Analysis of government investments in science, technology and innovation in the state of amapá between 2012 and 2021

Análise dos investimentos governamentais em ciência, tecnologia e inovação no estado do amapá entre 2012 e 2021

Rosiane de Oliveira Furtado Góes

José Francisco de Carvalho Ferreira

1 INTRODUCTION

The development of the Science, Technology and Innovation (ST&I) sector has been considered as the main tool for solving the most diverse problems that challenge nations, so investments in the sector are synonymous with increased economic competitiveness, but mainly the spring that enables the development process, be it global, national, regional or local.

According to Bresser Pereira (2010), the State is an instrument of collective action of the nation par excellence, and, to be strategic, the state apparatus needs to be strong, solid and large, as well as its finances need to be balanced. The same author also states that investments in technological progress depend on the quality of formal institutions (policies and laws) and informal institutions (social customs).

In this context, this article aims to analyze government investments in public policies aimed at the science, technology and innovation sector, between 2012 and 2021, in the State of Amapá, in the northern region of the country.

Within the national policy, and this is reflected in the policies adopted in the State of Amapá, there is a problem regarding the great divergence between the government's strategic planning and the programs and actions put into practice, demonstrating that the government understands, at least in planning, the importance of the science, technology and innovation sector for the development of the region, however, in the execution it is observed that it is not a priority, presenting inexpressive results within the public policies aimed at the area of CT&I, in the search for regional development.

State public investments in ST&I directly influence the regional development process in the State of Amapá, knowing this, the question was asked: was the planning

(what and where it is expected to achieve) and practice (budget execution) for science, technology and innovation effective for the development of the State of Amapá in the period 2012-2021?

The hypothesis raised is that the dichotomy between discourse and practice on investment in science, technology and innovation, considering mainly regional differences, presents structural and structuring weaknesses for the regional development of the State of Amapá.

Therefore, reflection on the subject becomes necessary and even essential to rethink public policies, developed within the scope of the Government of the State of Amapá, and the way of financing these actions, in order to promote a more significant regional development for the state.

2 OBJECTIVE

Analyze government investments in science, technology and innovation from the government planning of the State of Amapá, in the period between 2012 and 2021.

3 METHODOLOGY

The methodological design of this research was based on the empirical-analytical epistemological approach and with a hypothetical-deductive approach method, with bibliographic and documentary research being carried out, with the analysis of government plans, management reports, budget-financial reports, among other official documents, configuring a mixed qualitative-quantitative research, with the intention of achieving numerical results (quantitative data) that served as a parameter to analyze the data empirically (qualitatively), since this study is configured as a descriptive research, because it has as its primary objective the description of the characteristics of a given phenomenon.

This study starts from a concern in which we sought to initiate a process of reflection on government practices - planning and financial execution - and investments aimed at the science, technology and innovation sector analyzed in the period 2012-2021, verifying if there was an evolution of investments and if they present themselves significantly both in the planning and in the execution of government public policies that assist in the process of regional development of the State of Amapá.

As a way to quantify and qualify the observed problem, it was necessary to know the multi-annual plans (PPAs) elaborated in the period under research, analyzing the

planning carried out by the government for the CT&I sector, scoring the programs and actions contained in these PPAs aimed at the development of CT&I and established in state planning, and the financial budget execution of these plans that was analyzed from the management reports, as well as balance sheets and budget-financial reports.

Bibliographic and documentary research was conducted, which, according to Gil (2002, p. 40), "[...] is very similar to the bibliographic. The difference is in the nature of the sources, because this form is based on materials that have not yet received an analytical treatment, or that can still be reworked according to the objects of the research".

Regarding the documentary aspect, materials and data contained in: digital public archives, transparency portal (federal and state), Multi-Year Plans (PPAs), Budget Guidelines Laws (LDOs), Annual Budget Laws (LOAs), were used to demonstrate what was planned by the government for the ST&I sector. Other documents used were: management reports, budgetary-financial reports that present information on the programs and actions executed each year, destined for the ST&I sector.

The study is configured as a descriptive research because its primary objective is the description of the characteristics of a given phenomenon, or else, the establishment of relationships between variables (GIL, 2002, p. 41), since the purpose of this study is the description of the scenario of investments aimed at CT&I in the State of Amapá, in the period 2012-2021, through the collection of information in official documents such as government plans, management reports and financial budgets.

In the development of this article, the analysis of the planning of government public policies is presented and the confrontation between the investments planned and made by the government of the State of Amapá, in the period between 2012 and 2021, aimed at the development of the CT&I area. Organized in an evolutionary study, based on the understanding that the ST&I sector is considered an essential tool to assist development, especially regional development, a description is made of the evolution of government public policies to stimulate and support activities aimed at science, technology and innovation in the State of Amapá, exposing the information contained in the plans, programs, laws and guidelines of local government policies aimed at the area of science, technology and innovation, emphasizing the investments made for the sector in the State of Amapá, in the period 2012-2021.

To carry out these descriptions, the multi-annual plans were analyzed by quadrennium, as follows: PPA 2012-2015, PPA 2016-2019 and, in the last quadrennium, PPA 2020-2023 a cut of the first two years of the multiannual plan is made, since the last

two years were still in execution at the time of analysis of this research. Finally, after collecting the necessary information, the data collected for the proposed period of analysis was compiled, that is, the period 2012-2021 (10 years), bringing together the information collected and analyzed by quadrennium (PPA 2012-2015, PPA 2016-2019 and PPA 2020-2023), with the objective of analyzing the investments made in science, technology and innovation in the State of Amapá.

4 DEVELOPMENT

When developing the analysis of the data collected on government investments in public policies aimed at the science, technology and innovation sector, in the period between 2012 and 2021, in the State of Amapá, a great disparity was observed between what was planned and what was executed, leaving the credibility of the strategically planned government for the science, technology and innovation sector in the State of Amapá weakened. However, it was also observed that this disparity is a reflection of the national policy to which the State of Amapá is inserted.

Despite the overnment Federal demonstrating that investments in ST&I are the tool to achieve economic, regional, social, sustainable development, , Brazil is still one of the countries that invests the least in ST&I, since while developed countries invest about 2% to 3% of their GDP, Brazil invests less than 1% (WIPO, 2018).

Turning to the national scenario and making a comparison between the revenue collected by the federal government and the amounts invested in the CT&I sector, in the period from 2014 to 2021, it is observed that only 0.23% of the revenue collected is destined for this purpose, demonstrating a fragility between the planning of the federal government and its execution. The justification raised by the federal government is due to the country having a diversified and unequal economy.

When relating regional development to the need for investment in science, technology and innovation, Staub (2001) states that Brazil needs to invest in a planned and organized manner in order to ensure greater efficiency in the application of public resources, however, if the regions do not have homogeneity in the distribution of investments in ST&I, the country's development will be affected.

According to Theis (2017), Brazil's current ST&I matrix does not enable socioeconomic development, since ST&I policies have been contributing to geographically uneven development, since they are functional to a process of capital

accumulation based on the concentration of investments in ST&I in the already developed regions.

With this concentration of investments (table 1), regional inequality is even more evident, that is, the lack of homogeneity mentioned by Staub (2001) and the geographically uneven development cited by Theis (2017), when analyzing the expenditures made by the federal government in the country's macro-regions regarding investments in ST&I.I, from 2012 to 2019 (period available for analysis), where they are concentrated in the Southeast (69.92%) and South (11.16%) regions, followed, respectively, by the Northeast (10.41%) and Midwest (5.18%) regions, and, finally, the North (3.32%), remaining the practice of concentrating resources in the most developed regions.

Table 1 - Percentage of Federal Government spending on S&T in the Federation Units - 2012-2019 period

Major Regions / Federation Units	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	% of 8 years
North	3,77%	3,91%	3,59%	3,04%	3,07%	3,06%	3,01%	3,48%	3,32%
North East	11,27%	10,22%	11,69%	9,06%	9,96%	10,29%	9,50%	11,86%	10,41%
South East	69,70%	70,57%	67,90%	72,90%	70,25%	69,97%	71,28%	66,30%	69,92%
South	11,32%	11,16%	11,64%	10,47%	11,48%	11,41%	10,53%	11,47%	11,16%
Center-West	3,93%	4,13%	5,18%	4,53%	5,23%	5,27%	5,67%	6,89%	5,18%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Brazil (2021). Organization of the author (2022).

The Northern Region, highlighted in table 1, is the region that received the least investments and incentives to develop public policies aimed at science, technology and innovation, in the period between 2012 and 2019 (period available for analysis), occupying the 5th and last position, in all the years analyzed, among the five macro-regions that make up Brazil.

This confirms the national scenario mentioned by Theis (2017), who reports that the Brazilian reality (federal government expenditures) contributes to the increase of regional disparities, from the moment that the most dynamic regions are further strengthened and the others are allocated insufficient resources.

This insufficiency of resources, mentioned by Theis (2017), destined for the Northern Region reflects the low investment made for the CT&I sector by the States that make up the region, as can be seen in the table 2, where such states are compared with

the other states of the federation, occupying, almost in all years, with rare exceptions, the last positions regarding the volume of investment made by the States.

Table 2 - Ranking of Public Investments in S&T - States of the Northern Region, period 2018-2021

PUBLIC INVESTMENT IN TC - National				
States of the Northern Region	Year 2018	Year 2019	Year 2020	Year 2021
North	**5º**	**5º**	**5º**	**5º**
Acre	17º	23º	20º	9º
Amapá	**21º**	**26º**	**22º**	**23º**
Amazonas	5º	14º	6º	11º
Pará	12º	10º	16º	17º
Rondônia	24º	24º	23º	24º
Roraima	23º	27º	4º	27º
Tocantins	26º	25º	24º	25º

Source: FIEC System (2018; 2019; 2020; 2021). Prepared by the author, 2022

Still analyzing table 2, in which the object of analysis of this research was highlighted, the State of Amapá, within the period observed through the FIEC Index of Innovations in the States, has always remained in the last positions regarding investments directed to the development of ST&I.

The analysis of the State of Amapá (table 3), both in the national and regional scenarios, in relation to investments made in ST&I, allows us to perceive that in both scenarios, the State of Amapá occupies the last positions in volumes of investments for the sector.

Table 3 - Position of the State of Amapá in the volume of national investments in S&T - National and Regional panorama

STATE OF AMAPÁ North Region	PUBLIC INVESTMENT IN TC - National (27 States)	PUBLIC INVESTMENT IN TC - Regional (07 States)
Year 2018	21º	4º
Year 2019	26º	6º
Year 2020	22º	5º
Year 2021	23º	4º

Source: FIEC System (2018; 2019; 2020; 2021). Prepared by the author (2022).

According to Hirschman (1961), the main difficulty of underdeveloped countries is not the scarcity of resources but the inability to boost them. The same author states that state intervention is necessary to leverage local investment opportunities.

For Furtado (2002), only with the regional decentralization of central power and the elaboration of a multi-year plan that reflects regional realities, it is possible to dismantle the mechanism that perpetuates regional inequality in Brazil. With this, the conception of public policies arises that come to define government strategies aimed at problem solutions (DIAS; MATOS, 2015) and that these public policies translate government purposes through of programs and actions oriented to solve problems (SOUZA C., 2003). It is in the implementation phase of public policies that it is possible to understand how it is being put into practice and transformed into action.

4.1 THE STATE OF AMAPÁ AND INVESTMENTS AIMED AT THE DEVELOPMENT OF THE CT&I SECTOR - BETWEEN 2012 AND 2021

Government planning and the public policies implemented in each government reflect the priorities of the managers of each period. In the period of analysis proposed by this research, that is, 2012-2021, it is worth mentioning that there were changes of government (which is very evident in the different way of managing public policy priorities), which directly reflected in the way of thinking about the science, technology and innovation sector.

As already mentioned , the main instrument for analyzing government planning in this study is the multi-annual plans. The 2012-2015 Multi-Year Plan (AMAPA, 2012) was prepared during the administration of Governor Carlos Camilo Góes Capiberibe (PSB - 2011-2014), while the 2016-2019 and 2020-2023 Multi-Year Plans were prepared during the administration of Governor Antônio Waldez Góes da Silva (elected and re-elected).

The analyzed Multi-Year Plans were organized and divided into strategic axes, which, in this way, organize the PPA into strategic sectors, as well as their respective programs and actions. In the 2012-2015 PPA, ST&I was one of the strategic axes, being considered a development axis, while in the 2016-2019 and 2020-2023 PPAs, the ST&I sector was inserted within the strategic axis Economic Development.

According to the technical manual of the 2021 budget (SEPLAN, 2020), the program is an instrument for organizing government action, which articulates a set of

actions that assist in the execution and achievement of a pre-established common objective, aiming at solving a problem or meeting a certain need or demand of society.

In the PPA 2012-2015, the strategic axis Science, Technology and Innovation highlighted 12 programs focused on the area of science, technology and innovation that should be implemented in the four-year period 2012-2015. Within these programs were distributed 24 actions. When analyzing the management reports for the period, it was found that only 03 programs and 15 actions were executed, justifying that this fact was due to budget cuts.

In the PPA 2016-2019, already prepared by the new management, the CT&I sector was contained within the Economic Development axis, and it presented only 01 program to be developed, and this program contained 15 actions, developed over the four-year period.

In the PPA 2020-2023, the CT&I sector remained inserted within the strategic axis Economic Development, and, in this new government planning, the sector again presented only 01 program to be developed and the actions decreased to only 02 actions, with no documented justification for such reduction.

Analyzing the information above, there is a difference in the way of thinking and organizing the multiannual plan in the 2012-2015 management and the 2016-2019 and 2020-2023 managements. It was observed that in the PPA 2012-2015 (AMAPA, 2012) the management decided to present an expressive number of programs, 12 government programs aimed at the science, technology and innovation sector, which raised great expectations regarding the valorization of the sector. However, despite this significant number of programs that unfolded in numerous actions, the execution was minimized.

In the PPAs 2016-2019 (AMAPA, 2016) and 2020-2023 (AMAPA, 2020), the government decided to concentrate efforts on a single program, dividing it into 15 actions in 2016-2019 and only two actions in 2020-2023. Of the 15 actions contained in the PPA 2016-2019 program (AMAPA, 2016), they were only fully implemented in 2019, varying in other years. In the PPA 2020-2023 (AMAPA, 2020) there was a breakdown into only two actions, and they were executed in the two years analyzed (2020 and 2021). Thus, it is possible to visualize qualitatively that there is a difference in the conception of the two governments and that this reflects in the qualitative execution of programs and actions.

4.2 GOVERNMENT FINANCIAL BUDGET PLANNING AND EXECUTION

Seeking to show the degree of participation and relevance of the CT&I sector for the government of the State of Amapá (table 4), an analysis was made of the participation of the strategic axis to which the CT&I sector belongs and its participation in the general budget of the State, in the period 2012-2021.

Table 4 - Participation of the Strategic Axis focused on ST&I in the general budget executed by the Government of the State of Amapá (2012-2021)

OVERALL PERFORMANCE			
	GENERAL GOVERNMENT	AXES	
PPA	Executed Budget	Executed Budget	% Share of axis in overall budget
2012-2015	R$ 13.654.613.673,**59**	R$ 18.366.673,59	0,13%
2016-2019	R$ 14.527.000.000,00	R$ 110.658.000,00	0,76%
2020-2023	R$ 8.400.000.000,00	R$ 74.900.000,00	0,89%
10 YEARS	**R 36.581.613.673,59**	**R$ 203.924.658,54**	**0,56%**

(*) Proposed period of analysis of the PPA 2020-2023 (still under execution by the government).
Source: SEPLAN (2020).

In table 4 it is observed that only 0.13% was allocated to the strategic axis of CT&I in the period 2012-2015, 0.76% in the period 2016-2019 and 0.89% in the period 2020-2021, demonstrating that from 2016 to 2021 there was a relevant increase in spending related to the axis, however, still considered very low. At the end of the analyzed period (2012-2021) we have an average of 0.56% of financial execution of the strategic axis of CT&I within the general financial execution of the State of Amapá.

Analyzing what was planned and what was executed for the CT&I sector, it is known that in the PPA's the initial budget allocation is presented, that is, the resource foreseen to be allocated to the CT&I sector, but it may change because it depends on the government's collection.

When compiling the information collected in the analyzed multi-annual plans, annual government management reports, general balance sheets and summaries of budget and financial executions for the period 2012-2021, the great disparity between what was planned (foreseen) and what was executed in the analyzed period is demonstrated, as shown in the table 5.

Table 5 - Comparison by PPA between the planned budget and the financial executed (2012-2021)

AREA OF SCIENCE, TECHNOLOGY AND INNOVATION			
PPA	**PLANNED (expected)**	**EXECUTED**	**%**
2012 - 2015	R$ 43.226.224,00	R$ 4.234.370,62	9,80%
2016-2019	R$ 59.797.583,00	R$ 28.429.429,43	47,54%
2020-2021*	R$ 36.600.000,00	R$ 10.331.000,00	28,23%
10 YEARS	**R$ 139.623.807,00**	**R$ 42.994.800,05**	**30,79%**

(*) Proposed period of analysis of the PPA 2020-2023 (still under execution by the government).
Source: Amapá (2012; 2016; 2020) and SEPLAN (2020).

When analyzing the effectiveness of government planning quantitatively, it is possible to observe that in the period 2012-2015 there was an appreciation of the sector at the time of planning government actions, in which it presented a better budget allocation for the sector. However, at the time of executing the planning, the government managed to have an efficiency of only 9.8% of the total planned, failing to execute 90.2% of its planning.

In the period 2016-2019, government management managed to achieve a significant improvement in the efficiency of planning execution, in which it presents a percentage of 47.54% executed. But even so, it failed to execute 52.46% of what was planned for the sector.

In the following two years of analysis, 2020 and 2021, the percentage decreased to 28.23%, failing to execute 71.77%. It is worth remembering that these values are proportional to the two years analyzed of the PPA 2020-2023, still being executed by the state government.

At the end of the 10-year period (2012-2021), the science, technology and innovation sector has an effective budget-financial execution of only 30.79%, leaving 69.21% unrealized, showing an effort to plan and difficulty in executing the planned actions.

Now, turning to a more internal look, we sought to analyze the participation of programs related to the ST&I sector, within the strategic axes to which they belonged, seeking to verify their relevance to the strategic axis contemplated in the multi-annual government plans and their government administrations in the 10 years (2012-2021) of management under analysis, presented in the table 6.

Analyzing the participation of investments in programs and actions aimed at the science, technology and innovation sector, it presents a participation of 21.08% within

the axis to which it belongs, reaching a higher percentage in 2016-2019 with 25.69% (most significant percentage in the years analyzed), according to table 6.

Table 6 - Participation of Programs aimed at the development of the STI sector in the Strategic Axis Economic Development (2012-2021)

PERFORMANCE OF R&I PROGRAMS IN THE ECONOMIC DEVELOPMENT AXIS			
YEAR	**AXIS**	**PROGRAM - CT&I**	
	Executed Budget	**Executed Budget**	**% Program participation in the axis**
2012-2015	R$ 18.366.673,59	R$ 4.234.370,62	23,05%
2016-2019	R$ 110.658.000,00	R$ 28.429.429,43	25,69%
2020-2023	R$ 74.900.000,00	R$ 10.331.000,00	13,79%
10 YEARS	**R$ 203.924.658,54**	**R$ 42.994.800,05**	**21,08%**

Source: SEPLAN (2020).

After surveying all the data related to the budget and financial sector of science, technology and innovation in the State of Amapá, there is a great disparity between what is planned and what is executed, where the percentages referring to the general expenditures of the State and the strategic axis to which the sector belongs are far below what is necessary to achieve the much desired development for the region.

In the discourse, the science, technology and innovation sector is a strategic area and a driving force for development, in practice, its investments are minimal to what really needs to be done. Below is a general summary of investments, presented in table 7.

Table 7 - General summary of the share of investments of the State of Amapá aimed at the development of the ST&I sector between 2012 and 2021

AREA OF SCIENCE, TECHNOLOGY AND INNOVATION - between 2012 and 2021			
PERIOD	**PLANNED FOR CT&I - PPA**	**EXECUTED IN CT&I**	**%**
	R$ 139.623.807,00	R$ 42.994.800,05	30,79%
	General Budget - Executed STATE GOVERNMENT	**Axis Budget - Executed STRATEGIC AXIS**	**% Share of axis in overall budget**
2012-2021	R$ 36.581.613.673,59	R$ 203.924.658,54	0,56%
	Executed Budget AXIS	**Executed Budget - PROGRAMMES**	**% Program participation in the axis**
	R$ 203.924.658,54	R$ 42.994.800,05	21,08%

Source: Amapá (2012; 2016; 2020) and SEPLAN (2020).

Relating what was planned in the PPA for the CT&I sector and what was executed in the period 2012-2021, invested specifically in the science, technology and innovation sector, only 30.79% was realized, leaving a percentage of 69.21% uninvested, that is, less than 1/3 of the total amount available was actually invested, where the government presents neither effectiveness nor efficiency in management.

By relating what was executed in the strategic axis to which CT&I belongs, with what was executed in the general government budget in the period analyzed, the percentage becomes even more insignificant, showing that only 0.56% of the budget of the State of Amapá was directed to the axes to which the CT&I sector belonged.

By further refining this analysis and promoting the confrontation of the values of the general budget executed by the state government and the values allocated to programs and actions aimed directly at the development of the ST&I sector, this percentage drops to 0.12% of investment allocated by the State of Amapá to the sector. Then, we sought to verify the participation in the investments of programs and actions aimed at ST&I within the axis to which they belong, and the result was that they represent 21.08% of the investments of the axis in the ST&I area.

In closing this general summary of the participation of the State of Amapá investments aimed at the development of the CT&I sector in the management, little progress has been made in terms of development, structural and structuring, presenting itself as a fragility with regard to the regional development of the State of Amapá, where there is almost no prospect of change, since the form of government management remains the same over the years.

According to Monteiro Neto, Brandão and Castro (2017), it is undeniable the necessary combination and articulation between national and regional policies, because, when they are carried out, they tend to enhance the beneficial effects of economic growth and well-being in regions with a lower level of development.

The problems of federation and intergovernmental relations remain a challenge for the successful implementation of public policies in the country. The disconnect between regional policy objectives and their instruments and institutions (forgotten by the federal sphere) is recognized. Thus, in state governments, as a cascade effect, this inability to define clear and rigorous criteria for the resources that are available for investments in public policies that promote the development of the region is repeated (MONTEIRO NETO; BRANDÃO; CASTRO, 2017).

This is aggravated because, according to Furtado (2002), regional development policies presuppose an understanding of national development objectives. In other words, regional policies follow the guidelines of national policy, and there is a standardization of orientation in a completely different country. For the same author, a political-administrative alternative would be the regional decentralization of central power, which should be accompanied by multi-annual planning that would make it possible to reconcile the aspirations of the different regions. In Furtado's (2002) analysis and reflections, politics is the tool capable of dismantling the mechanisms that have perpetuated interregional disparities in Brazil.

5 FINAL CONSIDERATIONS

This study brought as a theme the investments focused on science, technology and innovation made by the public sector through the planning and execution of public policies, with a view to achieving regional development, focusing on the State of Amapá in the period 2012-2021.

The construction of this study started from the concern about the reflection on government action for regional development, seeking to analyze the information that confirms the lack of efficiency in the execution of government planning mainly in the CT&I sector.

The hypothesis raised was confirmed since one of the major problems presented for the leverage of CT&I in the State of Amapá and in the country, is the instability in the distribution and application of financial resources from the Federal Government and the State Government - Amapá, suffering a cascading effect in large budget cuts, making the sector cease to be a priority, thus demonstrating to walk in the opposite direction of global economies, since developed or newly industrialized countries invest a certain 2 to 3% of GDP, Brazil invests less than 1% and Amapá invests an average of 0.07% per year.

Despite the government strategic planning signals concern with investment in ST&I, with defined programs and actions, when analyzing the public budgets executed, it is observed that in the real scenario there is a dichotomy between the government discourse of importance of ST&I for national and regional development and the practice presented in the financial execution of the Federal and State governments (Amapá), demonstrating structural and structuring weaknesses, which need to be reviewed to give greater emphasis to policies that promote ST&I advances.

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