

**THE MDG ASSOCIATIONS WITH THE HDI AND THE PUBLIC ADMINISTRATION MODELS
IN BRAZIL'S NORTHEAST**

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Introduction

The present study focuses on the development dynamic of Brazil's Northeast region. In the 1950s, the Brazilian government promoted the creation of specific structures (such as SUDENE and BNB) for the development of the area. Lately, these structures have been working in interventions towards different development dimensions, including questions relating to the sustainable development model. In the last decades, United Nations Organization (UNO) conferences on sustainable development have become particularly important in institutionalizing inter-state relations. In 2002, the United Nations promoted the Johannesburg meeting, which ratified the importance of achieving the Millennium Development Goals (MDG) established in 2000 (Ribeiro, 2010). Most recently, in 2015, the Inter-Parliamentary Union and the UNO itself discussed Sustainable Development Goals (Sachs, 2015), but it is not yet possible to assess their results. Therefore, the present study focuses on the evaluation of the results on the MDG from consolidated data.

In 2014, the Brazilian Ministry of Planning, Budget, and Management published the National Monitoring Report, which analyzes the performance of the country in achieving the MDG through 2012, and points out some peculiarities of the Northeast region in relation to the rest of the country. As a positive result, the Northeast is the region with the largest reduction in chronic malnutrition, the fastest rate of decline in infant mortality, the highest growth of access to the general water supply network, and the greatest reduction of urban populace living in inadequate housing. On the other hand, a notable negative result is that the Northeast presented an increase in mortality due to AIDS (Ministry of Planning, Budget, and Management, 2014). However, analyses carried out in the National Monitoring Report are limited to the year 2012 and to the performance of the country as a whole and its regions.

The establishment of the MDGs was a normative innovation among UN member countries, whose most widespread development monitoring system was, and may still be, the Human Development Index (HDI). The components that make up the HDI and the targets derived from the MDGs have compatibilities in their conceptions, except for the innovations of the MDGs related to the environment and to global governance, which were absent in the systematization of the HDI. The present study contributes to this discussion, including the analyses in the most populous municipalities of the Northeast in the period 2000–2015, with the objective of evaluating the MDG associations with the HDI and the public administration models in Brazil's Northeast.

The importance of this research lies in guiding decisions by local government administration, especially in times of crisis and shortage of resources, to the various dimensions of development, including the agenda of sustainable development goals for 2030. The municipal administration may have broad guidance in their decisions (Denhardt & Catlaw, 2015) formulating and implementing policies for each of the sustainable development goals, or may select priorities (Osborne & Gaebler, 1993) based on the thesis that investments in certain goals will lead to positive effects in the others. In this sense, the present study contributes to the management of sustainability discuss by indicating the appropriateness of a public administration model to approach the goals. In a methodological view, the present study contributes to sustainability indicators understandings by showing an empirical test of association in municipalities' performances and by discussing inferences on different public administration models.

This article is structured in five parts. The first is this brief presentation of the objective. Next, the theoretical basis of the study is presented, highlighting discussions about

the MDGs, HDI and public administration models, as well as the research proposals. The third part describes the methodological course adopted. The fourth part shows the results and implications of the study. Finally, the fifth part presents the conclusions, answering whether the research propositions was refuted or not.

Theoretical Background

According to the Regional Development Secretariat of the Ministry of National Integration (Amparo, 2014), socioeconomic inequality between regions of the country is serious and historically persistent, revealing different conditions for access to opportunities of social advancement and a decent life. The North and Northeast regions are more vulnerable than the other regions. According to Sachs (2001), the concept of human development supposes the extension of rights to all citizens, implying an effective citizenship. The substantive freedom of individuals is a development factor, which in turn is a function of the human capacity of individuals in the various situations that social life provides (Sen, 2000). Sustainable development debates highlight population growth, based on Malthus' pessimistic position in the eighteenth century, wherein he argued that population growth would be greater than the planet's ability to provide resources, which in turn would result in intense distribution inequality and social crises (Kennedy, 1993).

From the 1930s on, Brazil engaged in continued industrialization, taking advantage of post-war external restraint, which resulted in high GDP increases in the period from 1940 to 1980, but also resulted in the deepening of social inequalities and distributive conflicts (Sachs, 2001). The national economic development process had negative consequences due to being essentially unbalanced at the sectoral, regional, and social levels (Tavares, 2010). At the sectoral level, the secondary sector received the most attention, especially in the transformation industries. The tertiary sector also benefited from infrastructure investments, while the primary sector remained unchanged. At the regional level, there were disparities between the North-Northeast and Central-South regions, due to the concentration of economic activities in the latter. Concerning the level of social imbalance, there was an increase in the marginal population in the cities, and a discrepancy between the income obtained by the population of the primary sector and the employed population of the secondary sector.

The central issue of development has been the maintenance of long-term well-being at a level that provides current and future generations the opportunity to enjoy a good quality of life (Bijl, 2011). Stiglitz et al. (2009) argue that traditional methods of measuring social development through economic data are not adequate, since the well-being of citizens requires monitoring from a sustainability perspective. Based on their report, the Organization for Economic Co-operation and Development (2009) has been working to assess citizens' quality of life. However, development based on the improvement of human conditions and the quality of life is usually assessed from a spurious perspective, since these improvements require more intense patterns of production and consumption, which endanger the environment's ability to provide natural resources needed in the medium and long term.

The United Nations held the Millennium Summit in September 2000, in which the MDGs were systematized (Rezende, 2008), being presented as an international normative innovation. Ruggie and Nelson (2015) point out that policy innovations resulting from standard review processes include updating regulations by incorporating new issues. The MDGs are multidimensional benchmarks, which include reducing poverty and hunger, universalizing education, reducing maternal and child mortality, preventing disease, access to water and basic sanitation, and establishing partnerships for sustainable development. A series of studies about Brazilian reality shows many associations between these goals (Neder et al., 2015; Zimmermann & Espínola, 2015; Versiani et al., 2016; Corrêa & Lima, 2015; Lima,

2010; Tavares et al., 2013; Baracat & Nobre, 2013; Johansen et al., 2016; Zorzi et al., 2016; Marchi, 2015).

Social imbalances include issues related to health and education, as well as population income, which have been better monitored since the advent of the Human Development Index (HDI), which makes comparisons between countries, states, and cities. The HDI, developed by the United Nations Development Program in 1990, is the best-known example of a tool for measuring the social dimension of development (Siedenberg, 2003). Three elements are central to the HDI: longevity, expressed by life expectancy, which is added to indirect benefits such as adequate nutrition and a good health system; knowledge, represented by reading ability or degree of literacy, which reflects the access to education that is necessary for productive life; and decent standard of living, represented by per capita income, which estimates the ability to purchase goods.

A critique of the HDI is that its variables reflect the average condition of a given population, hindering the visualization of the portion that has not yet attained the basic requirements of decent survival (van Bellen, 2010). Another critique is pointed out by Souza (1999), who comments on the systems used for the evaluation of the development of the countries, stating that indexes such as the HDI are analyzed according to the income of individuals, attributing greater importance to economic growth, although they show human issues such as mortality and education.

The Brazilian HDI has evolved more rapidly than the evolution of this index in countries with a similar economic development situation, especially in the elements of schooling and life expectancy (Steiner, 2006). However, this author points out that monitoring the HDI is not enough to assess social inequality, and affirms that it is possible to have a positive evolution of the HDI without greater social equality. This happens due to the saturation phenomenon, establishing that the higher the situation shown by an indicator, the slower its evolution and the greater the difficulty in continuing growth. Rezende (2008) argues that a sustainable development path depend on government actions, which are capable of addressing structural problems and producing effective results. Thus, good performances of municipalities towards sustainable development require a public administration model that deals with their range of goals in a particular way.

Characterizing the traditional forms of state, Giddens (2008) describes the patrimonialist and bureaucratic administration models. The problems and malfunction of these models were pointed out by the New Public Management perspective, whose interest is in the transposition of business practices for the public sector and in governmental entrepreneurial reforms (Osborne & Gaebler, 1993). Alternatively, substantial public issues are discussed in the New Public Service perspective, which is inspired by democratic policies, aimed at connecting citizens with their governments (Denhardt & Catlaw, 2015). According to Paula (2005), there are two political projects that compete for implementation spaces in the country (Chart 1): a managerial aspect - that was constituted in Brazil during the 1990s - and a societal one - that manifests itself in alternative experiences of public management, such as Management Councils and the Participatory Budget. Recent efforts have been made in discussing the public administration models, which sometimes emphasizes strategic models based on priorities and efficiency (Pinto & Behr, 2015; Filippim et al., 2010), but sometimes highlights societal models based on broad approach and participatory process (Drumond et al., 2014; Andion, 2012).

Chart 1: Characteristics of the public management models

	MANAGERIAL PUBLIC ADMINISTRATION	SOCIETAL PUBLIC ADMINISTRATION
Origin	The international movement for state reform, which began in the 1980s and is mainly based on the English and American models	Brazilian social movements that began in the 1960s and developments in the next three decades
Political project	Emphasizes administrative efficiency and is based on structural adjustment, on the recommendations of the international multilateral organizations and on managerial movement	Emphasizes social participation and seeks to structure a political project to rethink the Brazilian development model, the structure of the state apparatus and the management paradigm
Structural dimensions emphasized in management	Economic-financial and institutional-administrative dimensions	Socio-political dimension
Administrative organization of the State apparatus	Separation between the exclusive and non-exclusive activities of the State at the three governmental levels	There is no proposal for the organization of the state apparatus and emphasizes local initiatives of organization and public management
Institutions opening to social participation	Participatory at the level of discourse, but centralized in relation to decision making, the organization of political institutions and the construction of popular participation channels	Participatory at the level of institutions, emphasizing the elaboration of structures and channels that enable popular participation
Management approach	Managerialism: emphasizes the adaptation of managerial recommendations for the public sector	Social management: emphasizes the development of management experiences focused on the demands of the target audience, including cultural and participatory issues

Source: Adapted from Paula (2005, p. 41).

Based on the discussion presented, it is seen that both the Millennium Development Goals and the Human Development Index share interests in income, education, and health issues. In this sense, it is possible to intuitively associate the objective of reducing hunger and poverty to the income component of the HDI, the goal of universalizing education to the knowledge component, and reducing mortality and reversing the spread of diseases to the life expectancy component. In turn, the goals of universal access to water and sanitation, as well as establishing global partnerships, are normative innovations that the MDG present. In addition, the studies cited in this section show multiple relationships of the MDG with decent living conditions, longer life, and greater knowledge, which are the HDI components. In this sense, this study presents the Proposition 1 that there are strong associations between the evolution of the results on the Millennium Development Goals and the Human Development Indexes in the Brazilian Northeast municipalities. The discussion also points out that the effective resolution of sustainable development problems depends on governmental actions, which may vary between managerial and societal public administration models. Given that Proposition 1 is true, it would be possible to identify priority targets, which results would have positive effects on the overall results of municipalities. A management by priority objectives and goals is a practice of the managerial public administration, while the subjects that compose an agenda of actions in the societal models are not subject to prioritization, all being treated with equal importance. Thus, this study presents Proposition 2 that the municipalities with the best performance in the MDG adopt public management oriented to the managerial model. These propositions were tested based on the course described next.

Methodological Approach

The present work is a descriptive study, since it seeks to describe a certain reality (Cooper and Schindler, 2003). This study adopts a mixed methods approach (Creswell, 2009). First, a quantitative approach was used to examine the results and associations of the MDGs and HDI in the municipalities of the Northeast region of the country. The majority population of the region was used as criterion for delimitation of the municipalities' sample. According to the 2010 Demographic Census (Brazilian Institute of Geography and Statistics, 2010), this region is made up of 1794 municipalities. The sample of this study was composed of the 149 most populous municipalities in the Northeast, representing approximately 52% of the entire region, which includes the states of Bahia (BA), Sergipe (SE), Alagoas (AL), Pernambuco (PE), Paraíba (PB), Rio Grande do Norte (RN), Ceará (CE), Maranhão (MA), and Piauí (PI). Figure 1 shows the map of Brazil's Northeast region (a), and the sample of municipalities, with nodes size corresponding to population (b).



Figure 1: Maps of Brazil's Northeast region (a) and the sample of municipalities (b).
Source: Research data.

The data collected was secondary, part of a database assembled by Paraná's Industry Social Service (SESI-PR) and published on the Internet at <http://www.portalodm.com.br/>. This is an electronic site that presents the results on the MDGs of all Brazilian municipalities, assigning a percentage of attainment for certain quantified targets. A limitation of the study is that some targets which have not been quantified, or that lack sufficient information, have not been analyzed. These are Target 4, eliminating gender disparity in primary and secondary education; Target 9, integrating the principles of sustainable development into national policies and programs and reversing the loss of environmental resources; and the targets related to the goal of developing a global partnership for development. Secondary data was also collected on the HDI of municipalities and its components of income, education, and longevity of the population, in the Human Development Atlas of Brazil (<http://www.atlasbrasil.org.br/>). This is a longitudinal study, because the data collected describes the phenomenon investigated at different points in time. Data was collected for the period 2000 to 2015.

The data obtained was submitted to quantitative analysis, which incorporated local attainment measures, considering the percentage of attainment of each MDG target and the evolution of HDI components. The results were organized into a framework representing the realized performance of each municipality in the sample. Association analyses were used to identify the strength of the relationships between the MDG targets and the components of the HDI, through the evaluation of correlations, reliability, and regression of the results. The “Pearson’s r ” coefficient, which measures the strength of association between variables, and the reliability and regression indicators of these associations, was obtained using IBM SPSS Statistics 23 software. Therefore, Proposition 1 can be refuted if little or no strong association is identified between the MDG and HDI results.

Through the association analysis, it is possible to suggest an appropriate public administration model to Brazil's Northeast development. If strong associations are present, a strategic model based on priorities and efficiency allows public administration to progress in different aspects investing in particular goals. In turn, if no strong associations are shown, a societal model based on broad goals and participatory process is required to public administration make progress in municipality development. Thus, municipal performance in the MDGs is related with a public administration model, addressing the Proposition 2 of this study. To examine this proposition, the present study adopts a qualitative approach.

For the data collection in the qualitative approach of the research, documents with records on the actions of the municipalities with better performances in the MDGs were accessed. For this study, three municipalities were analyzed, among the most populous in the Northeast, which obtained better overall results in the MDGs and better specific results in the Basic Sanitation target, since this target obtained the greatest variation in results, as will be presented below. They are: Serra Talhada (PE); Paulo Afonso (BA); Salgueiro (PE). The documents were collected on the Internet, being official and journalistic publications, open and accessible without restrictions. The corpus consisted of 19 documents collected.

For the documents analysis, elements of content analysis were used, making use of thematic registration units, according to the analysis perspective of Bardin (2013). In the pre-analysis stage, the data collected were organized, with the purpose of facilitating the operationalization of the analysis, making the selection of suitable material for this process. The phase of material exploration and categorization was guided prioritizing the theoretical framework elaborated by Ana Paula Paes de Paula (2005) (Chart 1). From the content of the documents, it is possible to observe the predominance of a public administration model in the chosen municipalities, with Proposition 2 being refuted if the predominant model is that of societal public administration. The following are the results of the study.

Performance on the MDGs and their associations with the HDI

In general, the Northeastern municipalities did not reach the millennium development goals, achieving an overall average evolution of 76%, but there were particular highlights. The goals of the economic dimension were the ones that obtained the best results in the municipalities, demonstrating advances that surpassed expectations in most cases, since there was not much variation. Figure 2 shows the mean and standard deviations of the evolution on the MDG targets analyzed.

By the mean of the results of the municipalities analyzed, Target 2—to reduce the population suffering from hunger by half—was achieved by 185%. The Bolsa Família Program was important to this performance. This has been the main government instrument of income transfer, but its evaluations have highlighted a limited capacity to eradicate poverty (Neder et al., 2015; Zimmermann & Espínola, 2015). In turn, the Bolsa Família Program

contributes to the reduction of the population suffering from hunger, assuring to beneficiary families a value corresponding to the cost of purchasing a portion of the Brazilian basic food basket (Neder et al., 2015). Thus, although it has positive impact on the reduction of hunger in the population, this program has not allocated enough value to the cost of a complete basic food basket for the beneficiary families.

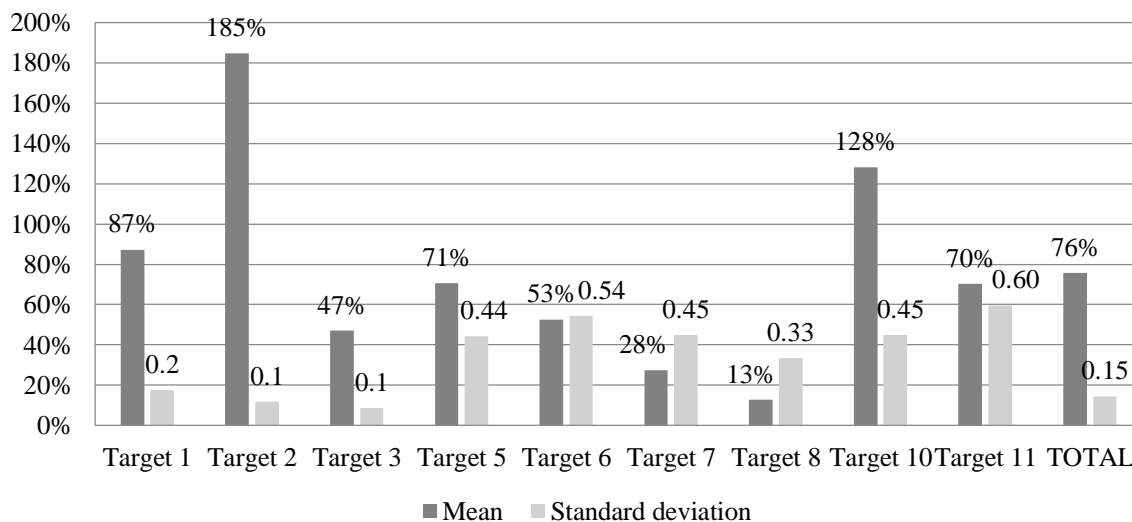


Figure 2: Evolutions of the MDGs targets.
Source: Research data.

The targets with the largest gaps to be bridged were those related to disease prevention. Target 8, to halt and start to reverse the spread of mosquito-borne diseases, was the one that obtained the lowest results, being carried out in only 13% of the target. Considering that mosquito-borne diseases are more frequent in low-income populations (Johansen et al., 2016), it can be seen that income transfer policies have not been sufficient to overcome the problems associated with the public health of populations in poverty.

The targets related to basic sanitation obtained positive results in many municipalities beyond the established expectations, bringing socio-environmental benefits for the appropriate use of natural resources. Target 10, to halve the proportion of the population without access to safe water, has been achieved and surpassed by most cities analyzed, resulting in an average result of approximately 128% of target. Thus, the municipalities analyzed seem to be on track to ensuring the fundamental human right of access to water in sufficient quantity and desired quality (Zorzi et al., 2016). For its part, Target 11, to reduce the proportion of the population without access to sanitation and essential services by half, was carried out by 70% of the target on average, suggesting that most of the analyzed municipalities have difficulties with the sanitation management process (Marchi, 2015). Together, the two targets related to basic sanitation, which have a direct impact on the environmental dimension of sustainable development, reached 99.25%. The results also show a reasonable variation in the performance of the municipalities, with only 2.3% being achieved in the set of targets on basic sanitation in Maceió (AL), while Itapetinga (BA) performed over 170% of these targets.

When it comes to the HDI, the results show that there was an overall average evolution of 29% in the composite index of the municipalities analyzed in the period from 2000 to 2010. Although the standard deviation of this evolution was low in the sample studied (0.09), it was possible to identify relevant cases with higher and lower evolutions in human

development conditions. The cases with the greatest evolution were in the Maranhão state municipalities of Santa Luzia (67%), Buriticupu (65%), and Barreirinhas (58%), while the cases with the smallest evolutions were in the Pernambuco state municipalities of Jaboatão dos Guararapes (15%), Olinda (13%), and Paulista (13%). Figure 3 shows the mean and standard deviations of the evolutions on the HDI and its components.

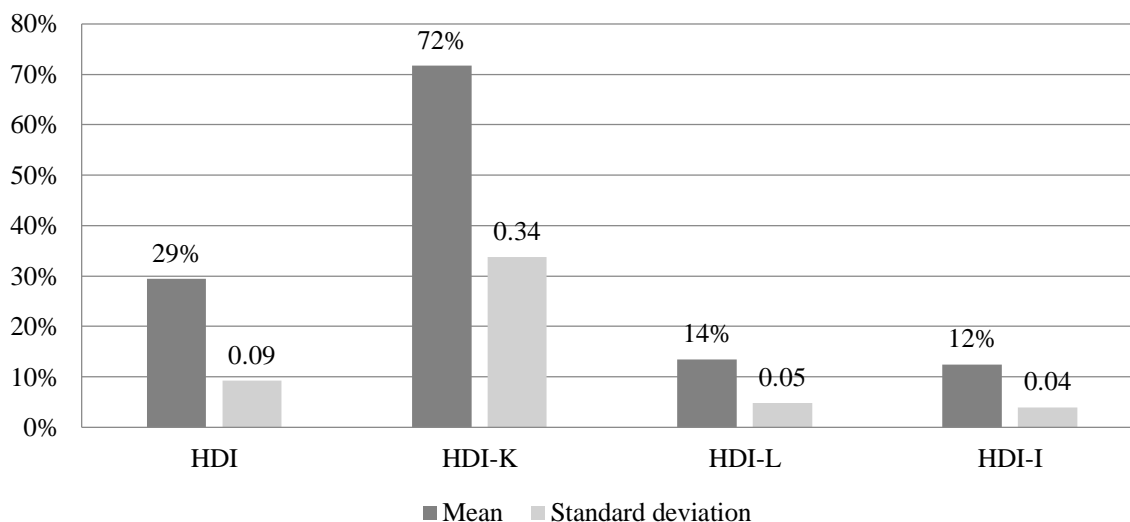


Figure 3: Evolution of the HDI and components.
Source: Research data.

Regarding the associations between the evolution of HDI components in the municipalities analyzed, no strong correlations were identified (i.e. having a Pearson's r greater than 0.6). The association most strongly identified was between evolutions in education and income components (with Pearson's r at 0.4 and significant at the 0.01 level). Neither were there any strong correlations between the evolutions of the MDG targets results in the analyzed municipalities. In these results, the strongest association was between advances in poverty reduction (Target 1) and universalization of basic education (Target 3), with a Pearson's r correlation indicator at 0.263 and significant at the 0.01 level. These findings indicate a probable association between the economic and social dimensions of development, from both the perspectives of the HDI and the MDGs, in the Brazilian Northeast in the decade 2000–2010.

The correlations between the results of the MDGs and the HDI in the municipalities indicated no strong association (Pearson's r above 0.6), although they are composed of convergent elements. Table 1 shows the Pearson correlation and significance indicators for associations between the MDG targets and HDI results. Among all possible associations between the analyzed variables, the strongest correlation between the MDGs and HDI was between Target 1, of reducing by half the population with income below the poverty line, and the educational component of the HDI, which represents reading ability or literacy level (Pearson's r -0.533 and significant at the 0.01 level). This result reinforces the theories that indicate investments in education to break generational cycles of poverty (Corrêa & Lima, 2015). However, the result obtained indicates an inverse association. In other words, there were minor literacy advances in cases where there has been further progress in poverty reduction and vice versa. One explanation for this result is that the municipalities with the highest literacy advances in the time frame studied had a low educational performance in the base year, while the municipalities that showed smaller advances in this direction had greater

literacy to begin with, and therefore had more ability to generate economic wealth in terms of human capital.

		Target 1	Target 2	Target 3	Target 5	Target 6	Target 7	Target 8	Target 10	Target 11
HDI-E	Pearson	-.533**	-.090	-.315**	-.191*	.155	-.006	.056	-.025	-.122
	Sig.	.000	.273	.000	.020	.059	.941	.497	.762	.139
HDI-L	Pearson	-.179*	.037	-.455**	-.171*	-.083	-.071	.008	-.019	.073
	Sig.	.029	.656	.000	.037	.316	.386	.927	.814	.377
HDI-I	Pearson	-.099	-.025	-.152	-.143	.097	-.001	-.013	.150	-.051
	Sig.	.231	.764	.064	.083	.241	.990	.872	.069	.534

** . The correlation is significant at the 0.01 level (bilateral).

* . The correlation is significant at the 0.05 level (bilateral).

Table 1: MDGs and HDI correlations

Source: Research data.

Cities such as Salvador, São Luís, and Natal, which are state capitals, showed results in education (0.525, 0.582, and 0.547 respectively) which were higher than the average of the Northeastern municipalities (0.35) in 2000, translating to qualified human capital to obtain better incomes in the labor market in the following years. These cities had the lowest growth in the HDI education component in the period 2000 to 2010, but their results in the poverty reduction target (99.1%, 110.7%, and 104.5%) are among the best in the set of municipalities analyzed. On the other hand, the municipalities of Buriticupu, Santa Luzia, and Barreirinhas, among others, had the lowest educational indicators in the year 2000 (0.129, 0.137, and 0.172). This starting point made it easier to achieve the greatest advances in education, but also had a low impact on the poverty reduction target (30.3%, 60.3%, and 57.8%). The results reveal the temporal nature of education as a dynamic factor in regional development, since its effects are not immediate. This explanation for the poverty reduction behavior in the analyzed municipalities highlights the limitations of income redistribution policies as a determinant of this process (Neder et al., 2015; Zimmermann & Espínola, 2015), while emphasizing education as protagonist in breaking the poverty cycle (Corrêa & Lima, 2015).

By linking poverty reduction with advances in educating the population, the importance of education systems is recognized in directing the supply of skills for work as a key element of wage inequalities along with market demands (Piketty, 2014). However, a linear regression analysis of the research data, considering the evolution in education as an independent variable and the progress in reducing poverty as a dependent variable, shows that 28% (R-square) of the variations in this association are explained. Thus, most of these associations between poverty reduction and advancement in education are not explained. Figure 4 show the tendency line and the data distribution in the association plot.

Piketty (2014) points out that educational advances in the United States and France during the twentieth century did not reduce income inequalities at work because they did not invest in educational systems that promote broad access to the training required for the most valued jobs in the market, thereby fulfilling a broader role than school democratization. In this sense, poverty reduction may be more closely associated with public policies for access to higher education, such as Prouni (University for All Program), but the MDG and HDI do not assess higher education in their indicators.

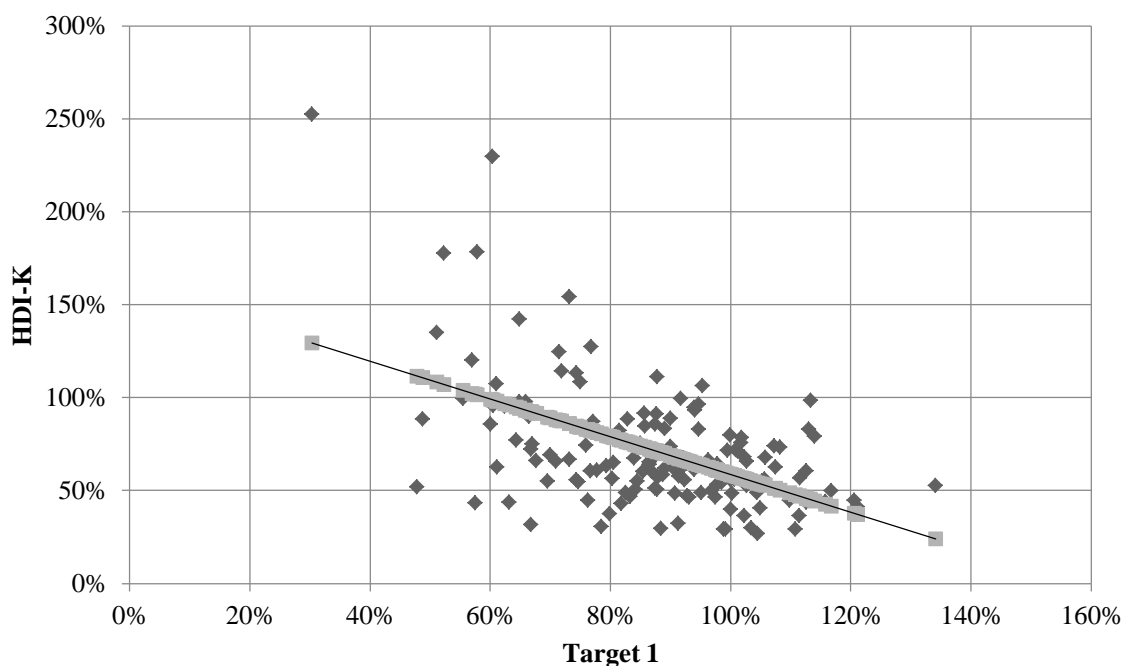


Figure 4: HDI-K and Target 1 association plot.
Source: Research data.

Association of MDGs with public administration models

The analyzed document 1 was a news about Serra Talhada, published in 2013 in the Portal Saneamento Básico, which brings evidence of the Managerial Model predominance in this municipality management. The news shows that basic sanitation was an achievement of the municipality public administration with the company Compesa (Sanitation Company of Pernambuco), and that there was no participation or political mobilization of citizens. The news suggests the Management Model maxim, which is to find the most efficient means for politically given purposes (Osborne & Gaebler, 1993), which in this case are the works of the drinking water supply through the Pipeline of Pajeú for all Serra Talhada. An analysis illustration is the following extract from the report:

The president of **Sanitation Company of Pernambuco**, Roberto Tavares, announced on Tuesday (05), in a passage through the municipality of Serra Talhada, in the Pernambuco arid region, that he works to **raise funds** to sanitize the entire city. In a meeting with the mayor Luciano Duque, he said that intends to provide **engineers and technicians to develop the sanitation project [...]** (Our translation and highlights).

Compesa is the authorized concessionaire in the municipality of Serra Talhada to act jointly to the City Hall to carry out works of sanitation. However, document 2, a news published in 2016 on a local site (Farol de Notícias), shows that the expected results in the predominantly managerial administration model did not happen. The text is an interview with the then mayor, in which he is charged the project and execution of the work of sanitation in which were made available 86 million reais in 2013 by the Growth Acceleration Program. However, the mayor transferred the public responsibility of his management and charges the concessionaire Compesa. It is understood that, according to the managerial model in the administrative organization of the State apparatus, the provision of basic sanitation is not an

exclusive activity of the government. An illustration of the analysis is the following excerpt from the news:

According to the mayor, the **management** recently held a **public hearing** on the subject, but the important thing is that society has answers about this project of Compesa, which put a stone on the subject. "If someone has to charge something is from Compesa. The municipality does something when it is not their obligation. We are finalizing our **sanitation plan** and from the **approval in public hearing**, we are going to put this on paper for **Compesa to assume its responsibility**. I'm going to repeat this a thousand times to see if people understand: who is the concessionaire of public services of sanitation and water is Compesa", he concluded. (Our translation and highlights).

The analyzed document 4 is an Environmental License issued in 2013 by the Municipality of Paulo Afonso, under the responsibility of the Secretariat of Infrastructure and Environment. The purpose of this environmental permit relates to the construction of 128 units of Housing Project My House, My Life and one of the key aspects is to ensure the quality of local infrastructure. One of the conditions presented in the license is "**to follow and comply** with the National Sanitation Basic Plan in accordance **with Law** No. 11,445 of January 5, 2007, which establishes national guidelines for basic sanitation and other provisions" (highlights ours). It is noted that there is a concern of the municipality regarding the pre-established norms and also that the focus of public management in this regard is based on bureaucratic aspects of traditional states (Giddens, 2008). Thus, the aim is to follow the rules already established, without the participation or power of intervention of the population, and to reproduce the bureaucratic model with the use of the environmental licenses themselves.

The Municipal Plan for Basic Sanitation (PMSB) of Paulo Afonso is discussed in document 5, which is a publication of 2015 from the municipality's communications office, reporting on the event of a public hearing that focused on the preparation of the Plan. In this news, it is established the importance of the vision that the Plan contemplates in front of the municipality reality for the citizens in the occasion, where it is stated that "**the participation of the people** is fundamental; so the Committee expects the **involvement of the community** and entities of organized civil society, as well as class organs" (our highlights). The news reports that, according to the committee coordinator, the event was an "opportunity for **people** to know the reality of the project and **submit proposals** and related ideas" (our highlights). Thus, the importance of the event and of citizen participation (Denhardt & Catlaw, 2015) is emphasized, with a view to highlighting the coordinator of the action opinion that "the PMSB will guide, for the next 20 years, the elaboration of public policies that will be fundamental for the sustainable development of the city". In view of this context, we can note the presence of the Societal Public Administration model (Paula, 2015), since it seeks the participation of individuals interested in sharing the decisions in formatting and carrying out the project, presenting ideas that may be experienced.

Regarding the city of Salgueiro, its Master Plan (analyzed document 8), which was prepared in 2008, foresees the development of the municipality based on the principle of a democratic and participatory management, as well as it establishes that "environmental sanitation actions should principles of universality, equity, integrality, intersectoriality, public management, **participation and social control**" (our highlight). Thus, it becomes coherent with the societal management model (Paula, 2015), but it is possible that the management practices do not reflect the normative orientations indicated in this Master Plan, requiring specific investigations for this finding.

In 2014, a news (document 9) is published on a local journalistic site (Carlos Britto), based on information from the Salgueiro prefecture's communications department, about the elaboration of an Environmental Management Plan. Although it is not explicit, the content of the news signals to a process of elaboration without the popular participation, being realized only by specialists in the subject, approaching the model of managerial public administration (Osborne & Gaebler, 1993) and confronting the analysis of document 8, made earlier. The news states that:

The Department of Planning and Environment launched a plan to discuss the issue. Discussions will be held in conjunction with the Pernambuco Agency for Water and Climate (APAC) [...]. The launch of the plan was attended by the director of Compesa, Januário Carvalho, and councilors Raimunda Barros, Hercilio Alencar and Juliano Barros. The plan preparation process will be holding thematic workshops and, **after** the fulfillment of discussion schedule, the project **will be presented to the public** (our highlights).

A legislator from the municipality of Salgueiro (Alvinho Patriota) published a news (document 10) on the basic sanitation of the city in 2014. The news reports that the city's basic sanitation service aimed to reach 100% of the urban area, but several locations were left without service over time. Although it does not explain the reasons for the withdrawal of certain locations, the news suggests a difficult relationship between Compesa and municipal management in solving the problems caused by open and overflowing sewers. The following excerpt from the news illustrates this difficult relationship.

A problem that must be **faced by COMPESA**, urgently, is the sewage overflow in several manholes [...] on **private property** - emptying into the dam Life Park. This situation has recently been communicated to the Federal Public Ministry, to take the **appropriate measures**, however, we expect COMPESA to anticipate and solve the problem soon. [...] (our highlights).

From the presented excerpt apparently the issue has not organized involvement of local civil society, leaving the Federal Public Ministry to settle the matter with Compesa from particular demands. This approach is aligned with the patrimonialist and bureaucratic models of the traditional state (Giddens, 2008), but also indicates the business influence on public service, which characterizes the managerial model (Osborne & Gaebler, 1993). The conclusions of the study are presented next.

Conclusions

The present study aimed to evaluate the MDG associations with the HDI and the public administration models in Brazil's Northeast, analyzing the most populous municipalities in the period 2000-2015. The results for the MDG show that most populous municipalities in the Northeast, in general, did not reach the desired goals, with the greatest performance gaps related to the reversal of HIV/AIDS incidence and mosquito-borne diseases. Only two targets were achieved by most municipalities, which were the reduction by half of the population who suffered hunger and lacked access to clean water, highlighting important advances in the economic and environmental dimensions of development. Despite the positive results, there are still gaps in these same dimensions when it comes to reducing the population with income below the poverty line and without access to basic sanitation. The results for the MDGs also show significant variation in the performance of municipalities in the goals of reducing maternal mortality and the population without access to basic sanitation.

The HDI component that achieved the greatest evolution was education of the population, with a reasonable variation among the municipalities analyzed. It is likely that this greater advance in education, as compared to the evolution of income and longevity of the population, was the effect of its low evaluation at the beginning of the time series of data (the year 2000) in all the municipalities analyzed. Although this result shows that the population education gap has been reduced, this remains the lowest evaluation component of the HDI, considering a general average in the most populous Northeastern municipalities. The Proposition 1 of this study was refuted, since we did not observe strong associations between the evolution of the results on the MDGs and the HDI components in the municipalities of Brazil's Northeast. One would assume that by achieving the MDGs, a municipality would also obtain increases in the HDI, but the results of this study do not support this assumption. Only a moderate inverse association was identified between reducing population with incomes below the poverty line and the evolution of education as a HDI component.

The performance of a municipality can vary depending on government actions. Rezende (2008) argues that relevant changes in development paths depend on government actions, which are capable of producing effective results, compared to corporate actions and volunteering in civil society. This author believes that the structural problems that cause poverty and social inequalities can only be addressed in the context of governmental actions. The analysis the variation found in the results of this study is due to the public management model adopted by local governments was carried out by a qualitative study on three municipalities. This study assumed that it is in the public administration that there may be discrepancies between the actions of different governments, leading to the MDGs being better realized in some municipalities than in others. However, the Proposition 2 was refuted too, since the documents analysed about the three municipalities with better performances on the basic sanitation target didn't show convergences in their public administration models. The results suggested that Serra Talhada has a predominant managerial public administrations. Paulo Afonso has a public administration with elements of a societal model, but also presented elements of a bureaucratic model, which gives more support to a managerial model. And Salgueiro presented elements of both models, managerial and societal, as well as elements of bureaucratic model.

The results of this research have practical and theoretical implications, by indicating that the evolution of trajectories in each of the development goals are independent of each other, requiring specific policies for each. Thus, municipal public administrations in the Northeast that strategically prioritize targets in certain areas, with the justification that this will have positive impacts on others, will experience lower evolutions in the broader development indices in the long term. Municipalities whose administration recognizes the equal importance of all goals, taking a societal view, and assign equal importance to developing structures to meet each one, will fare much better. As a suggestion for future research, it is recommended to analyze the educational systems management, evaluating the association between poverty reduction and access to higher education. It is suggested that future studies seek to identify the predominant public administration models in municipal governments that evidence the best performance in reducing maternal mortality.

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