0,081                    |
| ES | 10                          | 6                              | 196                     | 9                         | 0,052                    |
| RS | 31                          | 20                             | 686                     | 88                        | 0,073                    |
| PR | 30                          | 14                             | 605                     | 55                        | 0,098                    |
| SC | 16                          | 12                             | 513                     | 64                        | 0,102                    |
| GO | 17                          | 7                              | 385                     | 51                        | 0,091                    |
| MT | 8                           | 6                              | 464                     | 23                        | 0,102                    |
| MS | 8                           | 5                              | 122                     | 7                         | 0,076                    |
| DF | 8                           | 7                              | 314                     | 87                        | 0,036                    |
| BA | 39                          | 16                             | 527                     | 36                        | 0,087                    |
| PE | 25                          | 8                              | 505                     | 20                        | 0,089                    |
| CE | 22                          | 13                             | 335                     | 59                        | 0,087                    |
| MA | 18                          | 10                             | 321                     | 34                        | 0,075                    |
| PB | 12                          | 7                              | 398                     | 63                        | 0,057                    |
| PI | 10                          | 8                              | 102                     | 21                        | 0,051                    |
| AL | 9                           | 6                              | 42                      | 1                         | 0,102                    |
| SE | 8                           | 6                              | 228                     | 14                        | 0,057                    |
| RN | 8                           | 1                              | 85                      | 3                         | 0,078                    |
| PA | 17                          | 7                              | 263                     | 11                        | 0,112                    |
| AM | 8                           | 7                              | 101                     | 3                         | 0,047                    |
| TO | 8                           | 6                              | 109                     | 10                        | 0,073                    |
| AC | 8                           | 3                              | 46                      | 5                         | 0,107                    |
| RR | 8                           | 5                              | 45                      | 5                         | 0,125                    |
| AP | 8                           | 6                              | 62                      | 8                         | 0,143                    |
| RO | 8                           | 5                              | 91                      | 5                         | 0,102                    |

Source: Adapted from Transparency Brazil (2017)

<sup>1</sup> The legislative session corresponds to the period of Congress’s activity during the year: February 2 to July 17 and August 1 to December 22.

### 3.2 Treatment of the data

We have opted to define the  $K$  number of clusters as 5 (five), due to the criterion that Brazil is divided into five geographic regions: North, Northeast, Central West, Southeast and South. Thus, based on the obtained results, it will be possible to compare the geographic regions. For the analyses, we opted for classifications based on 10 iterations with the criterion of 0 convergence, without using averages in the execution.

Box 2 presents the initial centers of each cluster, which are the values of the variables used by cases which are considered to be at the center of each cluster. Thus, the initial center of Cluster 1 is formed exclusively by the State of São Paulo. The initial center of Cluster 2 is the State of Pará. Cluster 3's initial center is the State of Rio de Janeiro, while Cluster 4's initial center is the State of Alagoas. Finally, the State of Paraná is the center of Cluster 5. To better visualize the presented data, the states analyzed were grouped as displayed in Figure 2.

**Box 2 – Centers of Initial Clusters**

|           | Cluster |      |      |      |      |
|-----------|---------|------|------|------|------|
|           | 1       | 2    | 3    | 4    | 5    |
| NUMDEP    | 70      | 17   | 46   | 9    | 30   |
| OCORTRIB  | 37      | 7    | 22   | 6    | 14   |
| PROREL    | 1561    | 263  | 1103 | 42   | 605  |
| PROPIRREL | 153     | 11   | 84   | 1    | 55   |
| FALTAS    | ,086    | ,112 | ,081 | ,102 | ,098 |

Source: Research data

**Figure 2 – Clusters of States**

|           |    |    |    |    |    |    |    |    |    |    |  |
|-----------|----|----|----|----|----|----|----|----|----|----|--|
| Cluster 1 | SP |    |    |    |    |    |    |    |    |    |  |
| Cluster 2 | ES | GO | DF | CE | MA | PB | SE | PA |    |    |  |
| Cluster 3 | MG | RJ |    |    |    |    |    |    |    |    |  |
| Cluster 4 | MS | PI | AL | RN | AM | TO | AC | RR | AP | RO |  |
| Cluster 5 | RS | PR | SC | MT | BA | PE |    |    |    |    |  |

Source: Research data

With the center of each cluster determined, each case was directed to the cluster whose center was closest to it. This initiated a process of iteration. In this process, each case was reallocated depending on its distance from the newly calculated center, and so on successively. With each iteration, the movement of the centers decreased until the optimum result was achieved when all the values arrived at the value of the established convergence. In this study, even though we initially opted for 10 iterations, we arrived at the optimal result in just 2 iterations with convergence values of 0, as can be seen in Box 3 below.

**Box 3 – Iteration History**

| Iteração | Mudança em centros do cluster |        |        |        |        |
|----------|-------------------------------|--------|--------|--------|--------|
|          | 1                             | 2      | 3      | 4      | 5      |
| 1        | ,000                          | 51,708 | 75,157 | 38,949 | 55,743 |
| 2        | ,000                          | ,000   | ,000   | ,000   | ,000   |

a. Convergence achieved due to no changes or small changes in cluster centers. The change in the coordinated absolute maximum for any center is .000. The current iteration is 2. The minimum distance between the initial centers was 221.373.

Source: Research data

Box 4 displays a list of all the cases used in the analysis, indicating the cluster in which each case was classified and the distance between the cluster center, which, in turn, was the origin of Figure 2.

**Box 4 – Cluster Association**

| Número do caso | UF | Cluster | Distância |
|----------------|----|---------|-----------|
| 1              | SP | 1       | ,000      |
| 2              | MG | 3       | 75,157    |
| 3              | RJ | 3       | 75,157    |
| 4              | ES | 2       | 113,686   |
| 5              | RS | 5       | 142,178   |
| 6              | PR | 5       | 55,743    |
| 7              | SC | 5       | 41,404    |
| 8              | GO | 2       | 80,683    |
| 9              | MT | 5       | 91,281    |
| 10             | MS | 4       | 41,502    |
| 11             | DF | 2       | 47,263    |
| 12             | BA | 5       | 29,613    |
| 13             | PE | 5       | 53,031    |
| 14             | CE | 2       | 36,253    |
| 15             | MA | 2       | 18,042    |
| 16             | PB | 2       | 95,592    |
| 17             | PI | 4       | 25,973    |
| 18             | AL | 4       | 38,949    |
| 19             | SE | 2       | 81,838    |
| 20             | RN | 4       | 7,240     |
| 21             | PA | 2       | 51,708    |
| 22             | AM | 4       | 20,929    |
| 23             | TO | 4       | 28,692    |
| 24             | AC | 4       | 34,618    |
| 25             | RR | 4       | 35,547    |
| 26             | AP | 4       | 18,559    |
| 27             | RO | 4       | 10,659    |

Source: Research data

Box 5 presents the cluster centers after the iterative update process. This box makes it easier to interpret the composition of the clusters by presenting the central values of the variables used to form the clusters. If we compare this with Box 2 (Centers of Initial Clusters), we may observe that only Cluster 1 did not suffer alterations, because it is composed exclusively of the case of the State of São Paulo.

**Box 5 – Centers of the Final Clusters**

|           | Cluster |      |      |      |      |
|-----------|---------|------|------|------|------|
|           | 1       | 2    | 3    | 4    | 5    |
| NUMDEP    | 70      | 14   | 50   | 8    | 25   |
| OCORTIB   | 37      | 8    | 24   | 5    | 13   |
| PROREL    | 1561    | 305  | 1028 | 81   | 550  |
| PROPIRREL | 153     | 41   | 81   | 7    | 48   |
| FALTAS    | ,086    | ,071 | ,076 | ,090 | ,092 |

Source: Research data

For the distance between the centers of the final clusters, we observe that the clusters which are most similar to each other are Clusters 2 and 4, and the ones that are most different are Clusters 1 and 4, as can be seen in Box 6.

**Box 6 – Distances between Centers of Final Clusters**

| Cluster | 1               | 2              | 3       | 4               | 5        |
|---------|-----------------|----------------|---------|-----------------|----------|
| 1       |                 | 1262,563       | 538,401 | <u>1489,320</u> | 1017,766 |
| 2       | 1262,563        |                | 725,144 | <b>227,177</b>  | 245,377  |
| 3       | 538,401         | 725,144        |         | 951,470         | 479,918  |
| 4       | <u>1489,320</u> | <b>227,177</b> | 951,470 |                 | 471,624  |
| 5       | 1017,766        | 245,377        | 479,918 | 471,624         |          |

Source: Research data

Box 7 presents the results of our dispersion analysis. Column F allows us to extract general conclusions about the influence of the variables on the formation of the clusters. We were therefore able to verify that the number of relevant proposals presented by Representatives was the variable that exerted the greatest influence on the formation of clusters and absences exerted the smallest influence.

**Box 7 – ANOVA**

|           | Cluster           |    | Erro              |    | F              | Sig. |
|-----------|-------------------|----|-------------------|----|----------------|------|
|           | Quadrado<br>Médio | gl | Quadrado<br>Médio | gl |                |      |
| NUMDEP    | 1502,642          | 4  | 38,429            | 22 | 39,102         | ,000 |
| OCORTIB   | 350,441           | 4  | 9,741             | 22 | 35,975         | ,000 |
| PROREL    | 837403,949        | 4  | 3989,659          | 22 | <b>209,894</b> | ,000 |
| PROPIRREL | 6814,730          | 4  | 431,224           | 22 | 15,803         | ,000 |
| FALTAS    | ,001              | 4  | ,001              | 22 | <b>,923</b>    | ,468 |

The F tests should be used just for descriptive purposes because the clusters were chosen to maximize the differences between cases in different clusters. The levels of significance observed are not corrected for this, thus they cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Source: Research data

Box 8 presents data relating to the number of cases in each cluster and shows that all of the cases analyzed were valid and, therefore, no case was omitted.

**Box 8 – Number of Cases in Each Cluster**

|         |   |        |
|---------|---|--------|
| Cluster | 1 | 1,000  |
|         | 2 | 8,000  |
|         | 3 | 2,000  |
|         | 4 | 10,000 |
|         | 5 | 6,000  |
| Válidos |   | 27,000 |
| Omissos |   | ,000   |

Source: Research data

In sum, the data presented here beforehand ratified the viability of the performed cross-references. In this sense, we will next present the analyses and discussion regarding the investigated data.

## 4. ANALYSES AND DISCUSSION

This study seeks to analyze the performance of Representatives in Congress, comparing them with the development indices for Brazilian states, in order to understand if there is a relationship between political performance and the Municipal Human Development Index (MHDI) and Gross Domestic Product (GDP) per capita for the represented states. Thus, each of these states was classified using the non-hierarchical K-means cluster analysis technique which makes it possible to group the states with the greatest similarities, in terms of the performance of their Representatives in Congress, within the same cluster.

Based on the obtained clusters, we have sought to verify whether the states that belong to the same cluster have similarities in relation to GDP per capita, MHDI and the geographic region that they occupy. The results of the analysis demonstrate that there is not necessarily a relationship between the performance of Representatives in Congress and the other observed aspects.

Cluster 1 consisted exclusively of the State of São Paulo, located in the Southeast region, which occupies second place in GDP per capita as well as MHDI. São Paulo is the most populous state in Brazil and for this reason it has the maximum number of Representatives allowed by law, which is 70, while Minas Gerais, the state in second place, has 53 or 17 fewer. Thus, it is natural that the State of São Paulo occupies a differentiated position due to its having the largest number of members in the House of Representatives. In addition, the performance of its members is consistent to a certain extent with the state's MHDI and GDP per capita indices, with the state ranking second in both aspects.

Cluster 2 (Figure 3) is the most diverse in terms of the characteristics observed for the states that make it up. It includes Ceará, Maranhão, Paraíba, and Sergipe, located in the Northeast, and Pará, located in the North; these states occupy the lowest positions in terms of GDP and MHDI. Paradoxically the Federal District is also in this cluster. It is located in the Central West region and has a series of unique characteristics. The large number of public positions available due to the Brazil's capital Brasília and the headquarters of the three branches of government (Executive, Legislative and Judicial) as well as foreign embassies, leads to its occupying first place in terms of GDP per capita and the MHDI. Also appearing in this cluster is Goiás, which is also located in the Central West region, and Espírito Santo, located in the Southeast, which are both well positioned in the GDP per capita and MHDI rankings.

**Figure 3 – MHDI and GDP per Capita Rankings for Cluster 2**

| UF | Ranking IDHM | Ranking PIB <i>per capita</i> |
|----|--------------|-------------------------------|
| ES | 7°           | 5°                            |
| GO | 11°          | 10°                           |
| DF | 1°           | 1°                            |
| CE | 17°          | 24°                           |
| MA | 24°          | 23°                           |
| PB | 22°          | 26°                           |
| SE | 23°          | 18°                           |
| PA | 26°          | 21°                           |

Source: Research data

The third cluster is made up of just two states: Minas Gerais and Rio de Janeiro, located in the Southeast region, which are the second and third most represented states in the House of Representatives. In terms of MHDI, Rio de Janeiro is in 6<sup>th</sup> position in the national ranking while Minas Gerais is in 8<sup>th</sup>. In terms of GDP per capita, the disparity between these states is a little greater, given that Rio de Janeiro is in 3<sup>rd</sup> place in the national ranking, while Minas Gerais is in 11<sup>th</sup>, in accordance with Figure 4.

**Figure 4 – MHDl and GDP per capita Rankings for Cluster 3**

| UF | Ranking IDHM | Ranking PIB <i>per capita</i> |
|----|--------------|-------------------------------|
| MG | 8°           | 11°                           |
| RJ | 6°           | 3°                            |

Source: Research data

Cluster 4 is the one with the largest number of states, and it is made up of Mato Grosso do Sul from the Central West region, which is the highest in terms of MHDl and GDP per capita, occupying the 10<sup>th</sup> and 9<sup>th</sup> positions in the national ranking; and Piauí and Alagoas, located in the Northeast region, which occupy the 25<sup>th</sup> and 27<sup>th</sup> positions in MHDl and the 27<sup>th</sup> and 25<sup>th</sup> positions respectively in terms of GDP per capita. This cluster also contains all of the states in the North region except Pará. Amazonas, Tocantins, Acre, Roraima, Amapá and Rondônia are close to each other in the GDP per capita ranking. In terms of the MHDl ranking, the State of Amazonas appears a little lower than the others, occupying the 20<sup>th</sup> position (Figure 5).

**Figure 5 – MHDl and GDP per Capita Rankings for Cluster 4**

| UF | Ranking IDHM | Ranking PIB <i>per capita</i> |
|----|--------------|-------------------------------|
| MS | 10°          | 9°                            |
| PI | 25°          | 27°                           |
| AL | 27°          | 25°                           |
| RN | 16°          | 20°                           |
| AM | 20°          | 12°                           |
| TO | 13°          | 16°                           |
| AC | 15°          | 17°                           |
| RR | 14°          | 13°                           |
| AP | 12°          | 15°                           |
| RO | 18°          | 14°                           |

Source: Research data

Cluster 5, in turn, is made up of the three states in the South region, Rio Grande do Sul, Paraná and Santa Catarina, which are also close in terms of the positions they occupy in the national rankings for MDHI and GDP per capita; the State of Mato Grosso, located in the Central West region, close to the states of the South region in terms of its positions in the national rankings for the MHDl and GDP per capita; and finally, the States of Bahia and Pernambuco, located in the Northeast region, are also close to each other in the MHDl and GDP per capita rankings, but distant from the other states that make up this cluster (Figure 6).

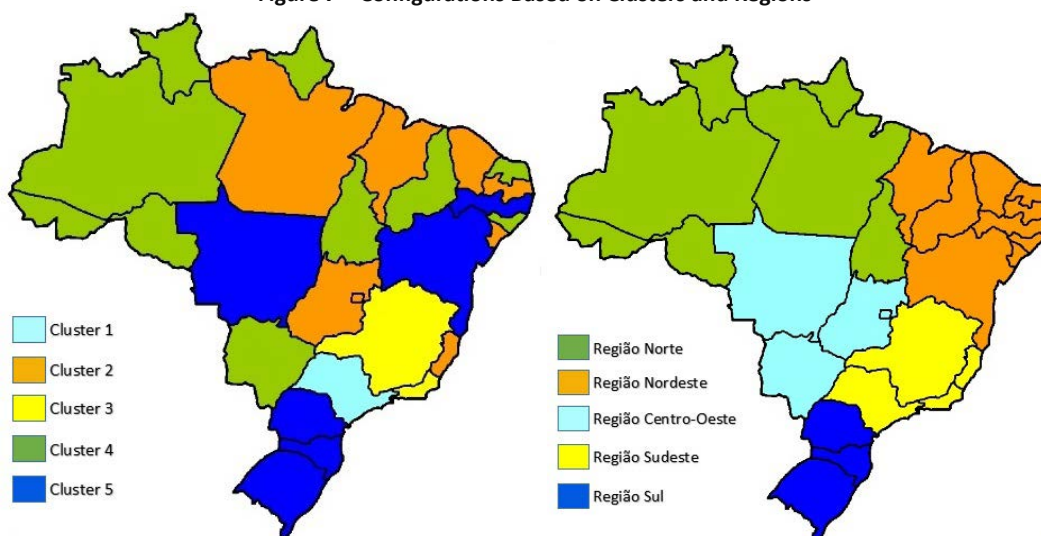
Figure 6 – MHDl and GDP per Capita Rankings for Cluster 5

| UF | Ranking IDHM | Ranking PIB per capita |
|----|--------------|------------------------|
| RS | 5°           | 6°                     |
| PR | 4°           | 7°                     |
| SC | 3°           | 4°                     |
| MT | 9°           | 8°                     |
| BA | 21°          | 22°                    |
| PE | 19°          | 19°                    |

Source: Research data

Finally, Figure 7 presents the configuration of Brazilian territory based on the obtained clusters as compared to the geographic regions the country is divided into.

Figure 7 – Configurations Based on Clusters and Regions



Source: Research data

Based on the images in Figure 7, we can verify that the division of the states in clusters based on the performance of the Representatives in Congress who represent them and the MHDl and GDP per capita indices, reveals a certain discrepancy in relation to the Brazilian geographical regions, given that states in different regions are similar in terms of their particular features, congruencies, and discrepancies in terms of the analyzed aspects.

## 5. FINAL CONSIDERATIONS

Given the necessity to stimulate awareness of democratic processes, this study has sought to analyze the performance of Representatives of the House, comparing the indices of the development of Brazilian states to understand whether there is a relationship between political performance and the Municipal Human Development Index (MHDl) and Gross Domestic Product (GDP) per capita in the states they represent.

In broad terms, this study has made it possible to perceive that instruments like the Legislator Project, the source of this study, are of great importance in having access to information about our legislators. As a democratic exercise, having this information available gives the population visibility and enables it to monitor the work of those who have been elected to represent it, reinforcing the idea of representative democracy ensured by the Federal Constitution. This statement is reinforced by the fact that the project makes it possible to access this data in a broad manner, and above all, to analyze this based on academic perspectives, in accordance with the work realized here.

Overall, the data makes it possible to group through clusters those representatives who have similar performance. To accomplish this, we have considered the total number of Representatives in the House; the number of representatives with occurrences in court and/or the Accounting Courts; the proportion of absences in legislative sessions; the number of relevant proposals presented; and the number of irrelevant proposals presented. The representative profiles made the clusters extrapolate their geographic frontiers and approximate states in the most diverse regions. It was in this sense, for example, that the performance of congressmen in states in the South was similar to those from the states of Mato Grosso, Bahia and Pernambuco, which make up Cluster 5. A similar situation occurred in others states that make up Clusters 2 and 4.

Even though they drew closer, however, it was possible to observe that there were considerable discrepancies within the same cluster in terms of the position of each state grouped by the national rankings for MHDl and GDP per capita. Looking at Cluster 5 again, despite the similarities in the performance of the Representatives in the House, the cluster includes the 4<sup>th</sup> (Paraná) and 24<sup>th</sup> (Bahia) states in the MHDl ranking, and the 4<sup>th</sup> (Santa Catarina) and 22<sup>nd</sup> (Bahia) states in the GDP per capita ranking. It should be noted that this discrepancy can also be observed in other clusters with greater numbers of states (2 and 4).

In a certain manner, this information makes it possible to perceive that there is no relationship of equivalence between the performance of Representatives in the House and the development indices observed in this study (MHDl and GDP per capita). Even though democracy is a political regime that tends to satisfy the expectations of its citizens in a direct or indirect manner through elected representatives, as is true of the Representatives of the House, we have verified that it is still fragile within the national scenario (Moises, 2010).

Corroborating the idea of Lordêlo and Pontes (2009), to the extent that social demands increase with the consequences of globalization and the advance of the world economy, we can observe that representatives elected by the population have greater difficulties in meeting them in a satisfactory manner. However, it is believed that the ethical and efficient performance of political agents can always contribute significantly to modify the situation in which the states find themselves. To accomplish this, the indices of human and economic development should be not just be present in the discourses of our elected representatives, they should above all be present in their actions.

Overall, this is an initial study which is not intended to exhaust this subject. The researched data, or even the identification of transparency actions, demonstrates the wide variety of analysis possibilities that are available in terms of discussions of the performance of political agents and their respective returns for the population. In this sense, we would suggest that future studies can use data from other Transparency Brazil projects (2017), or other reports displayed in the transparency portals of various spheres of government. Other research possibilities can be developed based on qualitative analyses of the effective representativity of the projects proposed by these representatives of the people.

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| 2. Development of hypotheses or research questions (empirical studies) | X          |            |            |
| 3. Development of theoretical propositions (theoretical work)          | X          |            |            |
| 4. Theoretical foundation / Literature review                          | X          | X          | X          |
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| 10. Manuscript writing                                                 | X          | X          | X          |
| 11. Other (please specify)                                             |            |            |            |

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