

Socioeconomic (Endogenous) Development Index of Municipalities in Free Trade Areas (FTA) linked to SUFRAMA: A Multifactor Analysis

Fabio Robson Casara Cavalcante¹ Carlos Alberto Paraguassú-Chaves² Ana Maria Moraes da Fonseca Cavalcante³ Fabrício Moraes de Almeida⁴ Lenita Rodrigues Moreira Dantas⁵ Carla Dolezel Trindade⁶ Simão Aznar Filho⁷ Ruy Drummont Smith⁸ Simão Dolezel Aznar⁹ Márcia Maria Rodrigues Uchôa¹⁰ Marcélio Rodrigues Uchôa¹¹

¹PhD in Sciences: Socio-environmental development - NAEA / UFPA. Associate Professor, Federal University of Rondônia – UNIR.

²PhD in Health Sciences -University of Brasília - UnB, Brazil; Post-Doctor in Health Sciences - UnB and Degli Studi D'Aquila University - Italy. Full Professor at the Rio de Janeiro Institute Faculty, Brazil

³Master in Agronomy from the Federal University of Pernambuco (UFPE), Brazil. Voluntary researcher at the Higher Institute of Health Sciences and the Environment of the Amazon – AICSA.

⁴PhD in Physics (UFC), with post-doctorate in Scientific Regional Development (DCR/CNPq). Researcher of the Doctoral and Master Program in Regional Development and Environment (PGDRA/UNIR).

⁵Geographer expert and lawyer. Researcher of the Institute of Health Sciences and the Amazon environment - AICSA.

⁶PhD in Law - Universidad Nacional de Lomas de Zamora (Argentina). Post-doctorate - Università deli Studi di Messina (Italy). Full Professor at the University Institute of Rio de Janeiro - IURJ, Brazil.

⁷PhD in Law - Universidad Nacional de Lomas de Zamora (Argentina). Post-doctorate - Università deli Studi di Messina (Italy). Full Professor at the University Institute of Rio de Janeiro - IURJ, Brazil.

⁸Master in Legal Sciences from the Autonomous University of Lisbon. Adjunct Professor at the Faculty Instituto Rio de Janeiro, Brazil.

⁹Graduated in Law. Master of Law Student, Specialist in Law. Professor at the University Institute of Rio de Janeiro, Brazil.

¹⁰PhD in Education from the Pontifical Catholic University of São Paulo (PUC/SP). Associate Professor at Faculdade Instituto Rio de Janeiro, Brazil.

¹¹PhD in Social Sciences from the Pontifical Catholic University (PUC/SP). Adjunct Professor at the Federal University of Rondônia, Brazil.

ABSTRACT

The objective was to analyze the regional development of the nine cities covered by the SUFRAMA policy in comparison with nine other Amazonian municipalities not covered by this policy, in order to identify the municipal performance achieved in the face of the Brazilian Amazonian reality. The theoretical foundation of this work is linked to the theory of endogenous development associated with the institutionalist theory of Douglass North and the poles of development in Schumpeter and Perroux. A multivariate factorial data model was used to extract the scores for the construction of indices, using the SPSS statistical tool, version

22, using the factor analysis technique developed similarly to the main components. It was possible to build socioeconomic development indexes and, with that, proceed with the due analysis intrinsic to the epistemological issue of this work. The data showed adequacy to factorial studies and allowed us to observe, in general, the low level of socioeconomic development of the surveyed municipalities, however, with a more favorable situation for the municipalities covered by the SUFRAMA policy.

Keywords: SUFRAMA. Endogenous Development. Indexes. Multifactor Analysis. Amazon.

1. INTRODUCTION

The theoretical foundation of this work is based on the theory of endogenous development and the theory of poles of regional development in association with the institutionalist theory of Douglass North. The idea of Endogenous Development is to endogenize a series of previously exogenous variables (such as human capital, the environment, etc.) in order to generate increasing returns. Economic growth would then be an endogenous result of an economic system, and not the result of forces that affect it from the outside. It is noteworthy, therefore, that the importance of this theory has been driven by the process of globalization, where reflections on the role of locality and territory in development strategies have been gaining density in the contemporary agenda. [1].

On endogenous development Vázquez-Barquero [2] states that “economic development occurs as a result of the use of locally generated potential and surplus” and complements by stating that “to neutralize the steady state tendencies, it is necessary to activate the factors determinants of the processes of capital accumulation, namely, the creation and diffusion of innovations in the productive system, the flexible organization of production, the generation of agglomeration economies and economies of diversity in cities and the strengthening of institutions”. In this sense, Dowbor[3] presents a vision of development that, without underestimating the economic importance, places the human being and the collective and majority interests as a central point, converging on the possibility of enhancing the capacities of all individuals. An important contribution made by Campanhola and Graziano da Silva [4] points out that “the global cannot exist without the local, and the local is characterized by social relations that are structured by global social relations”. Thus, Amaral Filho [5] understands endogenous development as a process in which economic growth leads to a continuous expansion of the capacity to generate and add value to production and also of the region's absorption capacity in retaining the economic surplus generated in the local economy and in the attraction of surpluses from other regions.

For Buarque [6], local development is defined as an endogenous process of change that leads to economic dynamism and improved quality of life for the population in small territorial units and human groups. To be consistent and sustainable, local development must mobilize and exploit local potential and contribute to raising social opportunities and the viability of the local economy; at the same time, it must ensure the conservation of local natural resources, which are the basis of its potential and condition for the quality of life of the local population. Zapata [7], in turn, highlights that local development consists of a process in which the social character is integrated with the economic one. The strategy of endogenous development or local development proposes to, in addition to developing the productive aspects, enhance

the social, cultural, environmental and political-institutional dimensions that build the well-being of society. In this sense, endogenous development seeks to meet the needs and demands of the local population through the active participation of the community involved. More than obtaining gains in terms of the position occupied by the local productive system in the international or national division of labour, the objective is to seek the economic, social and cultural well-being of the local community as a whole. In addition to influencing productive aspects (agricultural, industrial and services), the development strategy also seeks to act on the social and cultural dimensions that affect the well-being of society [8].

For Buarque [9] local development within globalization is a direct result of the ability of local actors and society in which they are structured and mobilized, based on their potential and their cultural matrix, to define and explore their priorities and specificities, seeking competitiveness in a context of rapid and profound transformations. Thus, considering the theoretical context of endogenous development, it is necessary for the Amazon region to adopt mechanisms to strengthen its local specificities, outlining collective actions in favor of a development model compatible with the multiple cultural characteristics existing in the territorial context in order to overcome obstacles and the “knots” that impede the perfect flow of development fluidity, based on a critical and organizational reading of four strategic factors: knowing your strengths, weaknesses, threats and opportunities, referring to the ZOPP method. It is understood, therefore, that the theory of endogenous development helps to substantiate the historical process of the Manaus Free Zone policy, by making it possible to understand that the process of construction of that policy is rooted in local needs and claims. However, one should be aware of the risk of this policy generating historical dependence, from the perspective of the self-reinforcing characteristics of North [10], Nobel Prize in Economics, in 1993, based on his institutionalist theory.

Rey [11] when analyzing the 50-year period of operation of the Superintendence of the Manaus Free Zone (SUFRAMA) revealed that the lack of complementation of the incentive policy generated a certain dependence in the region and that there would be a need for new public actions to correcting this process, which reinforces the theoretical foundation adopted in this study, that is, producing new trajectories from the endogenous or local force in a bottom-up logic. Thus, in view of the challenges to be faced in conducting this research, outlining the theory of endogenous development is an important step in the construction of the epistemological guidelines of the research, in order to become vigilant in the conduct of work in the field of economic sciences. At the same time, the theory of “growth poles” developed by French economist François Perroux brings the idea of creating economic incentive zones to increase the region’s productive capacity, in order to modify the geographic space and boost local social and economic development [12]. According to these authors, Perroux’s work “In his Theory of Poles of Growth, or “Théorie des Pôles de Croissance” demystifies the notion of geographic space, elevating the discussion to a level of complexity that takes into account the potential of a region to concentrate industries and human capital making it a zone of economic influence that can reach a high level of importance across borders.

According to Silva Filho; Carvalho [13] in the models of the new theory of economic growth, growth is seen as a product of economic forces endogenous to decentralized market systems. It is these forces that drive the process more than any exogenous technological innovations over which the market has no control. Therefore, the economy can reach an equilibrium of perpetual growth through its internal forces. In order for there to be such a growth, it is only necessary that the downward trend in returns to

capital be eliminated. In this sense, factors such as endogenous technological innovation (which arise as a result of the efforts of productive agents to maximize their profits), human capital (that is, the stock of knowledge of economic agents) and institutional arrangements (including government policy and civil society organization) come to assume a crucial role in the continued growth of per capita income in any economic system. Therefore, according to these same authors, it is at this point that the fundamental role played by the social actors that command the development policies of underdeveloped economies, whether economic blocks of countries, national economies or regions within a country, in the specific case of the present work, the policy of regional development of SUFRAMA, in the regional portion of the Amazon, northern region of Brazil. According to Schumpeter [14], economic development is not a phenomenon to be explained economically, but that the economy, in itself without development, is dragged by changes in the world around it and that the causes and, therefore, the explanations development must be sought outside the group of facts that are described by economic theory.

Therefore, in general, it can be said that for Perroux, Schumpeter, Vázquez-Barquero, among others, the economy should focus on a more social context. In this direction, the institutionalist theory of Douglass North, Nobel laureate in Economics in 1993, reveals that North [10] points out that institutional models tend to reinforce themselves, even when they are socially inefficient. It is easier for individuals to adapt to existing rules than to try to change them. When development takes a certain direction, organizational culture, customs and mental models of the social world reinforce this trajectory, that is, they drive it to move in the same direction [15]. Thus, North brought an approach that portrays the concern of the performance achieved by countries and regions in relation to the institutional arrangement, the result of the form and power of social interaction. In this view, the economic aspect is not a cause, but a consequence of a process of social and institutional formation of the place. In this way, the social now has the power to stimulate or stifle development.

Therefore, the present research is structured based on these theoretical principles that will guide the progress of the research and will allow conducting the study within a systematic epistemological surveillance. In this sense, the theory of endogenous development and regional development poles associated with Douglass North's institutionalist theory applied to the reality of Free Trade Areas will allow new opportunities for contribution to economic science, from the theoretical and methodological approach of research applied to the scenario Brazilian western Amazon. Free Zone, in Benton's view; Napier; Ülku[16], is understood as being a region inserted in the context of a national territory, where free import and export trade is allowed, through specific legislation and within an account system and special customs regime through from which the development of a given geographic region is promoted.

SUFRAMA's public policy, instituted in the 1960s in the country's Western Amazon, was an action by the federal government with the objective of giving a new impetus to development in the Brazilian Amazon region after the decline of the rubber economy, which generated socioeconomic effects. perverse in the regional and national scenario, becoming a major challenge for the country. Thus, this policy, since its origin, has as its main objective to encourage the development of the interior of the Amazon, as can be seen by Art. 1 of Decree no. 288, of February 28, 1967, which regulated it and as part of the Government's Economic Action Plan - PAEG (1964-1966): The Manaus Free Trade Zone is an import and export free trade area with special tax incentives, established with the aim of creating an industrial, commercial and

agricultural center in the interior of the Amazon, endowed with economic conditions that allow its development, given the local factors and the great distance from the consumer centers of its products.

The Amazon reality was chosen as the scenario of the present study because it is the main region of biodiversity in the world and that there is international attention in relation to economic activities in the perspective of sustainable development, which requires the Brazilian government to carry out technical studies that can serve as an aid for the strategies and actions of the federal executive in designing effective public policies, which, among others, are the result of research that can shed light on the understanding and interpretation of the regional Amazonian reality as an element of national economic integration. Thus, faced with such a scenario, Brazil created the policy of the Superintendence of the Manaus Free Zone (SUFRAMA) as a strategy to boost economic growth and regional development, without giving up environmental preservation and social justice.

Therefore, the objective was to analyze the economic and social development indices of the nine municipalities covered by the SUFRAMA policy and linked to the Free Trade Areas with the economic and social development indices of the nine municipalities that are not covered by the aforementioned fiscal incentive policy. However, they are municipalities inserted in the border strip of the Western Amazon. Thus, given the context of economic globalization and the need to establish national policies to stimulate the development of regions with a significant presence of legally protected areas, such as the Brazilian Amazon and the Manaus Free Trade Zone policy, this work demonstrates its importance to the to analyze a regional context based on a vision of a pole of development inserted in a reality of economic freedom, which indicates the existence of an important paradox to be analyzed and discussed within science. The aim is, therefore, to fill a fertile space in terms of analysis of regional economic development policies in the country, based on solid theoretical and methodological foundations capable of bringing light and constructions to the debates around this theme.

2. RESEARCH METHODOLOGY

2.1 Type of search

This is a quantitative research of the experimental type, which will seek to raise indicators for later calculation of the index for purposes of comparison between the municipalities selected for this study.

2.2 Universe and sample

Within the universe of 92 municipalities located on the border strip in the Brazilian Western Amazon [17], 9 municipalities covered by the Free Trade Areas policy were surveyed, namely: Tabatinga (Amazonas), Guajará-Mirim (Rondônia), Boa Vista and Bonfim (Roraima), Macapá and Santana (Amapá) and Brasiléia, with extension to the municipality of Epiaciolândia, and Cruzeiro do Sul (Acre) and 9 more municipalities, for comparison purposes, not covered by the aforementioned policy, namely: Feijó, Sena Madureira and Tarauacá (Acre), Barcelos, Benjamin Constant and Boca do Acre (Amazonas) and Buritis, Nova Mamoré and Pimenta Bueno (Rondônia), totaling a sample of 18 municipalities along the border of the Western Amazon that participated in this study, with the years 2010 and 2018 being the two periods chosen for data collection. For this, the following acronyms of the municipalities selected in this work were

adopted in order to facilitate the process of calculation and presentation of data, as follows: Tabatinga (TAB), Guajará-Mirim (GUA), Boa Vista (BOA), Bonfim (BOM), Macapá (MAC), Santana (SAN), Brasília (BRA), Epitaciolândia, (EPI), Cruzeiro do Sul (CRU), Feijó (FEI), Sena Madureira (SEN), Tarauacá (TAR), Barcelos (BAR), Benjamin Constant (BEN), Boca do Acre (BOC) and Buritis (BUR), Nova Mamoré (NOV) and Pimenta Bueno (PIM).

2.3 Data collection

The economic and social indicators collected from institutional sources are shown in Table 1 below.

Table 1: Survey of quantitative data effectively worked on for the preparation of the regional development index of the present study

THEME	INDICATORS	SOURCE
economic index	Gross Domestic Product per capita, at current prices (R\$ 1.00)	IBGE (Statistics)
	Share of gross value added at current prices of agriculture in the gross value added at current prices of agriculture in the federation unit (%)	IBGE (Statistics)
	Share of gross value added at current industry prices in gross value added at current prices of industry in the federation unit (%)	IBGE (Statistics)
	Share of gross value added at current prices of services, administration, defence, education and public health and social security, in added value	IBGE (Statistics)
	Participação do valor adicionado bruto a preços correntes total no valor adicionado bruto a preços correntes total da unidade da federação (%)	IBGE (Statistics)
	Gross Domestic Product, at current prices (R\$ 1,000)	IBGE (Statistics)
	number of cattle	IBGE (Municipal livestock research)
	Coffee production (% in relation to the state)	IBGE (municipal agricultural production)
	Value of the production of round wood (Thousand BRL)	IBGE (Production of plant extraction and forestry)
social index	Population served with water supply (%)	IBGE (demographic census)
	Unit No. Health (per thousand inhabitants)	DATASUS

	Number of beds (per thousand inhabitants)	DATASUS
	Number of doctors (per thousand inhabitants)	DATASUS
	IFDM Consolidated	Firjan
	IFDM Employment & Income	Firjan
	IFDM Education	Firjan
	IFDM Health	Firjan
	IDEB - Elementary school (early years)	INEP

Source: Own elaboration

2.4 Data processing

This is a factor analysis study. The model in question follows the calculation reasoning proposed or applied by Reis [18]; Hair et al. [19]; Santana [20] and Santana [21]; Gama et al. [22]; Santana [23]; Fávoro and Belfiore [24]. This model has already been tested and applied in other studies, such as Cavalcante [15], Paraguassu-Chaves et al. [25]; Paraguassu-Chaves et al. [26]; Paraguassu-Chaves et al. [27]; Paraguassu-Chaves et al. [28]; Paraguassu-Chaves et al. [29]; Paraguassu-Chaves et al. [30], where it was possible to build indexes within this methodological perspective. According to Hair et al. [19] factor analysis is a generic name given to a class of multivariate statistical methods whose main purpose is to define the underlying structure in a data matrix. Complementing this reasoning, the aforementioned authors also reveal that when summarizing the data, the factor analysis obtains latent dimensions that, when interpreted and understood, describe the data in a much smaller number of concepts than the original individual variables. The logic of construction of the social and economic indices, proposed here, therefore follows this reasoning.

These authors reveal that although there is still much debate about which factor model is the most appropriate, empirical research has shown similar results in many cases. Continuing with this reasoning, the authors state that in most applications, both principal component analysis and common factor analysis arrive at essentially identical results if the number of variables exceeds 30, or if the commonalities exceed 0.60 for most of the variables.

Therefore, factor analysis can identify the structure of a set of variables, as well as provide a process for data reduction [19]. In this study, we adopted the same methodological procedures already experienced by the authors in other research experiences. Thus, the factor analysis model adopted here is very similar to the principal components model, according to Santana [20] and Santana [21]. Also according to this author, the principal components model with m components and p variables ($q < p$), can be written based on the description presented by Dillon; Goldstein [31], in which the model is presented in matrix form (Equation 1):

$$\begin{aligned}
 CP_1 &= Y_{11}X_1 + Y_{12}X_2 + \dots + Y_{1p}X_p \\
 CP_2 &= Y_{21}X_1 + Y_{22}X_2 + \dots + Y_{2p}X_p \\
 &\vdots \\
 CP_q &= Y_{m1}X_1 + Y_{m2}X_2 + \dots + Y_{qp}X_p
 \end{aligned}$$

Equation (1)

On what:

CP_i = are the i -th principal components ($i = 1, 2, \dots, q$);

λ_{ij} = are the coefficients related to each variable;

X_j = are the j th variables ($j = 1, 2, \dots, p$).

On the other hand, the basic model of factor analysis, according to Santana [20] and Santana [21], expresses each variable in terms of common latent factors and a single factor or specific factor. The algebraic representation of the model is given by equation 2:

$$X_1 = \lambda_{11}FC_1 + \lambda_{12}FC_2 + \dots + \lambda_{1q}FC_q + \varepsilon_1$$

$$X_2 = \lambda_{21}FC_1 + \lambda_{22}FC_2 + \dots + \lambda_{2q}FC_q + \varepsilon_2$$

Equation (2)

$$X_p = \lambda_{p1}FC_1 + \lambda_{p2}FC_2 + \dots + \lambda_{p,q}FC_q + \varepsilon_{mp}$$

On what:

X_i = are the i -th variables ($i = 1, 2, \dots, p$);

λ_{ij} = are the coefficients related to each common factor;

FC_j = are the j th common factors ($j = 1, 2, \dots, q$);

ε_i = are the i -th specific factors.

Thus, according to the author in question, the basic model of common factors is usually expressed in matrix form as in equation 3, according to Dillon; Goldstein [31]:

$$X = \alpha F + \varepsilon \quad \text{Equation (3)}$$

Being,

X the **p-dimensional**, vector transposed of the observable variables, denoted by $X = (x_1,$

$= x_2, \dots, x_p)$;

F the **q-dimensional**, vector transposed of unobservable variables or latent variables

$=$ called common factors, denoted by $F = (f_1, f_2, \dots, f_q)$, being that $q < p$;

ε = the **p-dimensional** vector transposed of random variables or single factors, denoted by $\varepsilon = (\varepsilon_1, \varepsilon_2, \dots, \varepsilon_p)$;

α = the matrix (p,q) of unknown constants, called factor loadings.

In the factor analysis process, an important aspect to be submitted to the data is the rotation of factors, through a factorial rotation tool, according to Hair et al. [19]. In practice, according to the same authors, the objective of all rotation methods is to simplify the rows and columns of the factor matrix to facilitate interpretation. Thus, it is assumed that in the factor analysis model the specific factors are orthogonal to each other, with all the common factors, where it is normally adopted that: $E(\varepsilon) = E(F) = 0$ and $\text{Cov}(\varepsilon, F) = 0$, according to Gama et al. [22] and Santana [23]. According to these authors, the initial structure used to determine the factor loading matrix, in general, may not provide a significant pattern of variable loadings, thus indicating that there is not something that signals a definitive way for this to occur. Thus, the confirmation or not of this initial structure can be done through various methods of factor rotation, according to Dillon; Godstein [31]; Johnson and Wichern [32]. For the purpose of the present construction of the regional development performance index, the VARIMAX method was adopted, considered one of the most popular methods of orthogonal rotation of factors [19]. The VARIMAX method is a process in which the reference axes of the factors are rotated around the origin until some other position is reached.

The objective is to redistribute the variance from the first factors to the others and reach a simpler and theoretically more significant factor pattern Hair et al. [19]; Santana [20] and Santana [21]; Gama et al. [22]; Santana [33]; Santana [34].

The choice of factors, in turn, is performed using the latent root technique. According to Hair et al. [19] latent root is the column sum of factor loadings squared for a factor. Also called eigenvalue, it corresponds to the amount of variance explained by a factor. According to these authors, a factor is understood to be the linear combination (statistical variable) of the original variables. The factors also represent the latent dimensions (constructs) that summarize or explain the original set of observed variables. Thus, the factor loading matrix that measures the correlation between common factors and observable variables is determined through the correlation matrix, according to Dillon; Goldstein [31]. Therefore, to determine the performance indices of economic and social development, we used the matrix of factor scores estimated by the factorial orthogonal rotation process, as pointed out by Santana [33]. The factor score, by definition, places each observation in the space of common factors. For each factor f_j , extracted factor score is defined by F_{ij} , expressed as follows (equation 4) [31]:

$$F_{IJ} = b_1x_{i1} + b_2x_{i2} + b_px_{ip} \quad \text{Equation (4)}$$

Being that:

b_i = are the estimated regression coefficients for the n common factor scores;

x_{ij} = are the n observations of the p observable variables.

i = 1,2,...,n.

j = 1,2,...,p.

Gama et al. [22] and Santana [34] show the evolutionary sequence of the formulas from the previous equation, which allows arriving at the equation that represents the regional development performance index of the municipalities object of the present study. Thus, according to the authors, it appears that although the variable F_{ij} is not observable, it can be estimated using factor analysis techniques, using the matrix of observations of the vector x of observable variables. In factorial notation, equation 5 becomes:

$$F_{(n,q)} = X_{(n,q)}b_{(p,q)} \quad \text{Equation (5)}$$

According to Santana [34], in equation 5, F is the regression matrix estimated from the n factor scores, which can be affected both by the magnitude and by the measurement units of the x variables. To get around this type of problem, the variable x is replaced by the standardized variable w , (equation 6), given by the ratio between the deviation from the mean and the standard deviation of x , as follows:

$$w_{ij} = \quad \text{Equation (6)}$$

With these values, equation 6 is modified making equation 7 possible, as follows:

$$F_{(n,q)} = w_{(n,q)}\beta_{(p,q)} \quad \text{Equation (7)}$$

Based on equation 7, the beta weight matrix (β) with q standardized regression coefficients, replaces b , given that the variables are standardized on both sides of the equation. Pre-multiplying both sides of

equation 6 by the value $\frac{1}{n}w'$, where n is the number of observations and w' is the transposed matrix of w , makes it possible to arrive at equation 8 [34]:

$$\frac{1}{n}w'_{(p,n)}F_{(n,q)} = \frac{1}{n}w'_{(p,n)}w_{(n,p)}\beta_{(p,q)} = R_{(p,p)}\beta_{(p,q)} \quad \text{Equation (8)}$$

According to Santana [34] the matrix $\frac{1}{n}w'w$ it is constituted in the matrix of inter-correlated variables or matrix of correlation between the observations of the matrix x , designated by R . The matrix $\frac{1}{k}w'F$ represents the correlation between factor scores and the factors themselves, denoted by Λ . Thus, rewriting Equation 9, we have that:

$$\Lambda_{(p,q)} = R_{(p,p)}\beta_{(p,q)} \quad \text{Equation (9)}$$

The same author continues revealing that if the matrix R is non-singular, one can pre-multiply both sides of equation 10 by the inverse of R , obtaining:

$$\beta = R^{-1}\Lambda \quad \text{Equation (10)}$$

Thus, substituting the β vector in equation 4, we obtain the factor score associated with each observation (equation 11), as follows:

$$F_{(n,q)} = w_{(n,p)}R_{(p,p)}^{-1}\Lambda_{(p,q)} \quad \text{Equation (11)}$$

Thus, the main formula for the socioeconomic performance index (IDSE) of the municipalities studied is arrived at, from the perspective of the perception of regional development, which is defined as a linear combination of these factor scores and the proportion of variance explained by each factor in relation to the common variance. The mathematical expression is now represented by the following formula (equation 12), which was based on Santana [34]:

$$IDL_i = \sum_{j=1}^q \left(\frac{\lambda_j}{\sum_j \lambda_j} FP_{ij} \right) \quad \text{Equation (12)}$$

Where,

$i = 1, 2, \dots, n$.

$\lambda =$ the variance explained by each factor;

$\sum \lambda =$ the sum total of the variance explained by the set of common factors.

The factor score was standardized (FP) to obtain positive values from the original scores and allow the ranking of performances to be determined by the index in question, which ranges from 0 to 1. The formula that allows this hierarchy can be seen by equation 13:

$$FP_i = \quad \text{Equation (13)}$$

It is thus seen that F_{min} e F_{max} are the maximum and minimum values observed for the factor scores associated with the performance of the socioeconomic development index (IDSE) from the perspective of the perception of regional development adopted for the present study.

With this, with multiple potential for use, due to the wide capillarity of studies linked to the interest in better understanding and analyzing, in practice, the theme of socioeconomic development and the scenarios of the local and regional reality around the Brazilian western Amazon region, which the analysis of economic and social indicators based on the multivariate method of data, using the technique of factor

analysis and statistical tools from SPSS, allows the construction of a critical view of SUFRAMA's policy and its reflection in the perspective of regional development.

It is hoped, therefore, that this work can help in debates in terms of public policies for regional development, considering the economic and social focus as the axis of analysis. Thus, in the current scenario, where the issue of the Amazon has been more effectively demanded at the negotiation tables for the conclusion of bilateral or multilateral agreements in the spheres of economic and social integration, such as economic blocs, common markets, cooperation between countries, channel efforts to the field of academic debate, from the critical view applied to the process of understanding and interpreting the regional reality, its internal dynamics and the trend of its historical trajectory, thus allowing to build a clear and objective perception of the reality object of the present study, in order to bring new elements and new bases for discussion in the context of SUFRAMA's policy focused on aspects of economic and social development.

2.5 Data adequacy criteria for factor analysis

According to Santana [34], the two main tests that assess data adequacy for factor analysis are the Bartlett sphericity tests, which assess the general significance of the correlation matrix, that is, it tests the null hypothesis that the correlation matrix correlation is an identity matrix; and the Kaiser-Meyer-Olkin (KMO) test, which is based on the principle that the inverse of the correlation matrix approximates the diagonal matrix, in order to compare the correlations between the observable variables. Such models can be expressed in mathematical formulas. Said mathematical formulas of these tests are based on Dillon; Goldstein [31]; Reis [18], Santana [34].

a) Bartlett's test

According to Santana [34], in particular, the Bartlett test of sphericity tests the null hypothesis that the variables are independent, against the alternative hypothesis that the variables are correlated with each other, as can be represented as follows, according to the said author:

$H_0: R = I$ ou $H_0: \lambda_1 = \lambda_2 = \dots = \lambda_p$, (Equation 14) and is given by:

$$X^2 = - \left[n - 1 - \frac{1}{6}(2p + 5) \right] \cdot \ln |R| \quad (\text{Equation 15})$$

$$X^2 = - \left[n - 1 - \frac{1}{6}(2p + 5) \right] \cdot \sum_{i=1}^p \ln \lambda_i \quad (\text{Equation 16}).$$

On what:

$|R|$ is the determinant of the sample correlation matrix;

λ is the variance explained by each factor;

n is the number of observations; and

p is the number of variables.

The statistic has an asymptotic distribution of χ^2 com $[0,5.p.(p-1)]$ degrees of freedom.

b) Kaiser-Meyer-Olkin (KMO) test

The mathematical formulas for these tests were based on Dillon; Goldstein [31], Reis [18], according to Santana [34]:

$$KMO = \frac{\sum_i \sum_j r_{ij}^2}{\sum_i \sum_j r_{ij}^2 + \sum_i \sum_j a_{ij}^2} \quad (\text{Equation 17})$$

On what:

r_{ij} is the sample correlation coefficient between variables x_i and x_j ;

a_{ij} is the partial correlation coefficient between the same variables that is, simultaneously, an estimate of the correlations between the factors, eliminating the effect of the other variables.

The a_{ij} should assume values close to zero, since the factors are assumed to be orthogonal to each other. Values of this test below 0.5 are unacceptable [6].

c) Commonality

In addition to the two previous tests, there is also commonality as an important criterion for testing the suitability of data for factor analysis. In this sense, commonality is the proportion of common variance present in a given variable. Thus, on a scale of zero to one, a variable that does not present specific variance or error would have a commonality of 1, while a variable that does not share variance with any other variable would have a commonality of value 0. In general, the literature indicates a minimum value of 0.5 for commonality to be considered satisfactory. Therefore, for a variable to work well in a factor analysis, it needs to have a large proportion of common variance Hair et al. [19]; Matos and Rodrigues [35]. In the specific case of this study, the cumulativeness met the requirements for factor analysis.

2.6 Scale adopted for analysis of social and economic indices

Below is table 2, which illustrates the description of the scale adopted for this study.

Table 2: Index scale and description

Scale	Description
0.801 to 1.000	Very high
0,601 to 0,800	High
0,401 to 0,600	Regular
0,201 to 0,400	Weak
< 0,200	Very weak

Source: Authors

3. DATA ANALYSIS AND DISCUSSION

3.1 DETERMINATION OF THE ECONOMIC INDEX OF MUNICIPALITIES WITH SUFRAMA: 2010 and 2018

The highest indices of economic development of the municipalities served by the SUFRAMA policy in 2010 were the municipalities of Macapá (0.717) and Boa Vista (0.652), capitals of the States of Amapá and Roraima, respectively, followed by the municipality of Brasília (Acre) 0.307 and the municipality of Santana (Amapá) 0.239. The municipalities of Tabatinga (Amazonas), Guajará-Mirim (Rondônia),

Cruzeiro do Sul and Etipaciolândia (Acre) and Bonfim (Amapá) had indexes below 0.200, which here was classified as having very low performance.

In 2018, the economic development index was higher in Boa Vista (Roraima) with an index of 0.713 and in Macapá (Amapá) with an index of 0.626, followed by Brasília (Acre) with 0.319, Bonfim (Roraima) with 0.243 and Etipaciolândia (Acre) with 0.224, with the other municipalities (Cruzeiro do Sul and Etipaciolândia in Acre, Santana and Bonfim in Amapá, Guajará Mirim in Rondônia and Tabatinga in Amazonas) with performances below 0.200. Based on this, it is noted that the municipality with the highest growth rate in the IDEC in the period in question were the municipalities of Bonfim (Roraima) with 57.3% growth, Etipaciolândia (Acre) with 35.4% and Guajará- Mirim (Rondônia) with 13.1%. On the other hand, the municipalities that presented the highest negative growth rates were: Santana (Amapá) with -21.3% and Macapá (Amapá) with -12.8%.

3.2 DETERMINATION OF THE SOCIAL INDEX OF MUNICIPALITIES WITH SUFRAMA: 2010 and 2018

From the point of view of social development, based on the year 2010, the municipalities assisted by the SUFRAMA policy achieved the highest rates, with Macapá (Amapá) IDSO 0.581 and Boa Vista (Roraima) IDSO 0.580. Next, in descending order, come the municipalities of Santana (Amapá) and Brasília (Acre) which reached, respectively, IDSO of 0.402 and 0.388, Cruzeiro do Sul (Acre) with 0.319; Guajará-Mirim (Rondônia) with 0.310; Etipaciolândia (Acre) with 0.303; Bonfim (Roraima) with 0.258 and Tabatinga (Amazonas) with an index below 0.200. The highest IDSO in 2018 was observed in the municipality of Boa Vista (Roraima) with a performance of 0.700. Next come the municipalities of Cruzeiro do Sul (Acre) with 0.508; Brasília (Acre) with 0.487; Macapá (Amapá) with 0.447; Guajará-Mirim (Rondônia) with 0.373; Etipaciolândia (Acre) with 0.342; Tabatinga (Amazonas) with 0.338; Bonfim (Roraima) with 0.322; Santana (Amapá) with 0.319.

From the point of view of growth in the analyzed period (IDSO-2010 and IDSO-2018), it appears that only 22.2% of the municipalities assisted by the SUFRAMA policy showed negative growth rates and this reality was observed exclusively in the municipalities of the State of Amapá that participate in this study, where the municipality of Macapá presented a rate of -23.0% and Santana with -20.7% of growth in the period. The other municipalities showed positive growth rates, especially Tabatinga (Amazonas) which achieved the highest growth rate in the period (222.6%). The others showed the following growth rates, in descending order, Cruzeiro do Sul (Acre) = 59.3%, Bonfim (Roraima) = 35.1%, Boa Vista (Roraima) = 20.7%, Guajará-Mirim (Rondônia) = 20.6% and Etipaciolândia (Acre) = 12.9%.

3.3 DETERMINATION OF THE ECONOMIC INDEX OF MUNICIPALITIES WITHOUT SUFRAMA: 2010 and 2018

In 2010, the IDEC of the municipalities that are not assisted by the SUFRAMA policy reached a performance considered “low” for 40% of them and “very low” for the other 60%. In descending order, the performance found follows the following sequence: Pimenta Bueno (RO) = 0.329, Buritis (RO) = 0.263, Nova Mamoré (RO) = 0.235 and Sena Madureira (AC) = 0.229. The municipalities of Feijó and Tarauacá (AC), Barcelos, Benjamin Constant and Boca do Acre (AM) presented results below 0.200. In 2018, the

distribution of performances followed practically the same trends observed for 2010. Thus, in descending order, the performance of IDEC-2018 corresponded to the following sequence: Pimenta Bueno (RO) = 0.326, Buritis (RO) = 0.283, Nova Mamoré (RO) = 0.248 and Sena Madureira (AC) = 0.202. The other municipalities presented results below 0.200.

Thus, these results allow analyzing the growth rate in the period in question, that is, between 2010 and 2018, in relation to the IDEC. A negative growth rate was found in 60% of the municipalities, namely: Barcelos (AM) = -100%, Benjamin Constant (AM) = -42.1%, Sena Madureira (AC) = -11.9%, Tarauacá (AC) = -2.8% and Pimenta Bueno (RO) = -0.9%. On the other hand, the other municipalities showed positive growth rates, namely: Boca do Acre (AC) = 179.1%, Feijó (AC) = 13.1%, Buritis (RO) = 7.7% and Nova Mamoré (RO) = 5.4%.

3.4 DETERMINATION OF THE SOCIAL DEVELOPMENT INDEX OF MUNICIPALITIES WITHOUT SUFRAMA: 2010 and 2018

The IDSO – 2010 for the municipalities without SUFRAMA, the indexes indicate very low performance (70% of the municipalities) and 20% with low performance. The exception was the municipality of Pimenta Bueno (RO) which achieved the highest performance among the other municipalities, however with a scale level classified as “regular” performance, reaching an IDSO of 0.598. The municipalities with low performance were: Buritis (RO) = 0.317 and Boca do Acre (AM) = 0.215. While the municipalities with very low performance, in descending order, were: Sena Madureira (AC) = 0.142, Feijó (AC) = 0.099, Nova Mamoré (RO) = 0.092, Tarauacá (AC) = 0.040 and Barcelos (AM) = 0.026.

The IDSO of municipalities without Suframa in 2018 shows a trend of behavior of similar results data from 2010. The highest performance was achieved by the municipality of Pimenta Bueno (RO) with 0.644, followed by the municipalities of Boca do Acre (AM) with 0.414, Buritis (RO) with 0.401, Sena Madureira (AC) with 0.275, Benjamin Constant (AM) with 0.255, Nova Mamoré (RO) with 0.237, Tarauacá (AC) with 0.232 and Feijó (AC) with 0.213. The municipality of Barcelos (AM) was the only one to have a performance below 0.200 in this analysis.

Table 3: Socioeconomic indices determined by the survey for the municipalities surveyed for the years 2010 and 2018 and the growth rates in the period.

Municipalities	IDSO-2010	IDSO-2018	Growth rate %	IDEC-2010	IDEC-2018	Growth rate
TAB	0,105	0,338	222,6	0,024	0,023	-4,8
GUA	0,310	0,373	20,6	0,116	0,131	13,1
BOA	0,580	0,700	20,7	0,652	0,713	9,3
BON	0,238	0,322	35,1	0,154	0,243	57,3
MAC	0,581	0,447	-23,0	0,717	0,626	-12,8
SAN	0,402	0,319	-20,7	0,239	0,188	-21,3
BRA	0,388	0,487	25,4	0,307	0,319	3,7

CRU	0,319	0,508	59,3	0,169	0,166	-2,1
EPI	0,303	0,342	12,9	0,166	0,224	35,4
FEI	0,099	0,213	115,7	0,112	0,126	13,1
SEN	0,142	0,275	93,5	0,229	0,202	-11,9
TAR	0,040	0,232	487,2	0,125	0,121	-2,8
BAR	0,026	0,169	542,9	0,015	0,000	-100
BEN	0,055	0,255	367,1	0,023	0,013	-42,1
BOC	0,215	0,414	92,9	0,063	0,176	179,1
BUR	0,317	0,401	26,3	0,263	0,283	7,7
NOV	0,092	0,237	157,7	0,235	0,248	5,4
PIM	0,598	0,644	7,7	0,329	0,326	-0,9

Source:

Subtitle:

	Municipalities WITH SUFRAMA
	Municipalities WITHOUT SUFRAMA

Search result..

According to table 4, the municipalities of Boa Vista (RR), Macapá (AP) and Santana (AP), in 2010, reached the same level of performance, classified as “regular”. The municipalities of Guajará-Mirim (RO), Bonfim (RR), Brasília (AC), Cruzeiro do Sul (AC) and Eitaciolândia (AC) achieved a performance considered weak in this study. The worst performance was registered for the municipality of Tabatinga (AM) which had a very bad performance this year. In 2018, the situation improves for the municipality of Boa Vista (RR) which achieves a performance considered “high”. The municipality of Macapá (AP) remains at the same performance level as it was in 2010, that is, it remains at the “regular” level of performance in 2018. The municipality of Santana (AP) also recorded a drop in the period from 2010 to 2018, going from a “regular” performance to a “poor” performance in the last year of analysis. With the exception of the municipality of Cruzeiro do Sul (AC), which rose in the performance category in 2018, upon reaching the high performance scale, all other municipalities that had a “poor” performance in 2010 remained in the same performance range in the year 2018. Added to this list of municipalities with poor performance, the municipality of Tabatinga (AM), which in the previous year had a performance considered very weak.

Table 4: Classification of municipalities with SUFRAMA according to the scale of this research based on the social index.

Scale	Description	IDSO-2010	IDSO-2018
0,801 – 1,000	Very high	-	-
0,601 – 0800	High	-	BOA
0,401 – 0,600	Regular	BOA, MAC, SAN	MAC, BRA, CRU
0,201 – 0,400	Weak	GUA, BOM, BRA, CRU, EPI	TAB, GUA, BOM, SAN, EPI
<0,200	Very weak	TAB	-

Source: Search result.

According to the results presented in table 5, the municipalities of Boa Vista (RR) and Macapá (AP) remained in the same high performance category of IDEC in both analyzed years. No municipality was observed in the category of very high or regular performance in the period in question. In 2010, only the municipalities of Santana (AP) and Brasiléia (AC) had regular performance. However, in 2018, only Brasiléia (AC) remains in this category, along with the municipalities of Bonfim (RR) and Epitaciolândia (AC) that increased in performance, since in 2010 both municipalities were in the range of very poor performance. Thus, in 2018, the municipality of Santana (AP) is in the very poor performance range, in addition to the municipalities of Tabatinga (AM), Guajará-Mirim (RO) and Cruzeiro do Sul (AC) that remained with performance. very weak in the period from 2010 to 2018.

Table 5: Classification of municipalities with SUFRAMA according to the scale of this research based on the economic index.

Scale	Description	IDEC-2010	IDEC-2018
0,801 – 1,000	Very high	-	-
0,601 – 0800	High	BOA, MAC	BOA, MAC
0,401 – 0,600	Regular	-	-
0,201 – 0,400	Weak	SAN, BRA	BOM, BRA, EPI
<0,200	Very weak	TAB, GUA, BOM, CRU, EPI	TAB, GUA, SAN, CRU

Source: Search result.

According to table 6, with the exception of the municipality of Barcelos (AM) which remained in the same category of very poor performance in the two years surveyed, the other municipalities rose in performance category in the period from 2010 to 2018. Thus, the municipality of Pimenta Bueno (RO), which was in the regular performance range in 2010, moves to the high performance category in 2018. In the same way that the municipalities of Boca do Acre (AM) and Buritis (RO) that were in the range of poor performance in 2010 reach, in 2018, the range of regular performance. The municipalities of Feijó (AC), Sena Madureira (AC), Tarauacá (AC), Benjamin Constant (AM) and Nova Mamoré (RO) that were in the range of very poor performance in 2010, moved up to the range of poor performance in 2018.

Table 6: Classification of municipalities without SUFRAMA according to the scale of this research based on the social index.

Scale	Description	IDSO-2010	IDSO-2018
0,801 – 1,000	Very high	-	-
0,601 – 0800	High	-	PIM
0,401 – 0,600	Regular	PIM	BOC, BUR
0,201 – 0,400	Weak	BOC, BUR	FEI, SEM, TAR, BEM, NOV
<0,200	Very weak	FEI, SEM, TAR, BAR, BEM, NOV	BAR

Source: Search result.

The table 7 illustrates the result for the performance of the economic development index for the municipalities not covered by the SUFRAMA policy. Based on this table, it is possible to observe that the two scenarios inherent to the performance of IDEC-2010 and IDEC-2018, there was no change in the period. The municipalities of Sena Madureira (AC), Nova Mamoré (RO), Pimenta Bueno (RO) and Buritis (RO) that were in the low performance range in 2010, remained in the same range in 2018. Likewise, the municipalities of Feijó (AC), Tarauacá (AC), Barcelos (AM), Benjamin Constant (AM) and Boca do Acre (AM) remained in the range of very poor performance for the two analyzed periods. In this way, it can be seen that there was a concentration of municipalities in the range of "weak" or "very weak" performance for the year 2010 and 2018, unchanged.

Table 7: Classification of municipalities without SUFRAMA according to the scale of this research based on the economic index.

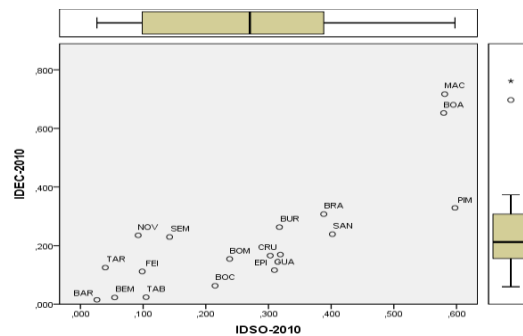
Scale	Description	IDEC-2010	IDEC-2018
0,801 – 1,000	Very high	-	-
0,601 – 0800	High	-	-
0,401 – 0,600	Regular	-	-
0,201 – 0,400	Weak	SEM, NOV, PIM, BUR	SEM, NOV, PIM, BUR
<0,200	Very weak	FEI, TAR, BAR, BEM, BOC	FEI, TAR, BAR, BEM, BOC

Source: Search result.

Organizing the indices found, according to the SPSS regression graph model, version 23, one arrives at graphs 1 and 2, below, lists the social and economic indices for the years 2010 and 2018, respectively, for the 18 municipalities researched. In Graph 1, it is possible to verify that the municipalities of Macapá (AP) and Boa Vista (RR) stand out in comparison to the other municipalities surveyed for presenting the highest social and economic performances for the year 2010. Pimenta Bueno (RO) also stands out for having a relatively high social index. The other municipalities surveyed had average performances with a

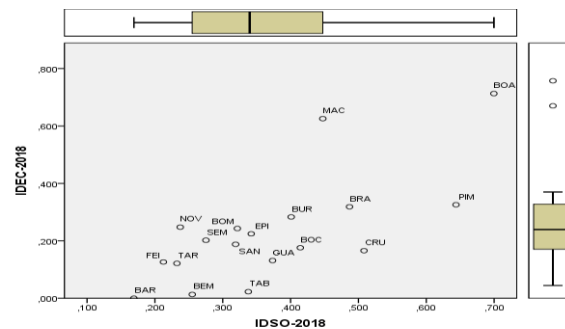
tendency to weak or very poor performance for the two indexes surveyed, considering the scale adopted in this work. Graph 2, in turn, shows the results of the SPSS regression, v.23 between the social and economic indices for the municipalities surveyed in relation to the year 2018.

Graph 1: Socioeconomic performance of the cities surveyed: 2010.



Source: Search result.

Graph 2: Socioeconomic performance of the municipalities surveyed: 2018.



Source: Search result.

Graph 2 shows the high performance of the municipalities of Boa Vista (RR) and Macapá (AP) for the IDEC-2018 and the high performance of the IDSO-2018 for the municipalities of Boa Vista (RR) and Pimenta Bueno (RO). In view of this context, the other municipalities were distributed in a range either with regular performance or with weak and very poor performance, in general.

Thus, analyzing the data presented so far, the complex reality of Amazonian municipalities calls attention, which, not infrequently, tends to demonstrate a scenario still lacking in a regional development process that can in fact lead to a perspective of institutional change, according to North [10] and that, therefore, can lead them to new trajectories, to new scenarios, to new levels. However, what is evident in this work is that although there is a certain dynamics between the municipalities surveyed, in general, such dynamics are located at a critical level, where the yellow signal is alarmed, indicating that there is a need for greater attention from the public power as an agenda. of changes through public policies, within an endogenous or local development context. However, there is another aspect that has not been researched, but that is essential for such a change to occur. It is about social capital as a collective mechanism for the convergence of forces, in order to enhance what there is of aptitude in the region, within an internal social perspective based on the context of endogenous development.

Such results indicate that development is still something difficult to be perceived within the Amazon regional context. Thinking about the Amazon with its peculiarities and complexities is the best way to go. However, in general terms, this is not what happens in practice. And the result ends up producing scenarios with multiple variables that end up interfering in some way with the local and regional dynamics. Understanding and interpreting such a complex reality is the challenge that continues to be projected in time and space, owing, even, to the economy, the challenge of contributing to the explanation of the phenomena that tend to have increasingly complex behaviors of reality. For this, it is necessary to find orthodox and/or heterodox economic forms of development capable of pulling up this scenario observed by the surveyed municipalities, which still tend to rest their dynamics on the lowest levels of development, with reflections, including, on the quality of local and regional life.

According to the results found for the IDSO-2010 and IDSO-2018 for all the municipalities surveyed, it can be observed that 70% of the municipalities assisted by the SUFRAMA policy showed improvements in their performance from 2010 to 2018 and, in the same way, 100% of the municipalities not served by this policy had their rates improved from 2010 to 2018. It can be seen that there was almost no change in performance in the two years surveyed. However, 50% of the municipalities assisted by the SUFRAMA policy had a small and slight improvement in 2018 when compared to 2010. Regarding the municipalities without SUFRAMA, it was observed that approximately 30% of the municipalities had a slight improvement in performance.

To obtain new perspectives of analysis, tables 8 and 9 were constructed, which deal with the distribution and frequency of the indices for a certain level of scale for the municipalities with SUFRAMA and without SUFRAMA, respectively. Table 8 shows that 66.7% of the municipalities assisted with SUFRAMA that participated in this research presented "weak" and "very weak" performance for the social development index for the year 2010. For 2018 this start was even higher, reaching 77.8% of the municipalities with this low level of performance.

Table 8: Distribution and relative frequency of the socioeconomic indices of the municipalities WITH SUFRAMA determined by the survey.

Scale	Description	IDSO-2010		IDSO-2018		IDEC-2010		IDEC-2018	
		qde	%	qde	%	Qde	%	qde	%
0,801 – 1,000	Very high	-	-	-	-	-	-	-	-
0,601 – 0,800	High	-	-	1	11,1	2	22,2	2	22,2
0,401 – 0,600	Regular	3	33,3	3	33,3	-	-	-	-
0,201 – 0,400	Weak	5	55,6	5	55,6	2	22,2	3	33,3
➤ 0,200	Very weak	1	11,1	-	-	5	55,6	4	44,5
Total	-	9	100%	9	100%	9	100%	9	100%

Source: Search result.

Although the SUFRAMA policy is a reality for these municipalities, it is noticeable from the data and indices analyzed that such a scenario could be even worse if such a policy did not exist. This allows us

to point out that it is not simply a matter of denying the importance of the aforementioned regional development policy, but of stating that there is a need to redirect the strategic focus so that SUFRAMA's policy can be felt more strongly by society in general, especially those residing in local level. In this sense, it is worth noting, in general, the fact that the taxes generated by economic activities in these municipalities served by the Manaus Free Zone influence policy are normally directed to the federal government treasury, with no possibility of part of this amount being applied in the region covered by that policy. Thus, the return of part of these values transferred to the treasury to be applied in local public policies seems to us to be a fair measure for strategic planning in favor of local and endogenous development. Thus, strengthening the internal social capital and the natural vocation of these regions that could focus their planning in favor of actions that aim to guarantee greater investments in infrastructure, health, education, etc. In relation to the municipalities not assisted by the SUFRAMA policy, the result was even worse. (Table 9).

Table 9: Distribution and relative frequency of socioeconomic indices of municipalities WITHOUT SUFRAMA determined by the survey.

Scale	Description	IDSO-2010		IDSO-2018		ÍDEC-2010		ÍDEC-2018	
		qde	%	qde	%	qde	%	qde	%
0,801 – 1,000	Very high	-	-	-	-	-	-	-	-
0,601 – 0,800	High	-	-	1	11,1	-	-	-	-
0,401 – 0,600	Regular	1	11,1	2	22,2	-	-	-	-
0,201 – 0,400	Weak	2	22,2	5	56,6	4	44,4	4	44,4
➤ 0,200	Very weak	6	66,7	1	11,1	5	55,6	5	55,6
Total	-	9	100%	9	100%	9	100%	9	100%

Source: Search result.

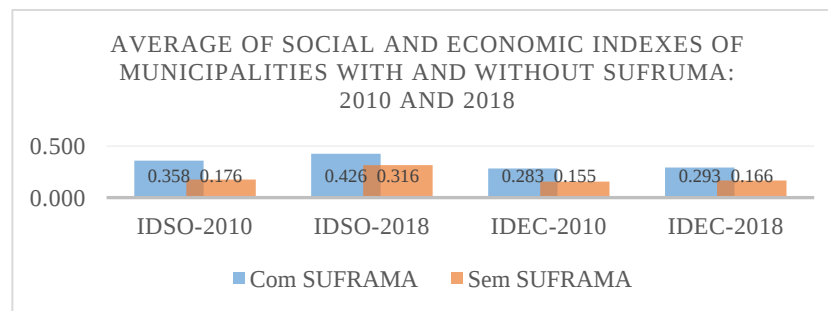
In this sense, 88.9% of these municipalities were at the "weak" and "very weak" level of development, both in 2010 and 2018. Regarding the economic development index for the year 2010, it was observed that 100% of the municipalities presented "weak" and "very weak" performances for both 2010 and 2018.

Although these results have been reached, further research and deeper analysis is necessary due to the multiple variables that may be acting and interfering in the dynamics observed in this study. Anyway, the present study signals a worrying scenario in terms of regional development, seen here based on economic and social indices, which allows new abstractions regarding the Brazilian Amazon region. By taking the average of the indexes between the municipalities with SUFRAMA and without SUFRAMA, with the objective of verifying, in a comparative way, the two samples of municipalities surveyed, we arrive at graph 3.

From this graph, it is possible to notice that in all scenarios the average of the indices presented by the municipalities with SUFRAMA exceed the average of the municipalities without SUFRAMA. The fact that the capitals of Roraima and Amapá are participating in this sample of municipalities, in some way, may have contributed to this scenario. However, this does not preclude the results found, which showed

some coherence with the reality in question. This observation serves so that future studies can analyze this aspect in order to corroborate or not with the results achieved here.

Graph 3: Average social and economic indices of municipalities with and without SUFRAMA: 2010 and 2018.



Source: Search result.

Thus, the starting point for a better understanding of this dynamic is the historical-economic formation of these regions, in order to allow a better critical analysis of the culture and its respective processes of endogenous development. Corroborating with the thought of North [10] where the social is the basis for understanding the dynamics or stagnation of an economy, that is, the economic is not the cause but a consequence of a certain institutional arrangement built by the social force of the place, it allows to trace new future perspectives of studies in the field of social capital as a means to understand, from the historical trajectory, the present scenario and, from it, the future of the region. In view of this, studies in this direction prove to be quite fertile to understand the Amazon scenario and its peculiarities materialized in its multiple variables that normally escape the context of the everyday national scenario of large urban-industrial centers. Understanding such dynamics involves expertise and requires methodological instruments capable of dealing with a complex reality such as, in general, the regions inserted in the Brazilian Amazon context.

4. FINAL CONSIDERATIONS

In general, a low level of economic and social development of the surveyed municipalities was evidenced, indicating a reality that goes through challenges that need to be overcome and focused on the local reality in an integrated way to the national context such as logistics, infrastructure, health, education and aspects economic and socio-environmental issues as the main axis of strategic vision to overcome such a regional challenge. Such results can, in the first place, serve as a counterpoint to the main reason for maintaining the SUFRAMA policy in the region. However, the fact that this scenario of weak or very weak regional development observed in the municipalities that participated in this study, including the municipalities that are not assisted by the SUFRAMA policy, allows us to conclude, therefore, that this is a reality faced in the Amazon region as a whole. This reality should be the subject of future research, in order to determine which factors contribute to this scenario, which may require other statistical methods used in multivariate data analysis, such as multiple regression, among other available and applicable models.

On the other hand, based on the *ceteris paribus* concept, an analysis can be made from the endogenous point of view of SUFRAMA's regional development policy based on the indices and results found in this study. In this way, it became evident that even with performances, in general, depressing in terms of the performance of IDEC and IDSO, especially in the municipalities served by the aforementioned policy, it is still necessary for the development of the region, in the view of many of these municipalities, characterized by be significantly limited by nature conservation units and indigenous lands that end up, in some way, limiting productive areas, which strengthens the maintenance of the SUFRAMA policy as an alternative of strategic action in search of the sustainable development of these regions, in particular, the Amazon western. In addition, it was demonstrated that even with low levels of economic and social development in this study, the municipalities covered by the SUFRAMA policy showed to have a slightly better scenario compared to those that are not assisted by this federal government policy, evidencing with this, in some way, the influence of this policy in the local reality.

From the point of view of the growth pole theory and the economic development pole brought by Perroux, it is clear that it was not possible to observe the effects of this reality in the municipalities covered by the SUFRAMA policy and which participated in this study. Even so, it is clear that the scenario could be more serious if such a policy did not exist in the respective regions. Perhaps therein lies the biggest problem of this policy in not having yet managed to produce a prosperous and autonomous environment of endogenous development, which seems to impact the way of seeing the aforementioned policy not as an element of change in the local and regional reality, but as a welfare policy. generating behavior dependent on government actions that ends up contributing in some way to low social capital, human capital and, consequently, the impact of this behavior on the culture of the place. Although it is an aspect perceived in this study in an abstract way, there is a need for further studies within this perspective. Within a view of contributing to greater effectiveness of SUFRAMA's policy, the issue of distribution of resources collected from taxes generated by the economic activities of the place can be mentioned. This is because the current model indicates that all resources from taxes paid by companies installed and collected by the government basically present a one-way path, with a one-way path to the national treasury coffers and not in a two-way context, with a sense also back to the municipal coffers. In this sense, an observation is made on this aspect that, in our view, could positively impact the development of these regions covered by the aforementioned policy.

REFERENCES

- [1] SACHS, Ignacy. *Desenvolvimento: incluyente, sustentável, sustentado*. Rio de Janeiro: Garamond, 2008. 152 p.
- [2] VÁZQUEZ-BARQUERO, A. *Desenvolvimento Endógeno em tempos de globalização*. Tradução: Ricardo Brinco. Fundação de Economia e Estatística, 2001.
- [3] DOWBOR, L. A intervenção dos governos locais no processo de desenvolvimento. In: BAVA, Silvio C. (org.). *Desenvolvimento local. Geração de emprego e renda*. São Paulo: Polis, 1996, n. 25, p. 29-44.

- [4] CAMPANHOLA, Clayton; GRAZIANO DA SILVA, José. Desenvolvimento Local e a Democratização dos Espaços Rurais. Cadernos de Ciência & Tecnologia. Brasília, vol. 17, n. 1. janeiro-abril 2000, pp. 11-40.
- [5] AMARAL FILHO, J. Desenvolvimento regional endógeno: (re)construção de um conceito, reformulação das estratégias. Revista Econômica do Nordeste, v. 26, n. 3, 2002.
- [6] BUARQUE, S. C. Construindo o desenvolvimento local sustentável. Rio de Janeiro: Garamond, 2002.
- [7] ZAPATA, Tânia et all. Gestão participativa para o desenvolvimento local. Recife: Instituto de Assessoria para o desenvolvimento humano, 2004.
- [8] BARQUERO, A. V. Desenvolvimento Endógeno em tempos de globalização. Tradução: Ricardo Brinco. Fundação de Economia e Estatística, 2001.
- [9] BUARQUE, S. C. Globalização e desenvolvimento local sustentável. In: BUARQUE, S. C. Metodologia de planejamento do desenvolvimento local e municipal sustentável. 2.ed. Recife: IICA, 1999.
- [10] NORTH, D. Institutions, Institutional Change and Economic performance. Cambridge University Press, Cambridge, 1990.
- [11] REY, K.M. Zona Franca de Manaus: análise dos 50 anos de atuação estatal no âmbito da Suframa em busca da promoção do desenvolvimento da Amazônia. Dissertação (Mestrado --- Programa de Mestrado Profissional em Governança e Desenvolvimento) – Escola Nacional de Administração Pública (ENAP), 2019.
- [12] CAMPOS, H.S.O.; ERMÍNIO, M.I.M. Desenvolvimento econômico e meio ambiente: uma análise crítica sobre a Zona Franca de Manaus. Revista Internacional Consinter de Direito, n.º VI, 1º semestre de 2018.
- [13] SILVA FILHO, G.E.da; CARVALHO, E.R.S. A teoria do crescimento endógeno e o desenvolvimento endógeno regional: investigação das convergências em um cenário pós-cepalino. Revista econômica do nordeste, Fortaleza, v.32, n. Especial, 9.467-482, novembro 2001.
- [14] SCHUMPETER, Joseph Alois. Teoria do Desenvolvimento Econômico. Tradução de Maria Sílvia. São Paulo: Abril, 1982.
- [15] CAVALCANTE, F.R.C. Análise da desigualdade regional no Estado de Rondônia á luz da teoria institucionalista de Douglass North. Tese (Doutorado) - Universidade Federal do Pará, Núcleo de Altos Estudos Amazônicos, Programa de Pós-Graduação em Desenvolvimento Sustentável do Tópico Úmido. Belém-PA, 2011, 464 p.
- [16] BENTON, C. N.; NAPIER, M.; ÜLKÜ, M. A. (2016). On supply chain integration to free trade zones: The case of the United States of America. Global Business Review, 17(4), 1-11. <https://dx.doi.org/10.1177/0972150916645675>.
- [17] IBGE. Municípios da faixa de fronteira. Disponível em: <https://www.ibge.gov.br/geociencias/organizacao-do-territorio/estrutura-territorial/24073-municipios-da-faixa-de-fronteira.html?=&t=acesso-ao-produto>. Acesso em: 28/05/2021.
- [18] REIS, E. Estatística multivariada aplicada. 2. ed. Lisboa: Silabo, 2001.
- [19] HAIR, J. F. et al. Análise multivariada de dados. 5. ed. Porto Alegre: Bookman, 2005. 730 p.
- [20] SANTANA, A.C. de. Métodos quantitativos em economia: elementos e aplicações. Belém: UFRA, 2005a.

- [21] SANTANA, A.C. de. Elementos de economia, agronegócio e desenvolvimento local. Belém: GTZ; TUD; UFRA, 2005b.
- [22] GAMA, Z. J. C. ; SANTANA, A. C. de. ; MENDES, F. A. T. ; KHAN, A. S. Índice de desempenho competitivo das empresas de móveis da região metropolitana de Belém. *Revista de economia e agronegócio*, v. 5, p. 127-159, 2007.
- [23] SANTANA, A.C. de. Análise do desempenho competitivo das agroindústrias de polpas de frutas do Estado do Pará. *Revista de economia e sociologia rural*, v. 45, n. 3, Brasília, jul/set. 2007a.
- [24] FÁVERO, L.P; BELFIORE, P. Manual de análise de dados. 1ª ed. Rio de Janeiro: Elsevier, 2017.
- [25] PARAGUASSU-CHAVES, C.A.; CAVALCANTE, F.R.C.; CLARO, P.C. G.; FISCHER, M.D.; OLIVEIRA, P. DE T. C. DE ; SILVA, I. R.R.P. E ; NETO, Z. DE O.; CALDERARO, I.F.N.; ALMEIDA, F.M. DE . Environmental Education Perception Index (IPEA) headed for sustainable development: A study in Elementary Schools in the city of Guajará-Mirim, Rondônia (Brazil). *INTERNATIONAL JOURNAL OF ADVANCED ENGINEERING RESEARCH AND SCIENCE*, v. 5, p. 38-50, 2018a.
- [26] PARAGUASSU-CHAVES, C.A.; CAVALCANTE, F.R.C.; ALMEIDA, F.M. DE; NETO, L.S. DA L.; SOUZA, L.V. DE; UCHOA, M. R.; CALDERARO, I.F.N.; OLIVEIRA, P. DE T.C. DE; CLARO, P. C. G.; DANTAS, L. R.M.. Factor Analysis and the Social Capital Index: A Study at the Brazil / Bolivia Border. *INTERNATIONAL JOURNAL OF ADVANCED ENGINEERING RESEARCH AND SCIENCE*, v. 5, p. 41-51, 2018b.
- [27] PARAGUASSU-CHAVES, C.A.; CAVALCANTE, F.R.C.; DANTAS, L.R.M.; ALMEIDA, F.M. DE; CAVALCANTE, A.M.M. DA F.; SOUZA, J. S. Índice de desempenho da condição de saúde (IDCS) nos municípios de fronteira do Arco Norte e Central do Brasil. *InterScience Place*, v. 14, p. 170-219, 2019.
- [28] PARAGUASSU-CHAVES, C.A.; CAVALCANTE, F.R.C.; BARROS FILHO, A. K.D.; CAVALCANTE, A.M.M. DA F.; DUARTE, J.C.; ALMEIDA, F.M. DE; MOREIRA DANTAS, L.R.; CARVALHO, C.D.; FONSECA NETO, J.V. Quantitative methods and study of the parth dependence effect of Douglass North from the cocoa production index (CPI) in Rondônia, Brazil. *INTERNATIONAL JOURNAL FOR INNOVATION EDUCATION AND RESEARCH*, v. 8, p. 469-493, 2020a.
- [29] PARAGUASSU-CHAVES, C.A.; CAVALCANTE, F.R.C.; BARROS FILHO, A.K.D.; ALMEIDA, F. M. DE; DANTAS, L.R.M.; MACIEIRA, C. DE A.; NETO, J.V.F.; BARATA, C. DA S.; SIQUEIRA, S.M.M.; CAVALCANTE, A.M.M. DA F.; NETTO, E.M. Factor Analysis Applied in the Construction of the Socio-Environmental Performance Index (IDRSA) in the Guajará-Mirim Free Trade Area, Brazil / Bolivia Border. *INTERNATIONAL JOURNAL OF ADVANCED ENGINEERING RESEARCH AND SCIENCE*, v. 7, p. 312-324, 2020b.
- [30] PARAGUASSU-CHAVES, C.A.; CAVALCANTE, F.R.C.; BARROS FILHO, A.K.D.; ALMEIDA, F. M. DE; DANTAS, L.R.M.; GOES, S.B. DE ; NETO, J.V.F.; CAVALCANTE, A.M.M. DA F.; BARATA, C. DA S.; NETTO, E.M.; ANJOS, O. DOS . Factor analysis as a tool for building the sustainable development index of river basins in Rondônia, Western Amazon. *INTERNATIONAL JOURNAL OF ADVANCED ENGINEERING RESEARCH AND SCIENCE*, v. 7, p. 220-237, 2020c.
- [31] DILLON, W. R.; GOLDSTEIN, M. Multivariate analisys: methods and applications. New York: Wiley, 1984.
- [32] JOHNSON, Richard A.; WICHERN, Dean W. Applied Multivariate Statistical Analysis. 2nd Edition.

- [33] SANTANA, A.C. de. Análise do desempenho competitivo das agroindústrias de frutas do Estado do Pará. In: CONGRESSO BRASILEIRO DE ECONOMIA E SOCIOLOGIA RURAL, 44., 2006, Fortaleza,CE. Anais... Brasília, DF: Sober, 2006. p. 1-20
- [34] SANTANA, A.C. de. Índice de desempenho competitivo das empresas de polpas de frutas do Estado do Pará. RER, Rio de Janeiro, v.45, n.03, p.749-775, jul./set. 2007b.
- [35] MATOS, D.A.S. e RODRIGUES, E.C. Análise Fatorial. Brasília, DF: ENAP, 2019.