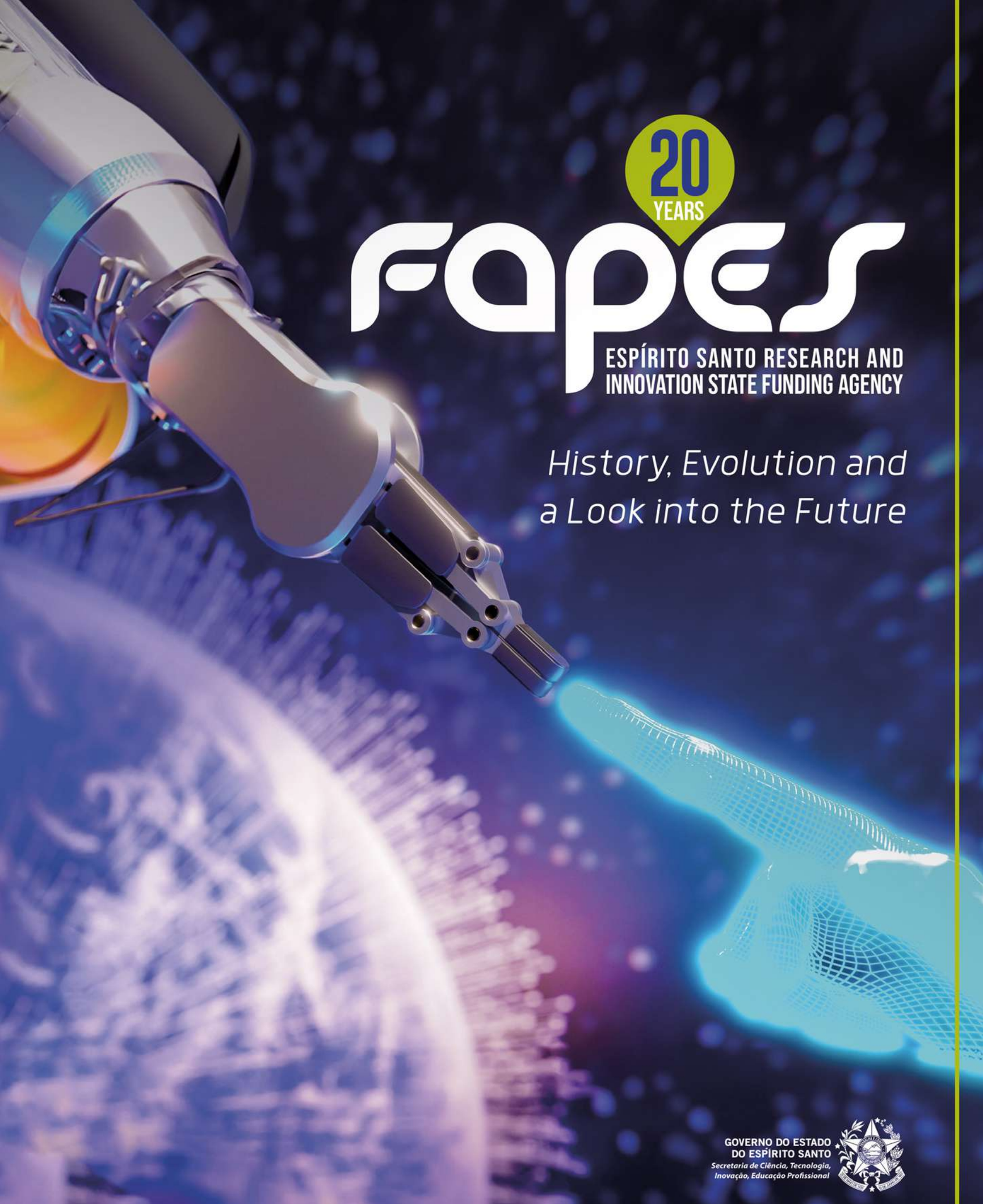
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YEARS
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ESPÍRITO SANTO RESEARCH AND
INNOVATION STATE FUNDING AGENCY
History, Evolution and
a Look into the Future
GOVERNO DO ESTADO
DO ESPÍRITO SANTO
Secretaria de Ciência, Tecnologia,
Inovação, Educação Profissional

TECHNICAL SHEET

GOVERNMENT OF THE STATE OF ESPÍRITO SANTO

SECRETARIAT OF SCIENCE, TECHNOLOGY, INNOVATION AND PROFESSIONAL EDUCATION

ESPÍRITO SANTO RESEARCH AND INNOVATION STATE FUNDING AGENCY

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PREFACE

This book is an initiative by FAPES to mark 20 years of its existence and it seeks to share with the public some of the most notable facts in its history of encouraging research and innovation in the State of Espírito Santo.

Chapter one brings to light important facts about the conception of FAPES. It also highlights the role of a group of people who worked together on the mission to create the legal and institutional conditions for the Agency to finally become a reality in 2004. In this first chapter, the reader will have the opportunity to learn about some important moments, the historical context and the accounts of people who participated in this process.

Chapter two describes FAPES 20-year history and its leading role in proposing actions that have left their mark on Science, Technology and Innovation in Espírito Santo. Starting with the first Universal Call for Proposals in 2005 and continuing with each new successful action, the Agency has gained maturity, credibility and recognition for the services it has provided to the people of Espírito Santo.

Given the significant volume of actions carried out by FAPES in this two-decade journey, chapter three highlights some of them and organizes them in the form of final actions, namely: Research, Dissemination of Knowledge, Human Resources Training, Innovation and Extension. Examples of success in these actions are presented throughout the chapter.

The last chapter brings the final considerations and indicates some future paths to be followed by the Espírito Santo Funding Agency in the relentless search for improving its processes with the incorporation of new technologies and the implementation of innovative actions in response to the new scenario that is emerging for Science and Technology in the coming years.

We wish everyone a great read, hoping that the two decades of history shared in this book will serve as inspiration to those seeking a society in which the fundamental sources of wealth are based on knowledge, relationships and sustainability.

FAPES Executive Board of Directors

MESSAGE FROM THE GOVERNOR

RENATO CASAGRANDE

FAPES 20 YEARS: PRESENT UNDER CONSTRUCTION

The world is constantly changing, demanding increasingly innovative responses to contemporary challenges. But what future do we want for ourselves, our children and grandchildren? With this question in mind, we propose to society a government plan that seeks a more innovative State. Support for research and innovation is not just a commitment, but a fundamental guideline of the Government of Espírito Santo. After all, to maintain our competitiveness, both today and in the future, it is essential that the State invests in the production of knowledge.

Today, we proudly celebrate two decades of the Espírito Santo Research and Innovation State Funding Agency (FAPES), founded in June 2004. Over three administrative periods, this institution has evolved in its structure and operations, becoming one of the main entities promoting Science, Technology and Innovation (STI) in the country, recognized by the Brazilian National Council to State Funding Agencies (CONFAP).

Over the past 20 years, FAPES has invested in actions and programs for the development of research, science, technology, innovation and extension, promoting knowledge generation and dissemination in Espírito Santo. Its main means of funding include institutional and financial support to projects, granting of scholarships and grants for research, development and innovation, as well as scientific and technological training of human resources.

It is worth noting that CONFAP recognized Espírito Santo as the state that invests the most in its researchers. In addition, more than 24,000 students have already been awarded scholarships for undergraduate studies in various areas through the Nossa Bolsa Program. This program promotes inclusion and socio-educational development, qualifying the local workforce and encouraging young people to enter the job market.

FAPES plays a crucial role in developing and monitoring the state's strategic public policies, especially in the agricultural sector. Recently, in partnership with the Secretariat of Agriculture, Supply, Aquaculture and Fisheries (SEAG), we launched the new call for proposals for the Program to Encourage Research, Extension, Development and Innovation in Agriculture (Inovagro). In just two years, Inovagro has already allocated R$18 million, the largest volume of resources in the history of Espírito Santo and one of the most significant in the country for this purpose.

Looking into the future, it is essential that research and innovation are applied to face the challenges of climate change, the adaptation of which becomes more urgent every day. We must invest in decarbonization, carry out the energy transition and adapt society's lifestyle to this new reality. In addition, it is essential to direct efforts in science and technology to combat the social inequalities that still persist in the country and in our state. This is the way forward.

PHOTO: HÉLIO FILHO/STATE SECRETARIAT OF COMMUNICATION (SECOM)

MESSAGE FROM THE SECRETARY OF SCIENCE, TECHNOLOGY, INNOVATION AND PROFESSIONAL EDUCATION

BRUNO LAMAS

The Espírito Santo Research and Innovation State Funding Agency (FAPES) plays a vital role in the scientific and technological development of our state, especially in promoting and fostering research, teaching, extension, science, technology and innovation. Over its two decades of existence, FAPES has been a fundamental pillar in building a more innovative and competitive Espírito Santo, celebrating its 20 years of significant contributions in 2024.

The harmonious and strategic relationship between the Secretariat of Science, Technology, Innovation and Professional Education (SECTI) and FAPES has been essential to the success of these initiatives. Aligned in their objectives, SECTI and FAPES work together to ensure that access to science, technology and innovation is widely disseminated and supported throughout Espírito Santo. This partnership reinforces the commitment of the State Government, led by Governor Renato Casagrande, to ensure continued resources and investments in the sector .

The efforts of the State Government are evident in the level of investment in science and technology, which exceeds the national average, positioning Espírito Santo as a national leader in the promotion of research and in the amount invested per researcher. This commitment is reflected in the various initiatives and programs to support research, which not only encourage scientific production, but also drive innovation and the practical application of the knowledge generated.

The current administration of FAPES, under the leadership of Director-General Rodrigo Varejão, continues to pave the way for even more significant advances. Together with previous directors, who performed their duties with great dedication and competence, Rodrigo Varejão has contributed to a fertile environment for scientific and technological development. These administratons have ensured that resources are applied strategically, benefiting both the scientific community and society in general.

PHOTO: FAPES COMMUNICATIONS OFFICE

Celebrating FAPES' 20th anniversary is a recognition of the importance of ongoing and dedicated work in favor of science and technology. It is a highlight of the positive impact that the Agency has had on training researchers, financing innovative projects and creating solutions that directly benefit the people of Espírito Santo.

The future looks promising and, with the partnership between SECTI and FAPES, combined with the ongoing support of the State Government, Espírito Santo will continue to stand out on the national scene, not only in terms of investments, but also in the quality and relevance of the research developed. FAPES' successful trajectory is a testament to the collective commitment to progress and innovation, fundamental pillars for a more advanced and competitive Espírito Santo.

MESSAGE FROM THE DIRECTOR-GENERAL

RODRIGO VAREJÃO

It is with great honor and a sense of great responsibility that I have assumed the position of Director of the Presidency of FAPES, succeeding Professor Denio Arantes and other directors who have dedicated themselves over the past 20 years to the growth of the Agency.

FAPES is a leading player in the promotion of Science, Technology and Innovation in Espírito Santo, and is a public institution of reference for the services it provides and for its recognition by a demanding scientific community. I would like to highlight the fundamental role of the Government of the State of Espírito Santo in strengthening FAPES, whether through the constantly evolving legal instruments, or through financial support via the State Science and Technology Fund (Funcitec) and institutional partnerships.

FAPES strives for excellence in its processes, zealously employing public resources with a focus on the quality of the delivery. When we talk about quality, it is important to mention the performance of our Science, Technology and Innovation (STI) Ecosystem partners through collaborative work through the Advisory Boards and the Agency's Scientific-Administrative Council.

FAPES' growth over the past 20 years has been impressive! The budget spent in 2023 was more than R$170 million. Congratulations to the Agency's team of collaborators. It was thanks to their dedication and tireless teamwork that we were able to reach this milestone. On the other hand, the partners in our STI Ecosystem have risen to the occasion, both in terms of volume and quality of the submitted proposals. I have followed this evolution as a FAPES grantee since 2005, when I participated in the first induced demand project in the area of Telemedicine.

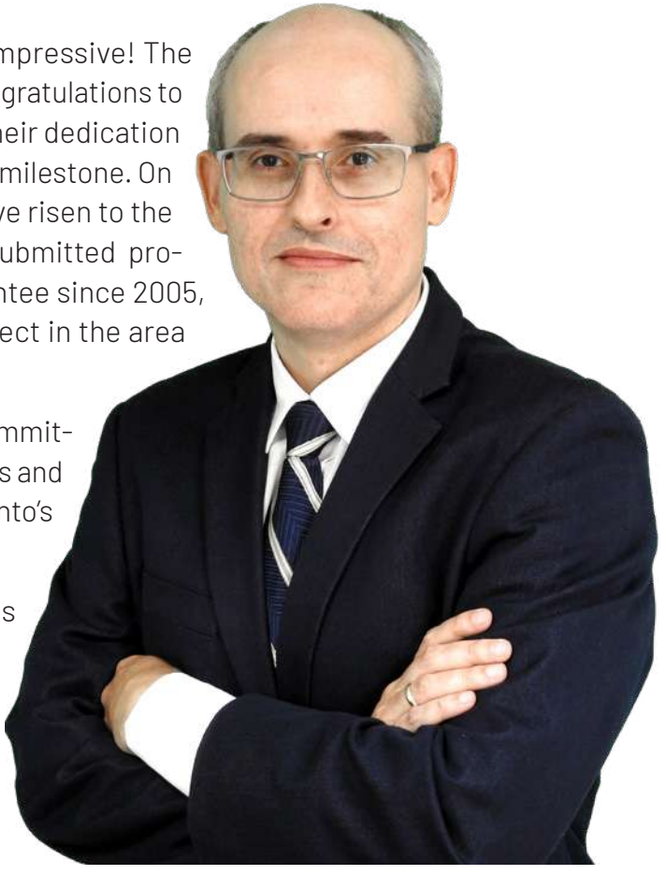


PHOTO: FAPES COMMUNICATIONS OFFICE

And FAPES's work continues to grow. We remain committed to expanding national and international partnerships and moving towards the internationalization of Espírito Santo's research and innovation.

Congratulations to FAPES for 20 years of achievements!

MESSAGE FROM THE TECHNICAL-SCIENTIFIC SECTOR DIRECTOR

CELSO SAIBEL

The year 2024 marks two decades of FAPES' existence. The recognition of the scientific community and institutional partners, as well as the transparency and efficiency of its processes, the dedication of its technical staff and its role in integrating the various sectors of society to promote sustainable development in the state leave no doubt: the Agency, created in 2004 as part of the implementation of the Espírito Santo State Science and Technology System, has succeeded!

In recent years, FAPES has launched dozens of public calls, contracted hundreds of projects and managed thousands of scholarship holders in a wide range of modalities, consolidating itself as one of the main components of the Science, Technology and Innovation (STI) system in Espírito Santo.

After working as a professor and researcher in public and private institutions for around 20 years, I took over as technical-scientific director of the Agency at the end of 2021. Since then, with this new profile of action, I have come to know closely the numerous aspects involved in the process that aims to allocate public resources to actions aimed at the development of STI in our state. Being much more than a bureaucratic activity – in the common sense, filling out forms and following rules –, this complex management process involves not only the observance of budgetary, regulatory, time, evaluation and selection aspects, among others, but also (and fundamentally) the cohesive and precise work of a specialized and dedicated technical team with a common objective, which is to guarantee "legality, impartiality, equality, publicity and morality" in all actions that seek financial support from FAPES. Furthermore, in this process, FAPES must continually identify critical points and opportunities for improvement to consolidate itself as one of the main players in Espírito Santo's society in terms of reflections on the strategic role of STI for Espírito Santo and the country in the coming years.

Not only because of the importance of the 20-year milestone for any institution, but also because of the interesting history of STI in our state, with the work of FAPES as a backdrop, it is with pride and great satisfaction that I present and recommend this work, wishing everyone a great read!

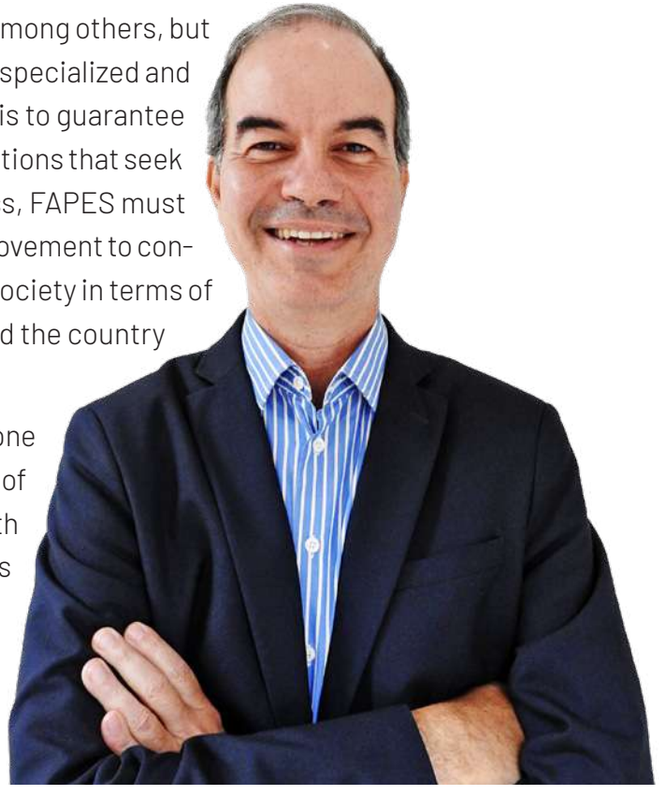


PHOTO: CELSO SAIBELS PERSONAL ARCHIVE

MESSAGE FROM THE ADMINISTRATIVE-FINANCIAL SECTOR DIRECTOR

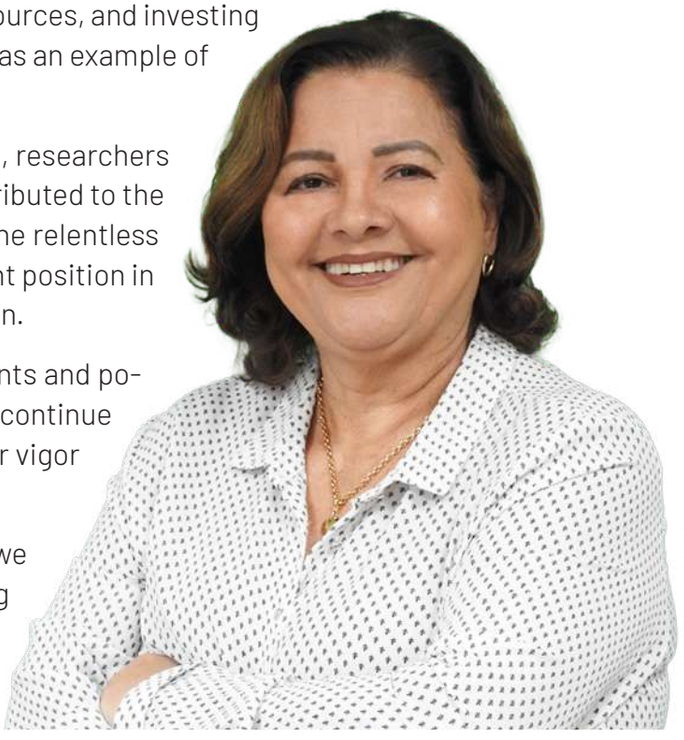
LUCIA ARAUJO

There is no doubt that the work carried out by FAPES over the past 20 years is remarkable. The Agency's dedication and commitment to promoting scientific research and innovation in Espírito Santo are evident.

FAPES has played an essential role in the development of knowledge and technological innovation in our state. Its constant support to researchers, educational institutions and innovation projects has been a fundamental pillar for scientific and technological progress, represented by the number of projects, human resources training grants and successful initiatives that have positively impacted society in Espírito Santo.

The impact of the work developed by FAPES goes beyond laboratories, classrooms, research centers and companies, given that the various innovations promoted by the Agency have generated concrete benefits for the population of Espírito Santo, from advances in health and education to improvements in sustainable technologies and the local economy. Each supported project reflects FAPES' vision of a more developed, sustainable and competitive Espírito Santo on the national and international scene.

FAPES's trajectory over the past 20 years has not been free from challenges. Facing economic and budgetary uncertainties, the Agency has demonstrated resilience and adaptability. Its strategies for diversifying funding sources, optimizing resources, and investing in technological innovation are worthy of praise and serve as an example of efficient and visionary management.



PHOTOS: FAPES COMMUNICATIONS OFFICE

We would like to express our gratitude to all employees, researchers and partners who, with commitment and dedication, contributed to the success achieved by FAPES. The collaborative work and the relentless pursuit of excellence have placed the Agency in a prominent position in the national scenario of promoting research and innovation.

We congratulate FAPES for two decades of achievements and positive impact. May this celebration serve as an incentive to continue on the path of innovation and excellence with even greater vigor and determination.

The future holds new challenges and opportunities, and we are fully confident that FAPES will continue to be a driving force in the scientific and technological development of Espírito Santo.

MESSAGE FROM THE INNOVATION SECTOR DIRECTOR

ELTON MOURA

When I took over the newly created FAPES Innovation Sector in 2019, I knew that the challenges would be great, but the achievements would be even greater.

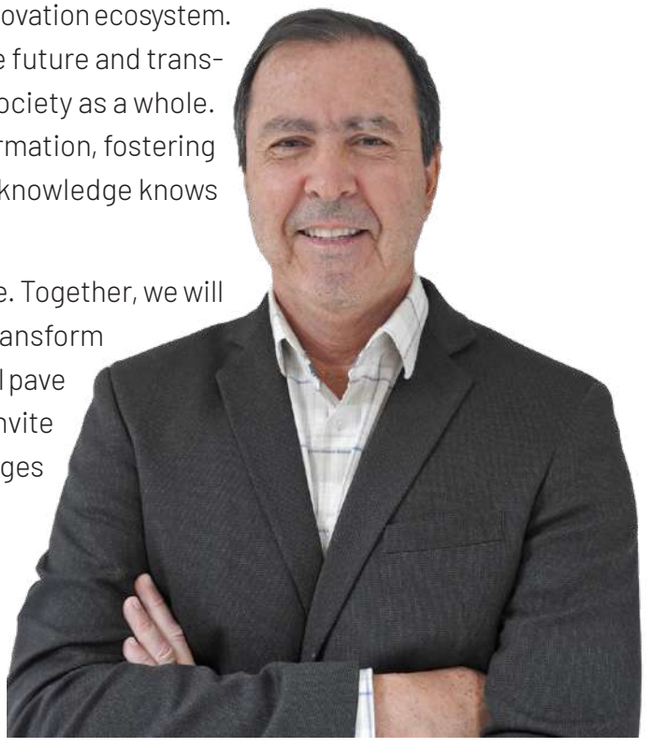
As FAPES celebrates its 20th anniversary, it is moving towards a future full of challenges and opportunities, reaffirming its commitment to promoting knowledge, technological advancement and innovation. In this context, internationalization emerges as a fundamental strategic axis to achieve our goals and to strengthen the institution's position on the national and global scene.

Our vision of internationalization is comprehensive and integrated, seeking to transform the Agency into a hub for ideas, talents and projects from all over the world. This process involves not only expanding our international partnerships, but also creating an environment that fosters transnational collaboration and the exchange of knowledge and experiences.

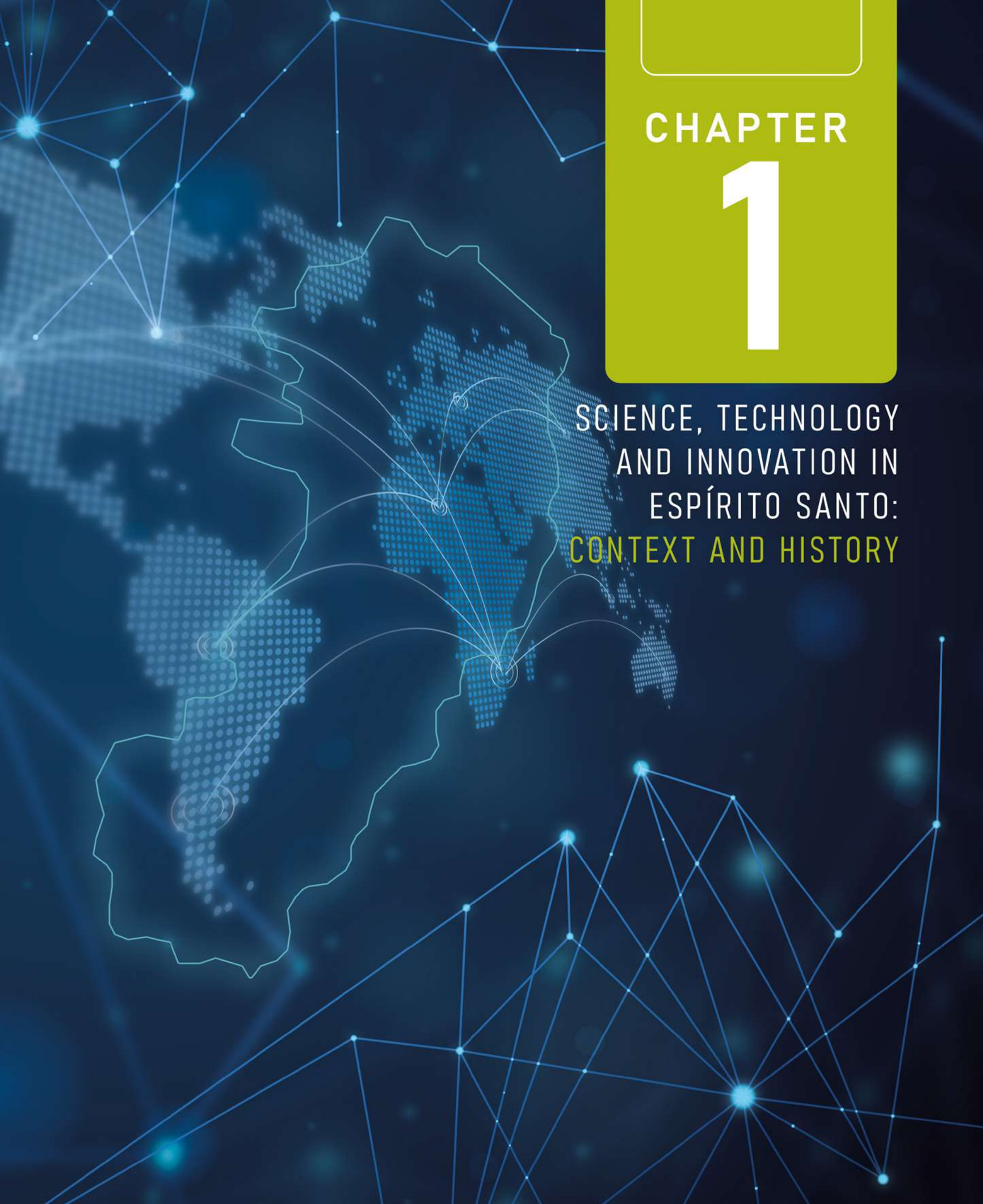
Our journey towards internationalization is guided by our commitment to excellence and sustainability. We believe that international collaboration enriches our research and innovation practices and contributes to the development of solutions that meet the needs of an ever-changing society.

As we look into the future, we are determined to build bridges that connect our innovative researchers and entrepreneurs with the rest of the world. By building bridges, we are connecting institutions and people, and creating a globally integrated research and innovation ecosystem. This ecosystem is essential to address the challenges of the future and transform our discoveries into concrete solutions that benefit society as a whole. The Agency is committed to being a catalyst for this transformation, fostering a future where international collaboration is the norm and knowledge knows no borders.

The future of FAPES is global, collaborative and innovative. Together, we will continue to break boundaries, explore new horizons and transform knowledge into solutions that make a difference. Today, we will pave the way for a more connected and promising tomorrow. We invite everyone to join us in this mission to transform global challenges into opportunities for a better and more sustainable future.



PHOTOS: FAPES COMMUNICATIONS OFFICE



CHAPTER 1

SCIENCE, TECHNOLOGY AND INNOVATION IN ESPÍRITO SANTO: CONTEXT AND HISTORY

THE TRAJECTORY OF STI IN ESPÍRITO SANTO: FROM DECENTRALIZATION TO INNOVATION IN THE 21ST CENTURY

The trajectory of Science, Technology and Innovation (STI) in Espírito Santo is relatively recent. In the early 20th century, as a reflection of the national panorama, little emphasis was given to initiatives aimed at these areas. It was after the promulgation of the 1988 Constitution, which encouraged the decentralization of scientific, technological and innovation policies, that a movement towards the construction of an organizational structure dedicated to fostering investments in science and technology began to emerge in the State of Espírito Santo [1].

Thus, this chapter outlines the creation, at the beginning of the 21st century, of the State Secretariat of Science and Technology (SECT), currently called the Secretariat of Science, Technology, Innovation and Professional Education (SECTI), and of the Espírito Santo Research State Funding Agency (FAPES), currently the Espírito Santo Research and Innovation State Funding Agency (FAPES). These milestones marked the advent of a new chapter in the narrative of STI in Espírito Santo.

Intertwined with this path are socioeconomic scenarios, both international and national, that have shaped policies related to STI at national and state levels. Globalization, the rise of the internet and emerging technologies, and the process of economic development in Espírito Santo since the end of the 20th century are events that, directly or indirectly, influenced the configuration in which STI was born in the State of Espírito Santo.

THE INTERNATIONAL SCENARIO

The fall of the Berlin Wall[1] on November 9, 1989, brought significant changes to the economies of all countries. This historic event marked the decline of the USSR and the beginning of a market economy in a global context [2]. With the collapse of the socialist movement worldwide and the establishment of capitalism as the political and economic regime in most countries around the world, the world changed [3]. These transformations gave rise to important organizations, such as the Southern Common Market (Mercosul) in 1991, and a year later, some European countries formed the European Economic Community, which later became the European Union. This was the beginning of a globalized world [2].

From the 1990s onwards, a set of neoliberal policies began to guide the economies of several countries. Economist John Williamson published an article with a list of economic policy recommendations, which became known as the Washington Consensus. These measures were the result of a series of meetings between the International Monetary Fund (IMF), the Inter-American Development Bank (IDB), the U.S. Department of the Treasury and the World Bank. The first of these took place in November 1989, when economic problems

[1] For 28 years, Germany was divided by a wall that delimited the territory between East Germany, led by the Union of Soviet Socialist Republics (USSR), and West Germany, coordinated by the United States (USA), France and England.

were discussed – such as inflation and economic crises – which affected several countries, reaffirming neoliberal guidelines, condensed into ten areas[2]. Such neoliberal policies guided the economies of several nations for a long period [4].

From the 2000s onwards, the commercialization of the broadband system (with higher connection speed) enabled greater access to the internet and faster web browsing, which also impacted the way people communicate and consume.

Still in the wake of the 1990s, one factor that boosted the economy at the beginning of that decade was the expansion of Internet services. The year 1991 is considered a major milestone in this beginning, as it was when the World Wide Web (WWW) emerged [5]. The following year, the first browser was launched, a web page search engine called Mosaic, which enabled the use of the mouse for online navigation [5]. From these two developments, the way was paved for the Internet to no longer be restricted to the academic community and government agencies, but to become popular among the general public, commercializing its use [6]. The expansion of the Internet occurred quickly and had an impact on the way people interact, encompassing economic, political and cultural aspects [7].

The new era of a globalized world mediated by the internet marked the generations that emerged from 1980 onwards. Millennials or Generation Y, which includes people born between 1980 and 1995 [8], entered the 21st century, establishing a new relationship with education, the economy and the job market, influenced by their daily contact with computers, smartphones, the internet and a high flow of information from network connections [9]. The following generations, Z – people born from 1995 to 2009 – and Alpha – people born from 2010 onwards – had an even greater impact on the socioeconomic sphere, with their new values and worldview, given their contact with new digital technologies from a very early age [10].

THE BRAZILIAN SCENARIO

The 1988 Federal Constitution, in addition to representing a historic milestone in the Brazilian political system, had a significant impact on the economic scenario, since "the constituents strengthened the structure of the State, establishing monopolies on the exploration of subsoil, minerals, oil, water resources, piped gas, communications and maritime transport" [11].

The 1990s were marked in Brazil by the repercussions of neoliberal policies in the country. The Brazilian government adopted a series of measures to reform the economy (privatizations, trade liberalization, financial and tax reforms, and reduction of the State's role in the economy), which were in line with the policies defined in the Washington Consensus [12]. This consensus was based on the work carried out by Williamson (1989), an economist at the Institute for International Economics, as previously reported. They indicated the origin of the crises in Latin American countries and the possible reforms needed to overcome them [13].

[2] They are: 1) fiscal discipline; 2) redirecting public expenditure; 3) tax reform; 4) financial liberalization; 5) exchange rate reform; 6) trade liberalization; 7) elimination of barriers to foreign direct investment; 8) privatization; 9) deregulation, and 10) secure property rights [4].

It is worth noting that, in contrast to the actions indicated in the Washington Consensus, countries such as China adopted measures aimed at the production and export of industrial products with lower added value, in addition to policies aimed at research and technological progress. This made it possible to achieve a transition to a high technological standard during the beginning of the 21st century, a result that was also identified in other East Asian countries, such as South Korea, Taiwan and Singapore. However, in these cases, these nations were supported by the Western economy, especially the United States, for their geopolitical defense strategies due to the threats of socialist revolutions in the region, given their proximity to the former Soviet Union and China [14].

In Brazil, two distinct periods can be identified to analyze the relationship between macroeconomic policy and industrial and technological policy in recent times. The first occurred between 1995 and 2002, when policies focused on the process of monetary stabilization. The second period, between 2003 and 2013, witnessed a return, with greater emphasis, to the practice of industrial policies [15].

In November 2003, the Industrial, Technological and Foreign Trade Policy (PITCE) was launched. There is no doubt that, since the 1990s, this policy represented the first step towards recognizing the need to build an institutional framework guided by public policies that could guide and induce the process of economic and industrial development.

PITCE elected priority sectors and those with a future. The first were semiconductors; software; capital goods; and pharmaceuticals and medicines. The second were the sectors of biotechnology, nanotechnology and renewable energy [16].

PITCE had the following goals:

> [...] the increase in economic efficiency and the development and dissemination of technologies with greater potential to induce the level of activity and competition in international trade. It will focus on increasing the efficiency of the productive structure, increasing the capacity for innovation of Brazilian companies and expanding exports. This is the basis for greater insertion of the country in international trade, stimulating the sectors where Brazil has greater capacity or need to develop competitive advantages, opening paths for insertion in the most dynamic sectors of international trade flows [16].

In general, it is commonly assessed that the PITCE brought benefits by establishing an institutional framework for government action [17]. Notable institutional frameworks date back to this policy, such as the Brazilian Innovation Law, the Law of Good and the Information Technology Law. In addition, the PITCE contemplated several of the actions proposed in the budget laws. However, the biggest obstacle was perhaps the incompatibility of macroeconomic policy, especially in relation to exchange rates and interest rates, with the strategies established in the PITCE [15].

The PITCE was replaced by the Productive Development Policy (PDP) in the period 2008-2011. Although the PDP is broader in scope than the PITCE in terms of sectors and more ambitious goals, the policy's reach was limited not only by internal issues that had not been resolved since the PITCE, but also by issues in the external scenario. In 2008, the Subprime Mortgage Crisis imposed severe limitations on the internal and external macroeconomic scenarios. These restrictions had significant repercussions on the levels of domestic investment and external demand, the effects of which also impacted the level of economic activity in Brazil [15].

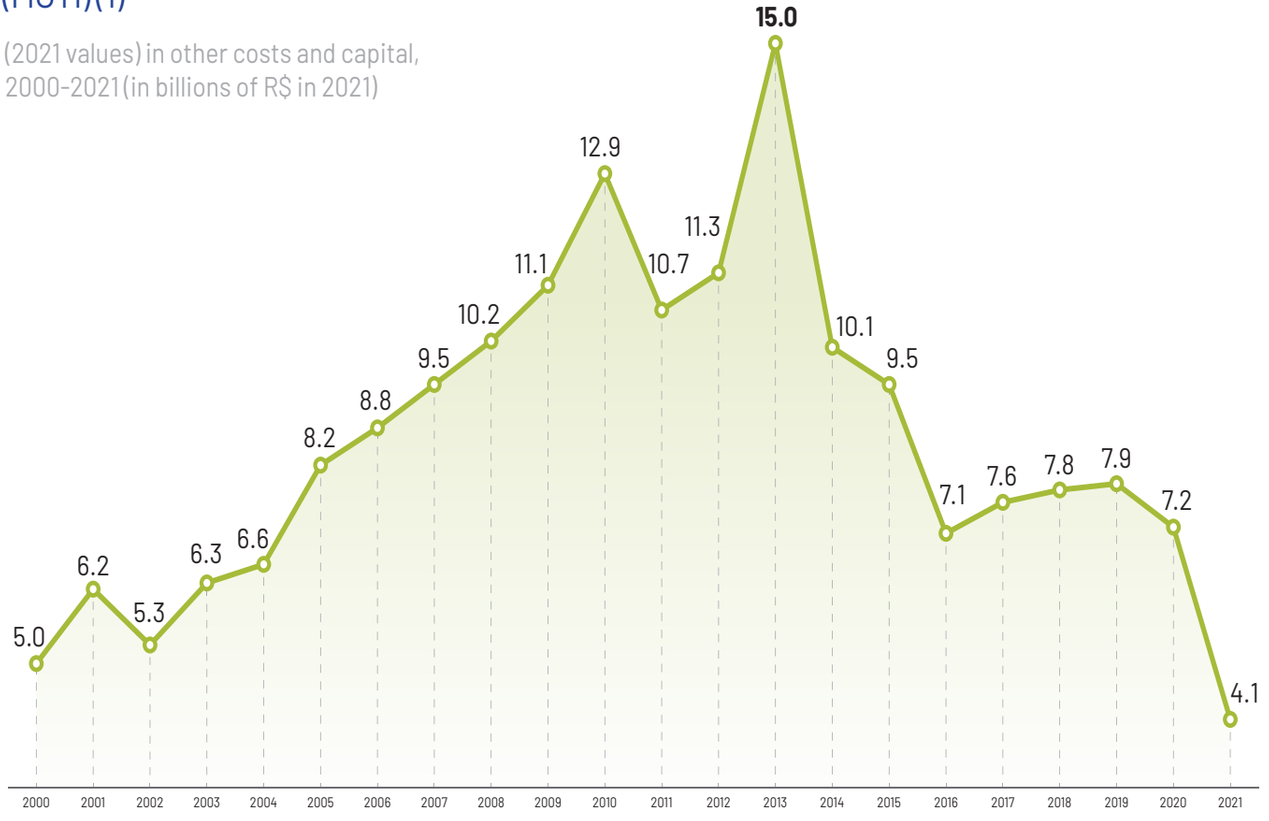
The PDP was subsequently replaced by the Brasil Maior Plan (PBM) for the period 2011-2014. This policy emerged in a very adverse macroeconomic situation, with falling investment and growth rates, in which the external scenario also presented uninspiring prospects from the point of view of foreign trade. The over-valued exchange rate was an obstacle to efforts to achieve external insertion anchored in dynamic sectors with the capacity to generate technical progress.

Unlike previous periods, the formulators of the PBM acknowledged the harmful effects of exchange rate policy on the external sector. "Thus, it was recognized that economic policy, in general, was not in line with industrial policy, so there was a need to expand compensatory instruments to inhibit the effects that hindered the competitiveness of national companies." [15, p. 98].

Despite the fact that Brazil launched, in 2018, the National Science and Technology Strategy (ENCTI) 2016-2022, the country entered a deep political and economic crisis from 2014 onwards, making any industrial and innovation policy strategy unfeasible from then on.

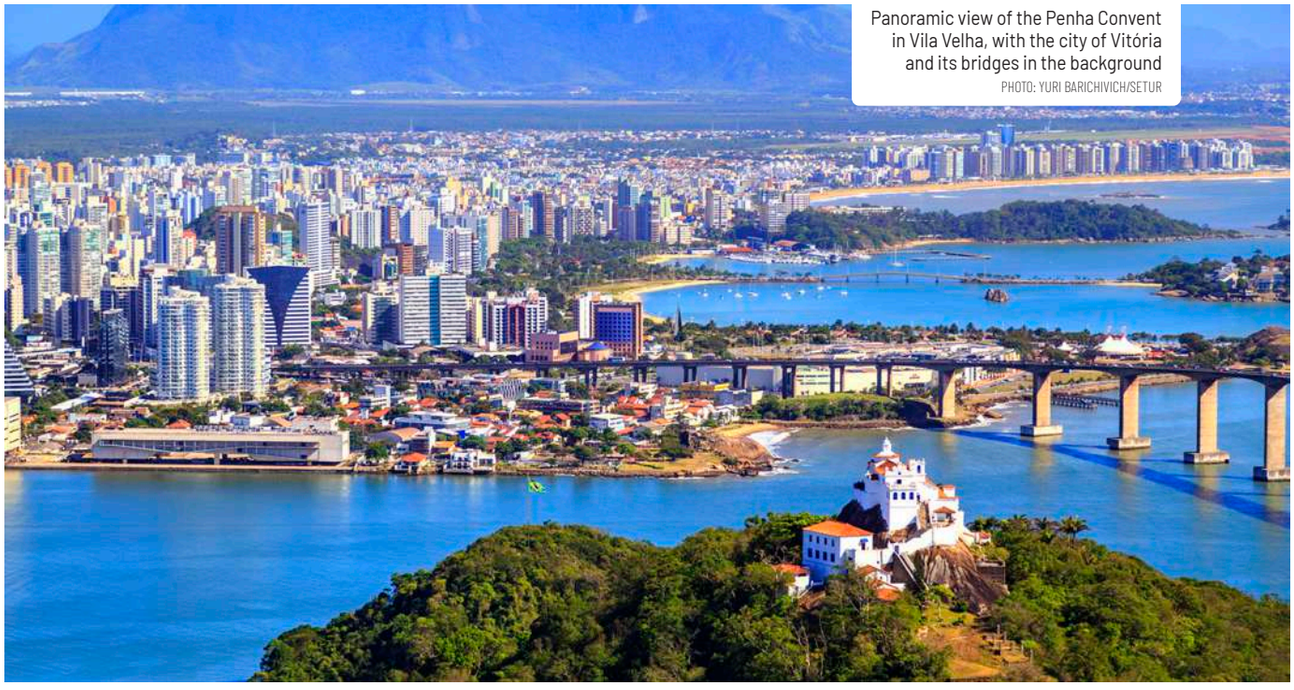
Graph 1 - Brazil: Budget execution of the Ministry of Science, Technology and Innovation (MCTI)(1)

(2021 values) in other costs and capital, 2000-2021 (in billions of R$ in 2021)



Source: Federal Government's Integrated Financial Administration System (Siafi) [18].
Preparation: Coordination of Science, Technology and Innovation Indicators (COICT) - CGPI/DGI/SEGEC - Ministry of Science, Technology and Innovation (MCTI)
Note: 1) Values deflated by the implicit GDP deflator

Graph 1 shows the budget execution of the Ministry of Science, Technology and Innovation (MCTI) in the period from 2000 to 2021. From 2014 onwards, the drop is vertiginous, reaching 2021 with executed values lower than those of the year 2000. As a consequence, the Industrial and Technological Research (PINTEC), 2017 edition, portrays:



Panoramic view of the Penha Convent in Vila Velha, with the city of Vitória and its bridges in the background
PHOTO: YURI BARICHIVICH/SETUR

> [...]for the first time in its history, a drop in all the main aggregate indicators of innovation in the country. This negative and worrying scenario was not, however, completely unpredictable. The crisis at Petrobras, the largest investor in R&D in the country, played a relevant role in the reduction of R&D investments in the Brazilian economy. However, even more important was the political-economic crisis that directly affected companies' investments in innovation. In particular, the downsizing of some of the most efficient public policies to stimulate innovation stands out [19].

It was in this scenario that the Coronavirus pandemic arrived in Brazil in 2020. The country faced several challenges, including the discontinuity of industrial and innovation policies that compromised the achievement of the general objective of reversing the country's deindustrialization process and its sustainable development.

THE SCENARIO IN ESPÍRITO SANTO

The political, social and economic development of Espírito Santo up until the end of the 20th century has been well documented by several researchers [20][21][22][23]. Espírito Santo reached the end of the 20th century with an economy consolidated in the production of commodities. During the 1990s, the State of Espírito Santo was impacted by the course of neoliberal policies established in the Washington Consensus. These policies advocated economic liberalization, opening of markets, administrative reforms and, mainly, the reduction of the State in the economy, as already mentioned at the beginning of this chapter.

Espírito Santo had created the Development Fund of Port Activities (Fundap) in the early 1970s, a tax incentive that benefited importing companies. With economic liberalization, the end of the 20th century and beginning of the 21st century were marked by the intense use of this instrument as a mechanism to encourage imports by the ports of Espírito Santo with the concept of the "vocation of Espírito Santo for foreign trade" [22] being widely disseminated among society.

Darcy Castelo de Mendonça Bridge, also known as the Third Bridge, at dusk, with the city of Vitória in the background
PHOTO: YURI BARICHIVICH/SETUR

The intense competition with external products made possible by economic liberalization highlighted the need for investments in improving quality and innovation in companies. Within the Development Bank of Espírito Santo (Bandes), a series of actions were encouraged aimed at providing the State with some infrastructure for innovation and technology, with emphasis on the creation of Technology Centers [1].

With the reduction of the State in the economy, the end of the 20th century was also marked by the displacement of the development agenda to a secondary level [22]. Even so, the scientific, technological and innovation agenda in Espírito Santo, despite the numerous difficulties in advancing in this scenario, managed to make important leaps with the creation of Law No. 4,778/1993, which instituted the State Science, Technology and Innovation System (SiSECT) and created Funcitec, events that will be discussed in more detail later in this chapter.

THE ECONOMY OF ESPÍRITO SANTO IN THE 21ST CENTURY

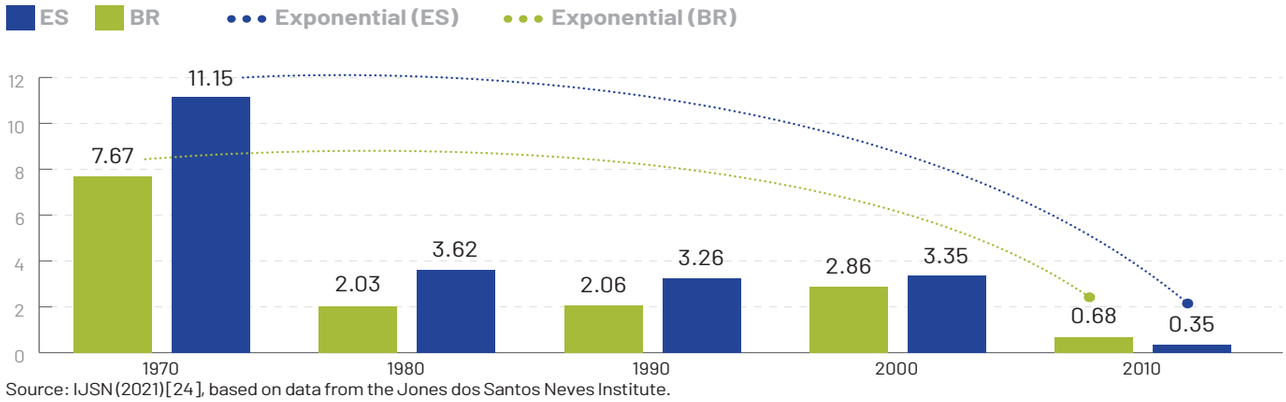
Although Espírito Santo has had activities focused on commercial-scale oil production since the late 1960s [23], the discovery of new fields on the coast of Espírito Santo, especially in 2007, brought new prospects for the state's economy, so much so that several experts pointed out that this industry "presents good growth prospects in the coming decades, constituting the most important growth vector for the state's economy" [21]. Once again, factors external to the Espírito Santo economy prevented many of the planned projects in the oil and gas area from being realized over the first two decades of the 2000s, and, consequently, the prospects for greater economic growth were frustrated.

In the absence of structural changes in the economy of Espírito Santo since the 1970s with the implementation of the Major Projects, it was clear that the current productive structure was already too fragile to ensure the persistent positive differences in GDP growth rates in favor of Espírito Santo.

Economist Orlando Caliman, in a lecture at the Jones dos Santos Neves Institute (IJSN) [24], showed the average annual rates of variation of real GDP over the last 50 years for the Brazilian and Espírito Santo economies, showing that, in the second decade of the 21st century, the average annual rate of variation of the Espírito Santo economy was lower than that of Brazil [24], as shown in Graph 2.

Graph 2 - Average Annual Rates of Variation in Real GDP Distributed by Decades

GDP Variation (%)



Source: IJSN (2021) [24], based on data from the Jones dos Santos Neves Institute.

From 2012 to 2020, the GDP results were not very favorable for Espírito Santo due to unlikely events that impacted the state's economy. In 2015, for example, Espírito Santo faced one of the worst water crises in its history [25]. A prolonged drought that began in 2014 generated negative effects, mainly in the North and Mountainous regions of the state, deeply affecting a large part of the rural and urban population [26]. This water crisis also had significant impacts on the state's industry and economy, with the suspension of water collection for industrial and irrigation purposes for a period, in addition to the suspension of agricultural credit [25]. That year, the state's GDP fell by 2.1%.

It is worth noting that, despite the reduction in GDP over this period, industrial activity, especially in the Extractive Industry, maintained a prominent position, with growth rates, except in 2016, when it fell by 6.2% due to the suspension of Samarco's activities. This occurred due to the rupture of the iron ore tailings dam in Mariana (MG)[3], on November 5, 2015 [27].

Among the changes that marked the state in subsequent years, the effects generated by the national crises in the oil and gas and mining extractive industries stand out. The first was influenced by the political situation of Petrobras, which influenced the projects planned for the oil and gas sector in Espírito Santo. The second refers to the disaster of the rupture of the mining tailings dam in Brumadinho (MG), when the state's GDP fell by 3.8%. It is worth noting that, once again, the industry of Espírito Santo was negatively affected. The state's industrial production fell by 9.7%, partly influenced by the production of the extractive industry, which, individually, saw a decline of 21%.

[3] The dam rupture released a large amount of mineral waste along the Rio Doce basin, affecting 41 municipalities, generating several significant negative impacts, such as the suspension of water supply in several affected cities, due to water contamination by metals and other components [55].

Another external event that had serious effects on the country and on Espírito Santo was the Covid-19 pandemic, which began in 2020 in Brazil. The state's GDP in 2020 fell by 4.4% compared to the previous year. The first case of the disease in Brazil was confirmed in the state of São Paulo on February 26. In just over a year, around 300,000 people have died in the country as a result of this pandemic, amid more than 12 million cases [28]. The first case of the new coronavirus in the State of Espírito Santo was confirmed on March 5, 2020, by the State Secretariat of Health (Sesa) [29]. As of September 2023, data from the Espírito Santo government indicate that 15,111 people have died from Covid-19 and 1,339,915 cases have been confirmed [30].

OVERCOMING ADVERSE SCENARIOS

Despite all the adversities that Espírito Santo has faced at the beginning of this century, there are numerous achievements that deserve to be highlighted. Initially, Espírito Santo has enjoyed political stability over the last 20 years, unlike Brazil, which plunged into a political crisis in 2013, culminating in an impeachment process in 2016. In the state, these years were marked by the management of two governors who, in a responsible manner, managed to navigate "very rough seas".

In the fiscal field, Espírito Santo has established itself as the state with the best fiscal management in Brazil. Since 2012, it is the only state in the country to achieve an "A" grade in the Payment Capacity of States and Municipalities (Capag) category, from the National Treasury Secretariat [31]. According to the State Secretary of Finance, Benicio Costa, even though the State has shown a net debt from 2019 to 2023, it has maintained its capacity to make investments. "We reached the amount of R$ 12.68 billion in investments from January 2019 to August 2023," Costa declared [32].

The State Governor, Renato Casagrande, emphasized that this record in resource allocation is due to the good financial management of the government of Espirito Santo. "Espírito Santo is the only state with an 'A' rating every year since the National Treasury began issuing ratings. And it all started in 2012, during my first term. Since then, we have kept the state organized and with efficient fiscal management, which gives us investment power, making Espírito Santo a reference in various areas", Casagrande stated [32].

From a social perspective, there have been numerous achievements in the areas of public safety, health and education, which can be seen in the numerous reports of the Jones dos Santos Neves Institute (IJSN). Regarding public safety, researchers evaluated the results of the Estado Presente Program in Espírito Santo and concluded that this program was effective in reducing the number of homicides [33].

In 2019, the state achieved the best score in the country in the Basic Education Development Index (IDEB). The 2019 IDEB result for High Schools in Espírito Santo was 4.6, even reaching 98% of the target, i.e., 4.7. This performance was better than that of 2017, when the Espirito Santo only reached 93% of the target [34]. In the overall evolution, across the entire state (municipal, state and institutions), the IDEB reached a score of 4.8 [35]. All these achievements were important in paving the way for the most recent investments in science, technology and innovation.

HISTORY OF SCIENCE, TECHNOLOGY AND INNOVATION IN ESPÍRITO SANTO

The 1988 Federal Constitution inaugurated a new chapter in the history of Brazilian states when it determined, in article 218, that it is the responsibility of each federative entity to promote and encourage "scientific development, research, scientific and technological training and innovation". In paragraph 5 of the same article, each state was authorized to invest part of its budget revenue in public institutions to promote research and innovation, which set a precedent for the development of a science and technology system in Espírito Santo.

Before 1988, Espírito Santo had a series of important institutions for the scientific and technological development of the state, such as the Federal University of Espírito Santo (UFES)(1954); the Rural Credit and Assistance Association of Espírito Santo (ACARES)(1956); the Federation of Industries of Espírito Santo (Findes)(1958); the Development Bank of Espírito Santo (Bandes)(1967), and the Espírito Santo Agricultural Research Corporation (Emcapa)(1973). However, the existing institutions acted in isolation, contributing to the dispersion and overlapping of efforts and human and material resources [36].

The embryonic actions for the structuring of SiSECT/ES began in the 1980s, when the state signed the Protocol of Intentions with the Secretariat of the Presidency of the Republic, through the National Council for Scientific and Technological Development (CNPq) and the Secretariat of Articulation with States and Municipalities (Sarem)[36]. This Protocol deals with the support that the Federal Government had been providing for the creation of State Systems for Scientific and Technological Development. In addition, it strengthened the organization of activities in the area of science and technology in the States, in the form of a system, through State Plans for Science and Technology (PEDCT) that would actually compose the National Plan for Scientific and Technological Development.

On November 10, 1981, the 1st Espírito Santo Science and Technology Meeting took place in the auditorium of the Espírito Santo Agricultural Research Corporation (Emcapa). The event was attended by 23 Espírito Santo entities that worked with activities related to the theme [36].

> Significant, then, was the holding of the 1st Espírito Santo Science and Technology Meeting, on November 10, 1981. This meeting served to demonstrate to the participants the need to better organize efforts around a state policy of scientific and technological development, of the combination of efforts, in favor of the same objectives, as well as to level the knowledge about activities and studies in progress in the various participating institutions [36].

Octávio Luiz Guimarães, who at the time was Chief Secretary of the State Planning Coordination, stated at the ceremony that Espírito Santo was the first state in the Southeast Region to sign the Protocol of Intentions to institutionalize a State System of Scientific and Technological Development, duly compatible with the goals and objectives of the National Policy for Scientific and Technological Development, together with other bodies operating in the area [36].

In the late 1980s, the 1989 State Constitution dedicated Article 197 to Science and Technology. In paragraph 2, Espírito Santo committed to allocating no less than two and a half percent of its budget revenue annually to the promotion of scientific and technological development projects, including state companies that have some kind of interface with the subject. Even so, this constitutional provision was not complied with.

Due to all the institutional advances related to science, technology and innovation made possible by Law No. 4,778/1993, especially the creation of Funcitec, experts in the field tend to consider it our First Innovation Law

In this context, in the early 1990s, there was a movement in the state in favor of implementing the State Science and Technology System, since Espírito Santo was the only state in the Southeast that did not yet have this type of system [37]. All this mobilization at the state level raised awareness among the government of the city of Vitória for the creation of Law No. 3,763/91, which established the Municipal Council for Science and Technology (CMCT) and the Science and Technology Support Fund (Facitec) [37]. According to the legislation, the Council was established with the objective of "guiding and controlling the actions of the city in favor of scientific and technological development" [38, p. 2], while the fund was supposed to "provide the financial resources necessary for the execution of the city's Science and Technology Policy" [38, p. 3].

SiSECT/ES was established in 1993, when Law No. 4,778 was created on June 7 of the same year [37]. This legislation determined the principles and mechanisms for the elaboration of the State Policy for Scientific and Technological Development and instituted the State Plan for Scientific and Technological Development.

Law No. 4,778/1993 created the State Science and Technology Fund (Funcitec), which was administered at the time by the Secretariat of Strategic Planning and later by the Secretariat of Planning, with the support of the Jones dos Santos Neves Institute for Research and Development Support (Ipes), currently the Jones dos Santos Neves Institute (IJSN). According to this law, Funcitec was established to financially support programs and projects relevant to the scientific and technological development of the state.

The aforementioned legal framework also created the State Council for Science and Technology (Concitec), a "collegiate body of a deliberative and normative nature, with the function of defining the guidelines of the State Policy for Science and Technology (PECT)" [37].

Due to all the institutional advances related to science, technology and innovation made possible by Law No. 4,778/1993, especially the creation of Funcitec, experts in the field usually consider it our First Innovation Law. In the words of Guilherme Pereira, "I consider Law No. 4,778, of 1993, the first innovation law in Espírito Santo. The first state to have an innovation law was Espírito Santo." [39].

Another important event in this context concerns the founding of the Technology-Based Business Incubator – TecVitória, in 1995 [40]. Ufes professors Alvaro Abreu and Anilton Salles Garcia participated in the creation of the incubator, which was the birthplace for a series of startups, including PicPay and Vix Team. "We made a major revolution in the generation of startup companies here in the state" [40].

Almost a decade later, in 2003, investments in STI gained more space with the creation of the Science and Technology Coordination (Coect). The following year, Complementary Law No. 289 created the State Secretariat of Science and Technology (SECT) – currently called the Secretariat of Science, Technology, Innovation and Professional Education (SECTI) – while Complementary Law No. 290 created FAPES, which at the time was called the Science and Technology Support Foundation, an autarchy that became linked to SECTI. The objective of both laws was to implement SiSECT.

Anchieta Palace, illuminated at night, in Vitória, highlighting its historic architecture and grandeur as the seat of the state government.
FOTO: VITOR JUBINI/SETUR

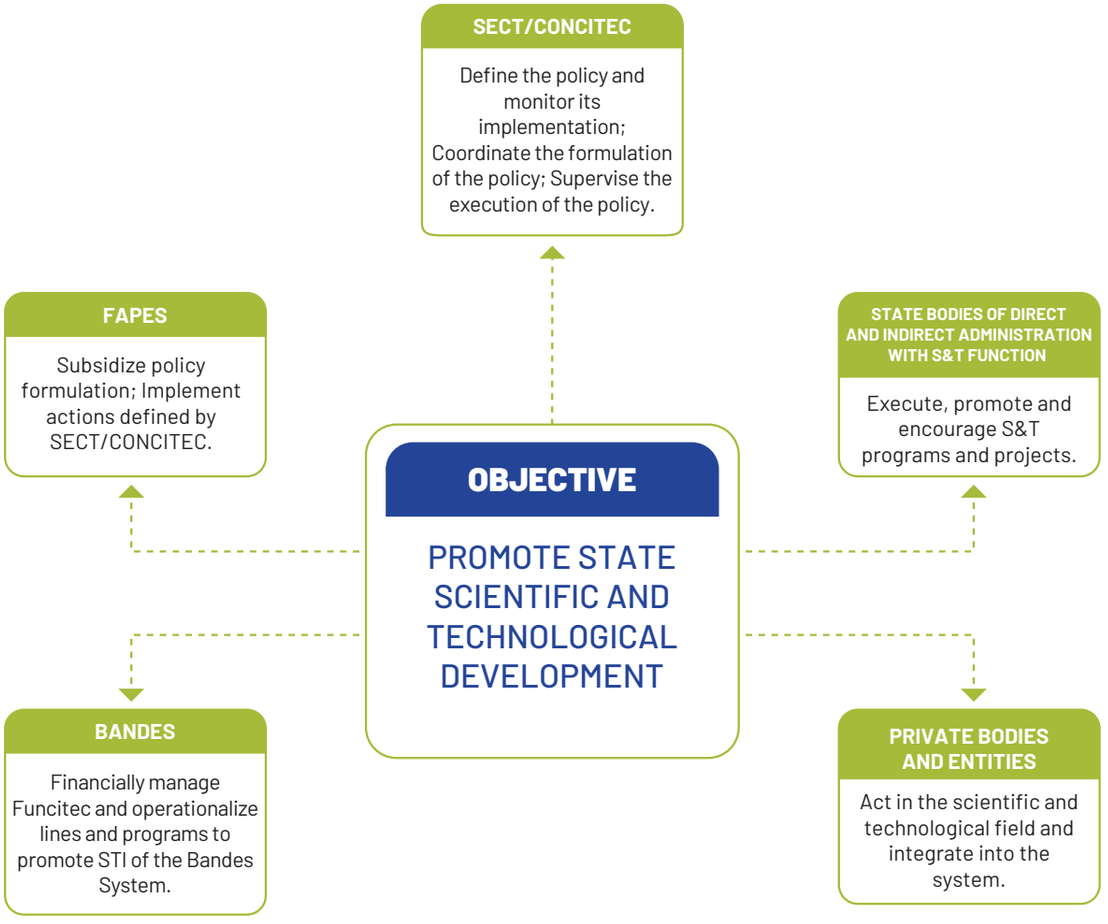
A significant group of social players worked behind the scenes in the creation of these legal instruments and mobilized in favor of the institutionalization of the State Science and Technology System. On March 24, 2004, a meeting was held at the Ministry of Science and Technology (MCT) to discuss the issue with the then Minister of Science and Technology, Eduardo Campos, an important occasion in the context of the creation of SECTI and FAPES. The following people participated in this meeting: Renato Casagrande, who was a federal deputy; Luiz Fernando Schettino, a professor at UFES and, at the time, State secretary of Environment and Water Resources; Francisco Guilherme Emmerich, who served as Dean of Research at UFES; Reinaldo Centoducatte, then Vice Dean of UFES; and Fernando Luiz Herkenhoff, State Coordinator of Science and Technology of Espírito Santo at the time [41].

According to Schettino, this group was formed to join forces towards the institutionalization of the Science and Technology System. These actors identified that, in order for the State to develop in economic, social and environmental aspects, it would be necessary to associate the scientific and technological components. However, resources from the federal and state governments were scarce, in addition to there being a certain lack of knowledge regarding the formulation of public notices and public policies, given that ST&I was something new. "There was the challenge of not having the culture and resources at that time, but there was unity and an understanding that it was essential to make the system exist and make it work" [41].

THE STATE SCIENCE AND TECHNOLOGY SYSTEM

The State Science and Technology System was then formed by SECTI, FAPES and Concitec. Public agencies or private entities that develop activities in the area of STI can also join the system, in addition to Bandes and state agencies of direct and indirect administration with a Science and Technology function (Figure 1).

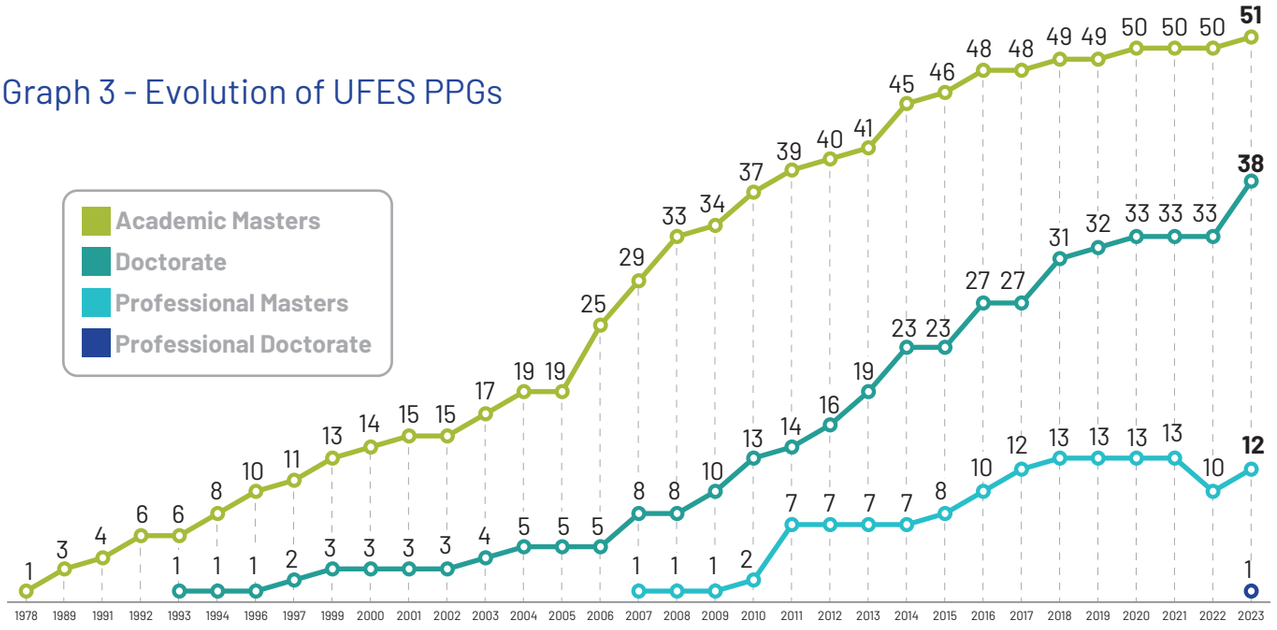
Figure 1 - State Science and Technology System



Source: FAPES (2005) [42]

With the institutionalization and operation of SiSECT, Espírito Santo advanced in its scientific and technological production [43]. Scientific research was still very incipient at the beginning of the 21st century and was mostly concentrated at the Federal University of Espírito Santo, with a large part of its researchers still in training in major international and national centers. In the words of Luciano Terra Peixoto, who presided over FAPES from September 24, 2007 to March 2, 2009, "the need for a state agency to support research was already necessary, not only to support these pioneers, who were at a disadvantage compared to consolidated groups from other states in the competition for federal funds, but also to pave the way for those who were just arriving." And many did indeed arrive, as shown in Graph 3, which shows the evolution of the Postgraduate Programs (PPGs) at UFES. UFES had five doctoral courses in 2004 and, in 2023, reached 38, inaugurating its first professional doctorate.

Graph 3 - Evolution of UFES PPGs



Source: PRPPG/UFES [44].

In 2004, Espírito Santo had 200 research groups registered with CNPq, representing 1% of the total number of groups in Brazil. In 2023, the State of Espírito Santo had 828 registered research groups, reaching 1.9% of the total number of groups in the country.

The data provided by CNPq also show that 16 researchers from Espírito Santo received favorable evaluations for the research productivity grant in 2006. By 2021, this number had risen to 63 researchers from Espírito Santo who were approved for productivity scholarships by the institution. However, in 2022, this figure decreased to 39 researchers. Despite the decline observed over the past two years, it is important to emphasize the progress made by Espírito Santo when compared to the early years of the series [45].

In these first two decades of the 21st century, scientific and technological research in Espírito Santo also benefited greatly from the expansion of the Federal University of Espírito Santo and private colleges, in addition to the transformation of the Federal Center for Technological Education of Espírito Santo (Cefetes) into the Federal Institute of Education, Science and Technology of Espírito Santo (IFES), in 2008. The State reached 2024 with all ten microregions of Espírito Santo covered by at least one private institution and at least one Federal Institute, which meant expansion, capillarity and access to more qualified education for citizens [46].

In terms of innovation statistics, Espírito Santo, despite the advances achieved, still has a discreet performance [43], especially when compared to other states that have years of tradition in investing in innovative activities. Data from the National Institute of Industrial Property (INPI) indicate that the state maintained a number of patents granted below five in most years, reaching the highest number in 2017, when it obtained 19 patent concessions.

Table 1 shows the number of Invention Patents (IPs) filed from 2004 to 2019. Notably, the growth in the number of patents filed in Espírito Santo was progressive in nearly every year. From 2004 to 2013, the number of filed IPs increased from 53 to 118. Although this figure dropped to 106 in 2014, it rebounded the following year, with 135 patents filed in 2015 and 145 in 2016.

Table 1 – Number of Invention Patents filed by state from 2004 to 2019

STATE NAME AND ACRONYM		YEAR															
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Espírito Santo	ES	53	59	63	69	74	70	78	63	73	118	106	135	145	103	104	97
Minas Gerais	MG	358	378	400	489	397	424	470	472	462	533	470	436	542	638	580	639
Paraná	PR	326	332	332	374	392	413	339	371	396	408	368	368	416	444	419	443
Rio de Janeiro	RJ	416	393	379	384	385	373	336	361	388	366	402	387	693	672	381	533
Rio Grande do Sul	RS	339	330	345	333	377	338	327	424	451	466	407	419	479	443	406	438
Santa Catarina	SC	257	268	247	233	310	268	320	287	264	297	303	308	305	311	324	403
São Paulo	SP	1830	1794	1732	1856	1840	1841	1799	1994	2035	1976	1828	1714	1598	1640	1556	1604

Source: INPI, Economic Affairs Office, BADEPI v7.0 [47].

Despite the favorable results observed in Espírito Santo, it is worth mentioning other states in Brazil that share similarities with Espírito Santo's economy. For instance, in Santa Catarina, the number of patent filings increased from 257 in 2004 to 403 in 2019.

The spatial distribution of scientific and technological activities in Brazil is concentrated in the Center-South of the country, mainly in the states of São Paulo, Rio de Janeiro, Minas Gerais, Paraná, Rio Grande do Sul and Santa Catarina [43]. This indicates that the insertion of Espírito Santo in the Brazilian regional context, despite growing, is still not very dynamic from a scientific and technological point of view.

RECENT INSTITUTIONAL MILESTONE

Until the first decade of the 21st century, the industry in Espírito Santo had little internal coordination, due, among other factors, to the limited presence of innovative companies [43]. This scenario, in which the State needed greater integration between agents promoting innovation, led to the creation of the Espírito Santo Mobilization for Innovation (MCI) in August 2018. The MCI is a joint and aligned movement of local actors to create conditions that foster innovation in Espírito Santo, contributing to the emergence of a new economic cycle and prosperity for Espírito Santo society. The Government of the State of Espírito Santo created the Funcitec/MCI subaccount, an investment fund for the MCI, seeking to mobilize actors from the private, public and academic sectors to intensify the culture of innovative entrepreneurship in the State of Espírito Santo. The Fund's resources are used in projects that win calls for proposals evaluated by a committee formed by actors who are part of the MCI [48] [49].

According to the final report of the Strategic Plan for the Innovation Ecosystem of Greater Vitória, prepared by the Reference Center for Innovative Technologies Foundation (Certi), the MCI comprises over 30 entities [50]. This document highlights both the potential and the areas that still need improvement in the state to strengthen Espírito Santo's innovation ecosystem. "The Espírito Santo Mobilization for Innovation is essential today because research and innovation projects, along with calls for proposals launched by FAPES, are implemented using MCI resources" [51].

The MCI has prepared a document called the "Innovation Manifesto of the State of Espírito Santo". This manifest is a response to the need for change through interaction between academia, the productive sector, society and the government, in favor of a common ideal. The members of the Manifesto understand that Espírito Santo has all the necessary elements to be a national reference. In view of this, three key goals were established to be achieved between 2020 and 2030 [52], as described below:

Goal 1: position Espírito Santo among the five most innovative states in Brazil.

Goal 2: increase the number of innovative companies emerging in the state. MCI's goal is to have one thousand startups in Espírito Santo by 2030.

Goal 3: boost the percentage of technology and innovation-based companies among the top 200 companies in Espírito Santo to 20% by 2030.

Next, aiming to promote the sustainable development of Espírito Santo, another recent initiative that aims to collaborate for the development of STI in the Espírito Santo territory was the Espírito Santo Sovereign Fund (Funses), created by Complementary Law No. 914, of June 17, 2019. It is a financial fund linked to the State Secretariat of Finance with the purpose of:

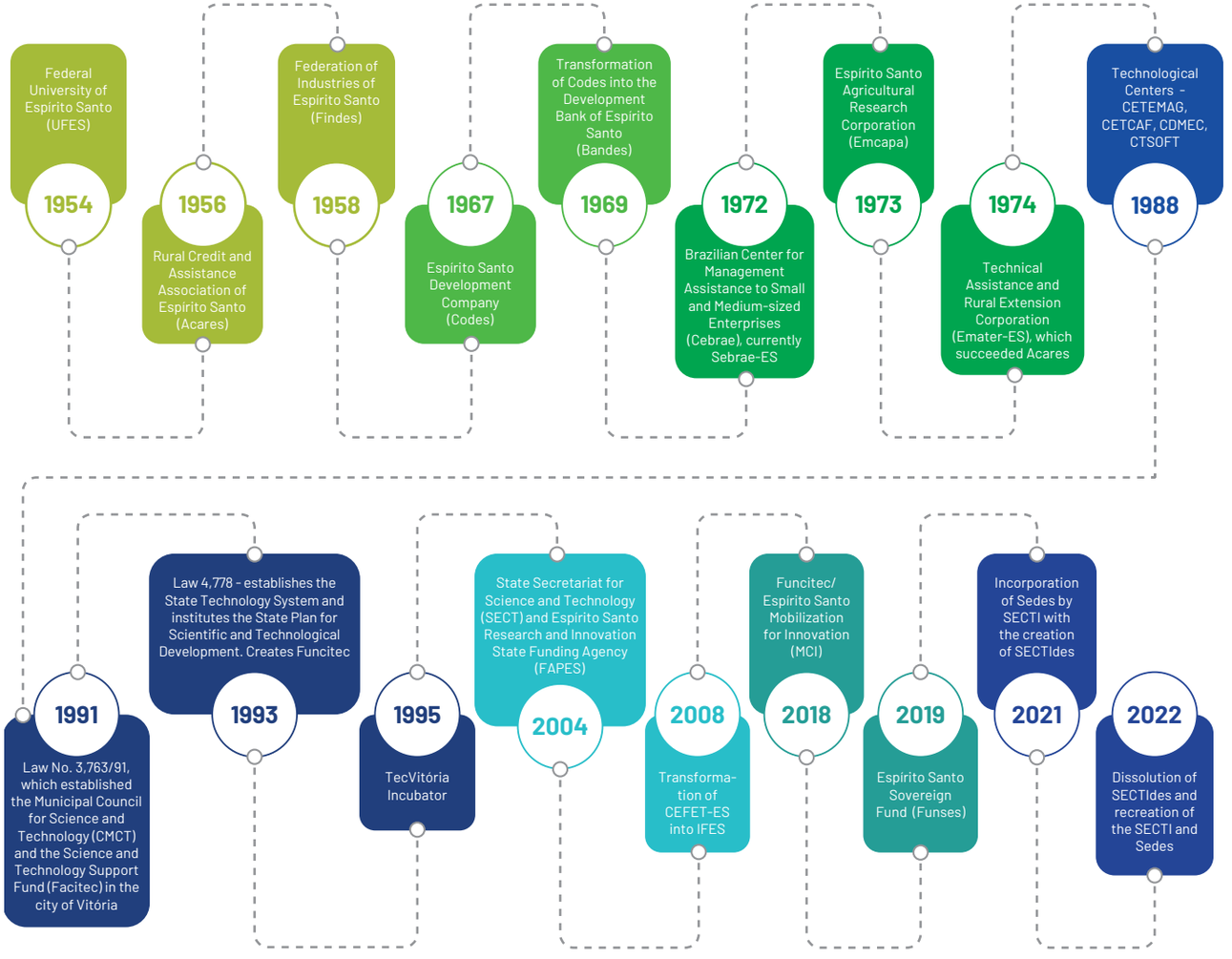
> I - promoting the sustainable economic development of the state, through a strategic investment policy that can minimize the impacts of the decline in revenues from the oil and natural gas industry in the long term;
>
> II - generating savings mechanisms, with an intergenerational purpose and as a way of mitigating possible fiscal risks and helping to conduct fiscal policy in countercyclical periods [53].

One of its modalities is the Investment Fund in Shares (FIP) Funses I[4], which focuses on investing in sectors such as Information and Communications Technologies (ICT) and Nanotechnology, among others [54]. The FIP management operates as a startup accelerator aimed at developing technology-based businesses, having already supported over 100 startups in the state [54]. This initiative aligns with Goal No. 2 of the MCI.

In 2021, Espírito Santo, with the aim of promoting greater convergence between Science, Technology and Innovation actions and the development of the State, promoted the incorporation of the State Secretariat of Development (Sedes) into the State Secretariat of Science, Technology and Professional Education (SECTI)/FAPES, creating the State Secretariat of Science, Technology, Innovation, Professional Education and Economic Development (SECTIdes), a model that remained in force until 2022. In December of last year, the Espírito Santo government transformed SECTIdes into SECTI and recreated Sedes. Complementary Law No. 1,023, which established the new departments, was published in the State Official Gazette, in the edition of December 26, 2022.

[4]Funses I is a Investment Fund in Shares (FIP) with a capital of R$250 million and a ten-year duration, focused on innovation in strategic sectors. Managed by TM3 Capital in partnership with the accelerator ACE, the fund invests between R$200,000 and R$30 million in companies in the early and advanced stages, prioritizing areas such as Technology, Health, Renewable Energy and others. In its first year, it accelerated 77 startups and invested R$33.7 million in 17 companies, contributing to the strengthening of the business and innovation ecosystem in Espírito Santo [54].

Figure 2 - Institutional milestones of STI in Espírito Santo



This chapter has shown that the path taken by the state towards the consolidation of a State Science and Technology System is characterized by a series of legislative milestones and pioneering actions driven by social actors. From the creation of Sisect/ES to the founding of FAPES, some events occurred, as shown in Figure 2, which can be considered crucial for the strengthening of STI in the state, and are described throughout this chapter.

Although the 1988 Constitution was the starting point for the State to consider the need to invest in STI, the joint effort of social actors, institutions and entities from the public and private sectors made it possible to implement policies aimed at fostering knowledge and innovation. In this context, the creation of FAPES, at the beginning of the 21st century, began the writing of a new chapter in the history of STI in the state. By checking the development and performance of FAPES over its 20 years of existence, it is possible to state that there is an Espírito Santo before and after FAPES. This will be explored in the following chapters.

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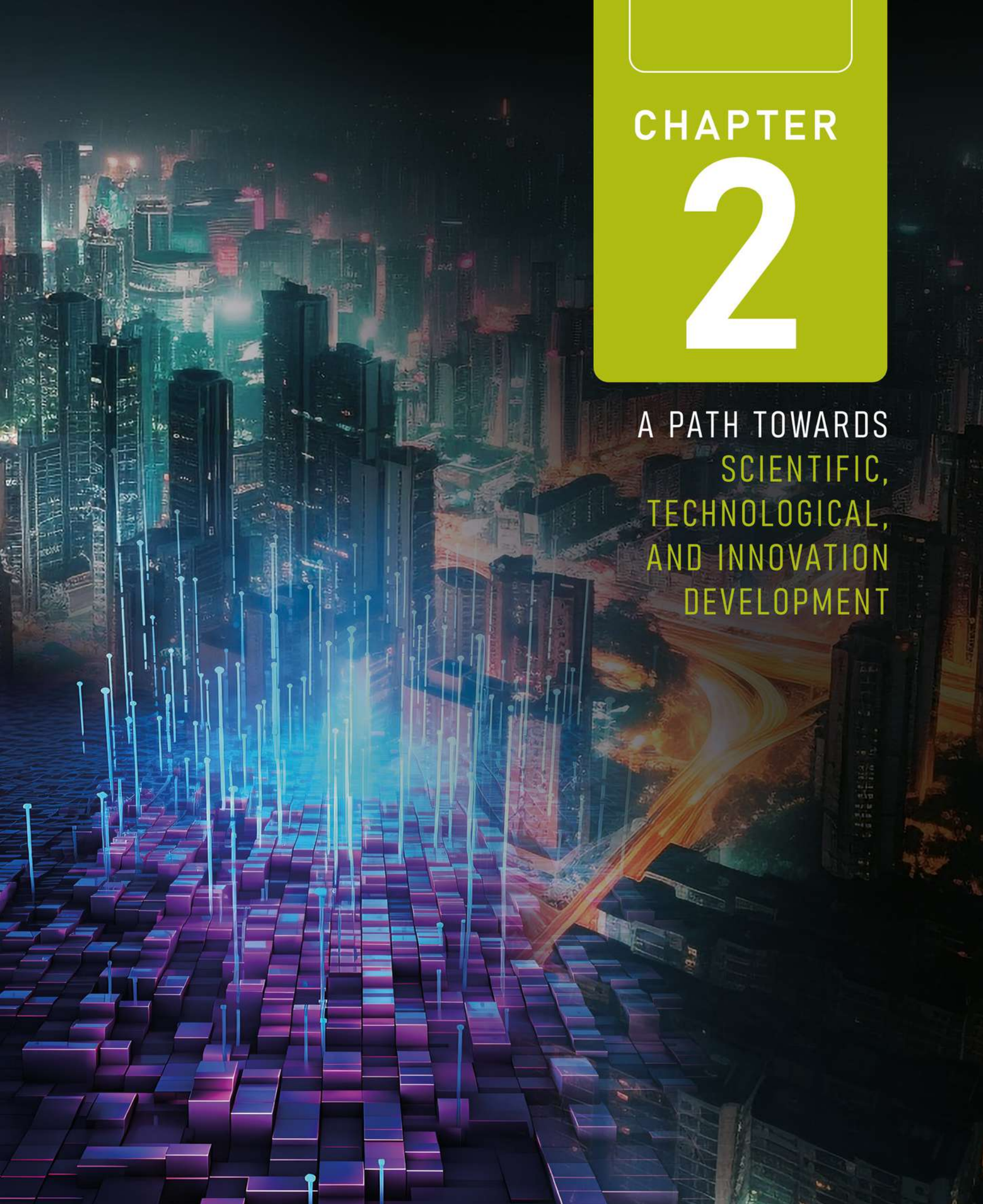


CHAPTER 2

A PATH TOWARDS SCIENTIFIC, TECHNOLOGICAL, AND INNOVATION DEVELOPMENT

FAPES' TRAJECTORY: FROM IDEALIZATION TO CONSOLIDATION

Before becoming a Research and Innovation State Funding Agency, FAPES followed a challenging journey marked by numerous obstacles, both in securing resources for science, technology, and innovation (STI) and in its institutionalization, as outlined in Chapter 1. Transforming into a development institution capable of enhancing the production of scientific, technological, and innovative knowledge required efforts that extended beyond simply establishing a legal framework. The legal framework served only as the starting point for a journey filled with challenges, planning, actions, and lessons learned—a path that has been detailed throughout this book.

This chapter will present the main points of the institution's 20-year trajectory, from when it was still the idealization of a dream for a group of researchers to the main events that marked its history over the years.

FIRST STEPS

FAPES was the 19th Research Funding Agency created in Brazil. Its creation, as shown in chapter 1, occurred in a national scenario that was more favorable to the development of STI activities in the country. Brazil was experiencing the beginning of the implementation of the Scientific and Industrial, Technological and Foreign Trade Policy (PITCE), with the introduction of important regulatory frameworks, such as the Innovation Law of 2004, so that the Research State Funding Agencies would be strategic institutions in the capillarity of national policies in subnational entities.

Located in the Southeast of Brazil, Espírito Santo was the only state in this region that reached the 2000s without having established its Research Funding Agency, as can be seen in Figure 1.

Back in the 1990s, when the State Science and Technology System was being structured, a small group of researchers, known as "the Kombi gang", dreamed of and discussed the project of creating an institution to promote research and development in Espírito Santo, which seemed to be a rather utopian idea at the time. "It was a group of a few people and we joked that it was the Kombi gang, because if we got together, we could all fit inside a VW Bus" [1].

The goal of this group was to seek to strengthen scientific research and put innovation on the agenda of government policy. After much study and debate, they came to the conclusion that the best path for Espírito Santo would be to have its own development Agency [1].

In 2004, this project became a reality through Complementary Law No. 290, which gave rise to FAPES. Before the bill to create FAPES was approved, it was the subject of intense debate in the scientific community. Two reasons are considered important for the approval of the creation of FAPES. The first is related to the fact that Espírito Santo was competing with researchers from all over Brazil in the demand for federal government resources. The second point refers to the need, at that time, for an Agency to develop some projects [2].

When FAPES and SECT were created, Guilherme Henrique Pereira took over as State Secretary of Science and Technology and also as President of the Espírito Santo Agency, while Cleber Guerra held the position of Undersecretary at the former SECT and the position of Administrative-Financial Director at FAPES. At that time, FAPES' activities were carried out in the building of the Jones dos Santos Neves Institute (IJSN), where SECT also operated.

Figure 1 - **Dates of creation of State Research Funding Agencies in Brazil**

Note: Prepared by the author based on data from Confap [3].

The Complementary Laws that established SECTI and FAPES had a direct impact on the state's organizational framework, as they represented the mission of inaugurating a new institutional space for the promotion of a state policy focused on science and technology. Thus, the year 2005 was marked by a lot of work to establish this emerging space: physical installation; preparation of standards and regulations; selection and training of personnel; organization of budgetary, financial, accounting and administrative flows; in addition to the articulation of a network of partners.

In the first months of 2005, the newly created institution began to gain strength with the approval of the Scientific and Technological Development Plan by the State Council for Science, Technology and Innovation (Concitec), in a meeting held on February 16 of the same year. Two decrees were subsequently published: No. 1459-R, of March 10, 2005, which regularized Complementary Law No. 289/2004; and No. 1478-R, of April 14, 2005, which regulated Complementary Law No. 290/2004.

The third floor of the Housing and Urbanization Company (COHAB) building, located at 2045 Vitória Avenue, was the first physical installation of FAPES, where SECT was also transferred to, a space provided on loan for use. All the work equipment was loaned by Ipes at the time – currently IJSN – and by the State Secretariat of Education (Sedu). FAPES occupied a small space on the third floor of this building and there were no areas reserved for a meeting room, archive, warehouse, among others [4].

When it first began operating, many of FAPES' work routines were developed by employees of the former SECT, both for its final actions and for the administrative area, since the Espírito Santo Agency was created with only 14 employees. When FAPES began to grow, some positions and employees from the Secretariat of Science and Technology were transferred to the Agency, given the volume of work, especially in finalistic actions [4].

FAPES has five main areas of activity: Research, Dissemination of Knowledge, Human Resources Training, Innovation and Extension. The latter was created with Complementary Law No. 978, of October 4, 2021, with the aim of promoting scientific and technological development in conjunction with Innovation.

Still in 2005, FAPES structured its partnership network, with the development and submission of several projects to the main agencies supporting science, technology and innovation. This effort resulted in the signing of several fundraising agreements, mainly with the Ministry of Science and Technology (MCT), the National Council for Scientific and Technological Development (CNPq) and the Project Financing Agency (Finep). With this, FAPES expanded its network of partners, including the Minas Gerais Technological Center Foundation (CETEC-MG), MCT, Finep and the National Institute of Industrial Property (INPI), in addition to several public and private departments and agencies located in Espírito Santo.

EVOLUTION

FAPES began its operations in 2005, shortly after its regulation. The date of April 11 of that year is a significant milestone in the institution's history, as it was the day FAPES launched its first call for proposals, Universal 001/2005, in which R$ 3.6 million (in 2022 constant values) was invested to finance 285 research projects across all areas of knowledge, including exact and earth sciences, engineering, biological sciences, health sciences, and social sciences and humanities.

This was just the beginning of a series of research initiatives aimed at strengthening science, technology, and innovation (STI) in Espírito Santo, as will be presented in Chapter 3.

Also at that time, the institution began to develop many projects and programs in partnership with educational institutions, government agencies, companies, and cooperatives with the aim of fostering research and innovation in Espírito Santo.

In 2006, during the administration of President Guilherme Pereira, the Nossa Bolsa Program was created. This program allows individuals in vulnerable situations to access higher education courses at private institutions in Espírito Santo through scholarships from the State Government. To be eligible to apply for the program, candidates must have a per capita family income of up to one and a half minimum wages, and they must have completed high school at a public school or at a private school with a full scholarship. Those who have completed a technical course at one of the State Centers for Technical Education (CEET) in Espírito Santo or have attended high school and/or a technical course at the Schools of the State's Promotional Education Movement are also eligible to apply.

The Nossa Bolsa Program is an important tool to help democratize access to higher education in the state. The 2024 edition of the Program offered access to 54 undergraduate courses, including traditionally competitive ones, such as Medicine, Engineering, and Law [6].

In line with its core mission of Scientific Dissemination, FAPES began supporting the television program "TV é Ciência" as a research project in 2007, with an investment of R$ 335.8 thousand (in 2022 constant values). The episodes highlighted the importance of science in the daily lives of the population and provided information about scientific and technological events of local, national, and international relevance. It was broadcast on "TV Educativa", with a total of 44 editions aired.

Logo of the television program "TV é Ciência."
PHOTO: FPES WEBSITE

With the aim of strengthening Stricto Sensu postgraduate programs in Espírito Santo, the first edition of the call for the Human Resources Training Program in Stricto Sensu Postgraduate Studies (Procap) was launched in 2008 by FAPES, funded 100% by the State. This call is for the selection of scholarship quotas for the training of human resources in master's and doctoral programs of Stricto Sensu postgraduate studies in Espírito Santo. In 2008, a total of 129 scholarships were awarded to the following institutions: Federal University of Espírito Santo (UFES), Vila Velha University (UVV), Fucape, Federal Institute of Espírito Santo (IFES), and Integrated Colleges of Aracruz (FAACZ).

Still in line with the final action of Human Resources Training, 2008 was also notable for the publication of the first Call for Proposals for PIBIC – Institutional Program for Scientific and Technological Initiation Scholarships [7]. The objective of this public call is to grant scholarship quotas to public or private higher education and research institutions in Espírito Santo, in order to encourage students to pursue scientific and technological careers in the state.

The following year, FAPES launched the first call for proposals for the Junior Scientific Initiation Scholarship Program – PBICJ/ES, in partnership with CNPq, aimed at selecting students from the fifth grade of elementary school to the second year of high school in municipal, state and federal public schools, supervised by researchers and/or teachers with Scientific Initiation projects [8]. Later that year, FAPES published the FAPES Call for Proposals 008/2009 – Technological Innovation [9], aimed at researchers in partnership with micro, small and medium-sized companies in Espírito Santo, with the aim of supporting the development of technological innovation, thus increasing competitiveness in the production sector.

The 1st State Conference on Science, Technology and Innovation (CECTI) is also considered a historic milestone in the trajectory of FAPES, as well as for the consolidation of public policies in the area. The event was held from March 24 to 26, 2010, at the Vitória Convention Center and was a preparation for the 4th Regional Conference on Science, Technology and Innovation, which took place on March 30 and 31 of the same year, and for the 4th National Conference on Science, Technology and Innovation, held from May 26 to 28, 2010, in Brasília.

The objective of the event was, above all, to discuss the policies and 18 medium and long-term strategies for Science, Technology and Innovation in Espírito Santo. During the event, the discussion revolved around two themes: I) Articulation of municipal, state and national STI systems and II) Research, development and strategic innovation for sustainable regional development. Based on these themes, the conference provided debates on public policies, strategic competencies, among other subjects. All of this had the participation of the academic community, businesspeople, people linked to the rural environment and the third sector, as well as representatives of public administration.

In 2010, researchers with master's or doctorate degrees, postgraduate scholarship holders and groups of undergraduate students had the opportunity to participate in the first Call for Participation and Organization of Events [10]. The purpose was to provide financial assistance so that this public could participate in or organize events related to STI. Since then, FAPES has been issuing this public call regularly, having reached a total of 11 calls by 2023.

Seeking to contribute to the economic development of the state and meet the demands of the government, in 2011 FAPES created the Applied Research Program for State Public Policies (PPE), with the objective of supporting research, development and innovation projects aimed at implementing state public policies. This initiative resulted in thematic calls for proposals – to be presented in chapter 3 –, such as the PPE Tourism Economy, PPE Prevention, Protection and Social Defense, PPE Biodiversity of Espírito Santo, among others.

INNOVATION

The creation of Complementary Law No. 642, of October 16, 2012, known as the State Innovation Law, impacted the history of FAPES, as it established measures to encourage scientific and technological research, thus stimulating a culture of innovation in Espírito Santo. The following year, Complementary Law No. 731/2013 was published, which changed the name of FAPES and reorganized its basic organizational structure, so that it became known as the Espírito Santo Research and Innovation State Funding Agency.

Despite the change in the legal framework, Anilton Salles Garcia, who presided over FAPES from February 8, 2011 to January 5, 2015, stated that it is still a challenge to instill in the public's imagination that the institution also works in favor of Innovation. "In most events, FAPES is remembered only as the Espírito Santo Research State Funding Agency. It has been 10 years since the law was changed and this is still not part of the culture of the people of Espírito Santo, nor is it in people's memory that FAPES is also an Agency focused on Innovation" [1].

In 2014, FAPES celebrated its 10th anniversary. On that occasion, several events were held to highlight the achievements in all of the institution's finalistic actions and the execution of almost R$300 million in investments in STI throughout FAPES' history up to that point.

Continuing in its history, in this context, an important process innovation for FAPES was the implementation of the FAPES Information and Management System (SigFAPES) in 2015. This system was provided by the Mato Grosso Research Foundation (Fundect) and developed in partnership with the Federal University of Mato Grosso (UFMT). Implemented in 16 research foundations throughout the country, it revolutionized the stages of the selection process through public call notices due to its speed, since hiring that previously took six months was now done in 15 days.

In this sense, SigFAPES represented a paradigm shift within the institution, since it was necessary to migrate all paper documentation to digital. This was reflected in the processes, which began to be carried out in an automated manner [11].

"In the past, on the last day of selection, lines of researchers would form in the FAPES corridor, waiting for the envelope with the projects to be delivered. After SigFAPES, that ended. The system was completely debureaucratized."

GEANDERSON CAMPOS COSTA
MANAGER OF BUDGETARY AND FINANCIAL PLANNING AT FAPES.

PHOTO: FAPES COMMUNICATIONS OFFICE

Decree No. 3408, of October 15, 2013, determined that the Advisory Boards would be organized by areas of knowledge [12], but it was in 2016 that Innovation was incorporated as one of these areas in the Boards.

In order to stimulate the formulation of creative ideas and entrepreneurship, FAPES published, in 2017, the Call for Proposals for the Innovation Synapse Program [13]. In this sense, people linked or not to micro, small and medium-sized companies were able to compete in the call for proposals to receive training and financial resources, aiming at the development of innovative ideas, applicable to relevant sectors of the Espírito Santo economy.

In 2018, FAPES made progress in supporting innovation activities in Espírito Santo with the creation of the Funcitec/Espírito Santo Mobilization for Innovation (MCI) Subaccount, presented in

chapter 1. The following year, the institution reorganized its organizational structure with the creation of the Innovation Directorate, through Decree 4425-R, of May 3, 2019 [14]. The creation of this Directorate represented another step forward for FAPES in supporting innovation activities in the productive sector of Espírito Santo. Since its creation, FAPES has supported innovation activities, which is a relevant and growing end-use action at the institution.

Also in 2019, FAPES launched the first Call for Proposals for the National Program to Support the Generation of Innovative Enterprises - Centelha Program, in Espírito Santo. The objective of this public call was to encourage entrepreneurship based on innovative ideas through training or financial resources for the development of innovative products or processes [15].

The whole world was surprised by the Coronavirus pandemic, and FAPES was also impacted by the health crisis. From the perspective of the institution's internal routines, 100% of employees were moved to remote work to ensure the health and safety of the institution's staff. Even before the pandemic, FAPES had already begun a digitization process by adopting the corporate system for digital process management of the State Government, E-Docs. Thus, since 2019, the institution has eliminated the use of paper, relying solely on electronic documents, which has resulted in a 98% reduction in the amount of paper used each month. With the pandemic, this digitization process accelerated even further.

It is worth highlighting the importance of FAPES having sought to innovate its processes since 2015, with the implementation of SigFAPES, and, later, with the adoption of E-Docs. Thanks to the institution's initiative to update itself digitally, the arrival of the pandemic did not prevent the Espírito Santo Agency from continuing to work in favor of the development of STI in the state.

The transition to the teleworking phase caused by the pandemic brought many challenges to the staff due to the new online tools and platforms, requiring a new attitude from employees, who needed to adapt to the new reality [17].

"Remote work required greater autonomy and self-management on the part of professionals, who became responsible for organizing their time and work priorities."

VALÉRIA PEREIRA CANALI
FAPES SCIENTIFIC TRAINING AND EDUCATION MANAGER

PHOTO: VALÉRIA PEREIRA CANALI'S PERSONAL ARCHIVE

Working from home brought the challenge for management departments to follow up on large-scale projects that were scheduled to be carried out in person. This was the case of the Research and Scientific Dissemination Management Department (Geped), which, at the time, entered into a partnership with the State Secretariat of Agriculture, Supply, Aquaculture and Fisheries (Seag) in an action to build a Project Bank. At that moment, the management department had to interrupt the action and review some points in

order to adapt all the planning that had been done to be carried out in person. "No challenge we have faced compares to this one (the pandemic) and we were able to handle what FAPES had to regulate within its actions" [18].

According to Rosa Maria Trevas Azevedo, head of FAPES's Institutional Partnerships Division, the pandemic was the most challenging period and the one that brought the most lessons learned since she arrived at the institution, about 15 years ago. The new online tools, which were previously unknown, and the virtual format of seminars with researchers, previously held in person, required from staff patience and a willingness to learn. Before the pandemic, FAPES' in-person seminars attracted an audience of approximately 30 people, a number that more than tripled when they moved to the virtual format. "This experience taught us a wonderful lesson, of being able to hold an online event with people from different places" [19].

From the perspective of supporting science and technology in this context, FAPES launched the Covid Call for Proposals to support solutions for the coronavirus crisis and maintained all the support for STI that already existed at the institution. This initiative was part of the actions that were being carried out by the state government with the aim of controlling the spread of the virus [20]. This submission process was a pre-selection of the research projects that would be included in Call for Proposals 03/2020, which FAPES subsequently launched. In this first phase, 313 proposals were registered, sent by researchers and professionals from the private sector. Of these, 127 were selected for the second phase, which was to participate in the call for proposals. In the call for proposals selection process, 97 proposals were chosen to be evaluated. In the end, 34 projects were contracted [21].

In 2021, Complementary Law No. 978 was published [22], reorganizing and modernizing FAPES' organizational structure. This legislation is what maintains the institution's current configuration. At the end of 2022, the Espírito Santo Agency registered the highest number of calls for proposals published in the 12-month period, with a total of 30 public calls. Among them, there were new calls, such as: Universal Extension, Businesses with Socio-Environmental Impacts (NIS), Seedes – the first Espírito Santo startup acceleration program – and Women in Science.

The manager of Research and Scientific Dissemination, Edinir Pinheiro Fialho, said that FAPES had to interrupt an action in partnership with Seag because of the pandemic

PHOTO: FAPES COMMUNICATIONS OFFICE

The head of FAPES's Institutional Partnerships Division, Rosa Maria Trevas Azevedo, highlighted that the pandemic brought many challenges, but also lessons learned

PHOTO: FAPES COMMUNICATIONS OFFICE

Figure 2 - FAPES 20-year timeline

2004
Law creating SECTI/FAPES and designating FAPES as sole manager of Funcitec

2005
Publication of the 1st Research Call for Proposals – No. 001/2005 – Universal

2006
Publication of Law No. 8,263/2006 – which creates the Nossa Bolsa Program

2007
Creation of the television program "TV É Ciência" broadcast by TVE

2008
Publication of the 1st Procap – Human Resources Training Program and the 1st Pibic – Institutional Scientific and Technological Initiation Scholarship Program Calls for Proposals

2009
Publication of the 1st Junior Scientific Initiation Scholarship Program – PBICJ/ES and the 1st Technological Innovation Calls for Proposals

2010
Holding of the 1st State Conference on Science, Technology and Innovation in Espírito Santo and publication of the 1st Call for Proposals for Participation and Organization of Events

2011
Creation of the State Public Policy Program – PPE

2012
Creation of Complementary Law Nº. 642/2012 - State Innovation Law

2013
Publication of Complementary Law No. 731 – reorganizes the institution's structure and changes its name to "Espírito Santo Research and Innovation State Funding Agency"

2014
10 years of FAPES and implementation of R$ 299,275,895.00 in support of STI

2015
Beginning of digital transformation with the submission of projects via SigFAPES

2016
Incorporation of Innovation in the Advisory Boards

2017
Publication of the Call for Proposals for the Innovation Synapse Program

2018
Creation of Funcitec/MCI

2019
Reorganization of FAPES' organizational structure, creating the Innovation Directorate and publishing the 1st Call for Proposals for the Centelha Program in Espírito Santo

2020
FAPES makes its administrative processes 100% online (E-Docs)

2021
Publication of Complementary Law No. 978/2021, which reorganized the organizational structure of FAPES

2022
The institution registered the largest number of published calls (30), with the new calls: Universal Extension, Businesses with Socio-Environmental Impact (NIS), Seedes (1st Espírito Santo startup acceleration program) and Women in Science

2023
Publication of new call for proposals: Gênesis Program and Technological Extension

2024
In May, FAPES reached the milestone of R$1 billion in investment in Science, Technology, Innovation and Extension

STAFF FRAMEWORK

The FAPES staff framework was created by Complementary Law No. 290, of June 23, 2004 [25], with nine commissioned positions, distributed among 14 employees, and one position could encompass more than one employee (Table 1).

TABLE 1 - COMMISSIONED POSITIONS CREATED AT FAPES BY COMPLEMENTARY LAW No. 290/2004

JOB TITLE	No. OF EMPLOYEES
President-Director	1
Director	2
Senior Secretary	1
Area Supervisor	3
Office Driver IV	1
Office Driver III	1
Service Agent I	3
Head of the Administration, Human Resources and Finance Group	1
Head of the Planning and Budget Group	1
Total	14

Source: Complementary Law No. 290 [25].

On July 21, 2009, Complementary Law No. 490 was published, which revoked the previous law and increased the number of positions to 15, resulting in FAPES having 28 employees. With the reorganization brought about by the legislation, some existing positions were subdivided and renamed, as was the case with the director position, which was transformed into the roles of "administrative-financial director" and "technical--scientific director." Following the creation of the three new positions, the institution now had four managers, six deputy managers, and two office drivers (Table 2).

TABLE 2 - COMMISSIONED POSITIONS MAINTAINED AND CREATED AT FAPES BY COMPLEMENTARY LAW No. 490/2009

JOB TITLE	No. OF EMPLOYEES
President-Director	1
Administrative and Financial Director	1
Technical-Scientific Director	1
Legal Advisor I	1
Special Advisor I	4
Legal Advisor	1
Special Advisor II	2
Chief of Staff of the Presidency	1
Assistant Advisor	1
Technical Supervisor	1
Area Supervisor	1
Service Agent II	1
Manager*	4
Deputy Manager*	6
Office Driver*	2
Total	28

Source: Complementary Law No. 490 [26].*Positions filled by commission created by this law. The others refer to existing positions that were maintained

In 2013, Complementary Law No. 731 [27] created four more positions for a total of 55 professionals. A new manager position and a deputy manager position were created, in addition to the positions "special advisor level I" and "assistant advisor" (Table 3).

TABLE 3 - COMMISSIONED POSITIONS MAINTAINED AND CREATED AT FAPES BY COMPLEMENTARY LAW No. 731/2013

JOB TITLE No. OF EMPLOYEES	No. OF EMPLOYEES
President-Director	1
Administrative-Financial Director	1
Technical-Scientific and Innovation Director	1
Legal Advisor I	1
Manager	7
Legal Advisor	1
Special Advisor I	2
Deputy Manager	8
Special Advisor II	1
Chief of Staff of the Presidency	1
Assistant Advisor	1
Technical Advisor	6
Technical Supervisor	1
Area Supervisor	1
Office Driver	2
Manager*	2
Special Advisor Level I*	1
Deputy Manager*	1
Assistent Advisor* 1	16
Total	55

Source: Complementary Law No. 731 [27].

*Positions filled by commission created by this law. The others refer to existing positions that were maintained.

Complementary Law No. 978, dated October 4, 2021, regulates the current organizational structure of the institution, comprising 12 appointed positions held by 44 commissioned employees. Currently, FAPES also has six permanent employees, four of whom are seconded or reassigned from other agencies. With the reorganization, the number of positions was reduced and renamed in a broader manner (Table 4).

TABLE 4 - FAPES COMMISSIONED POSITIONS ESTABLISHED BY COMPLEMENTARY LAW No. 978/2021

No.	JOB TITLE	No. OF EMPLOYEES
1	President-Director	1
2	Director	3
3	Manager	5
4	Special Advisor Level IV	1
5	Head of Division	3
6	Special Advisor Level I	3
7	Chief of Staff of the Presidency	1
8	Special Advisor Level II	5
9	Deputy Manager	9
1	Assistant Advisor	10
11	Technical Advisor	2
12	Activities Supervisor	1
Total		44

Source: Complementary Law No. 978 [27].

After mentioning the history of the formation of FAPES's staff, it is essential to discuss the expertise and competence that characterize the team of collaborators who work daily to promote the institution's actions. In addition to being technical and specialized employees, many of the employees have long service years and, therefore, have in-depth knowledge of the internal processes of the Agency. This is the case of FAPES's Budgetary and Financial Planning Manager, Geanderson Campos Costa, who has been with the institution since 2006.

Considering the size of the demand for activities that FAPES has today, the administrative manager of FAPES, Teresinha Mazzini Baby, believes that the number of employees is still limited. "We still have a quite reduced staff. The biggest challenge is the segregation of functions. We cannot distribute the tasks, which remain concentrated in the same people, resulting in a workload overload."

Despite the challenges posed by a reduced staff, FAPES Executive Board maintains the policy of professional appreciation. "FAPES team, although small in comparison to the volume of investment it has received over the years, embraces the cause and does not let the ball drop" [4].

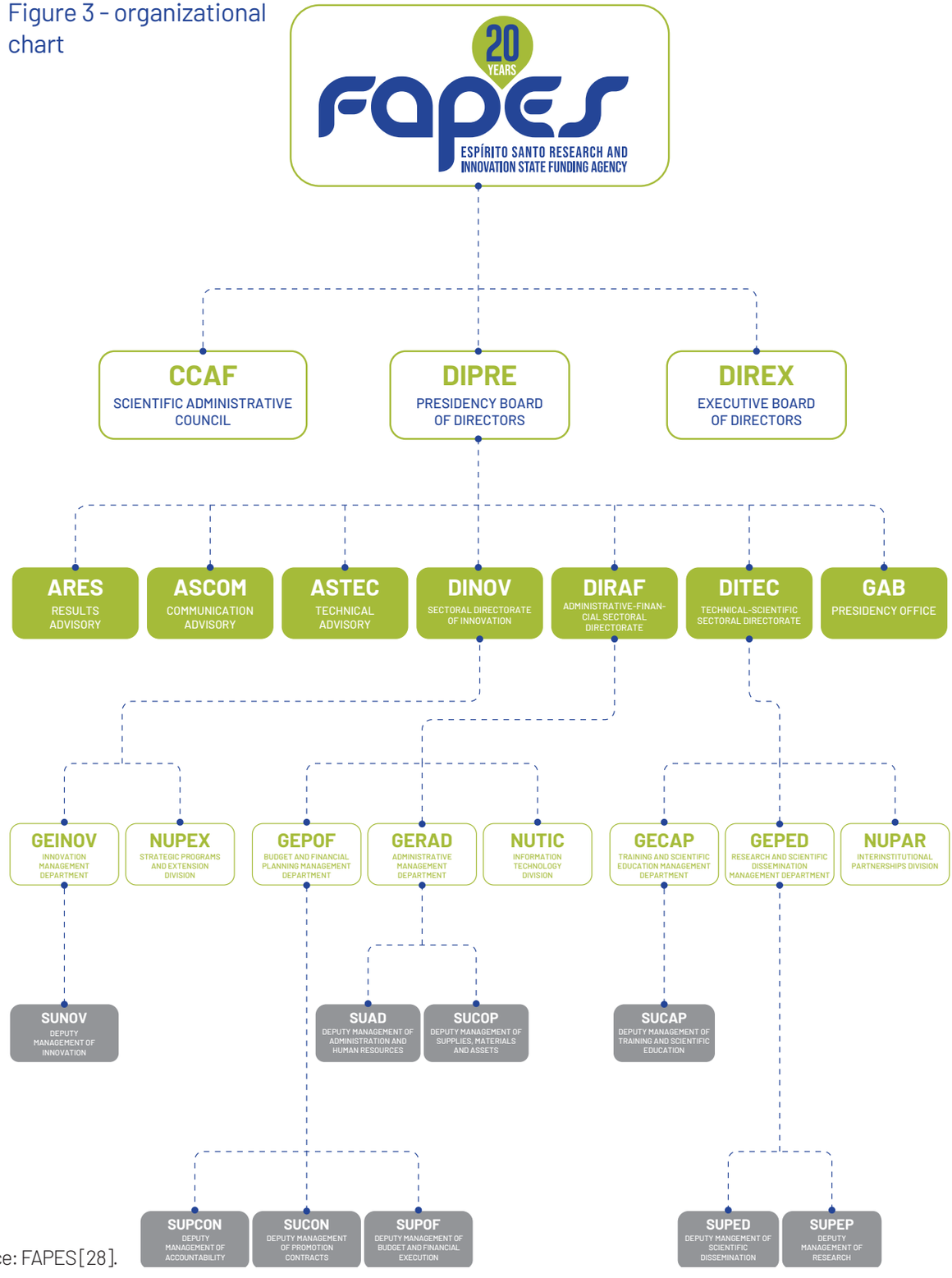
"Over the past 20 years, FAPES has been led by highly technical directors who have always valued their staff."

TERESINHA MAZZINI BABY
FAPES ADMINISTRATIVE MANAGER

OPERATION AND ORGANIZATION

The institution's organizational chart (Figure 3) is organized by hierarchy levels, between directorates, divisions and management departments, with their corresponding subdivisions.

Figure 3 - organizational chart



Source: FAPES [28].

The Executive Board of Directors (Direx) is responsible for managing the Espírito Santo Agency, approving calls for proposals, requests for financial support, accountability reports, in addition to formulating and submitting the institution's personnel, asset, and financial policies to the FAPES Scientific and Administrative Council (CCAF). The Direx is made up of four directors: the Director General, the Technical-Scientific Sector Director, the Innovation Sector Director, and the Administrative-Financial Sector Director, all appointed by the State Governor.

The Director General represents the institution by directing and supervising the administrative, financial, and asset management of FAPES, in addition to appointing and dismissing employees, authorizing payments, and performing other functions jointly with the Administrative-Financial Sector Director. The latter carries out all planning, as well as coordinating and evaluating support activities and those related to logistics and human resources.

The Technical-Scientific Sector Director manages the funding activities and carries out their monitoring, supervision, and control. This position is also responsible for supporting and encouraging STI, promoting integration between agencies, companies and institutions for the implementation of technological innovation projects, assessing technical reports and coordinating the Advisory Boards. In addition to supervising, controlling and monitoring development activities, supporting and encouraging technology, innovation and extension, the Innovation Sector Director also coordinates with agencies, institutions and companies with the aim of implementing technological innovation and extension projects. Among other activities, the Innovation Sector Director supervises the preparation of projects to raise funds with a view to innovation and extension.

In the history of the Executive Board of Directors, four people have held the position of Administrative-Financial Sector Director since 2004. The first was Agricultural Engineer Cleber Bueno Guerra, who held the position from January 21, 2005 to March 7, 2006. From March 8 of this last year, administrator Maria Tereza Colnaghi Lima took over the position until July 3, 2014. She returned to the position from January 6, 2015 to December 31, 2018. Administrator Euler Ribeiro Sobrinho held the position from July 11, 2014 to January 5, 2015. And since January 2, 2019, administrator Lucia Aparecida de Queiroz Araujo has been FAPES' Administrative-Financial Sector Director.

The Technical-Scientific Sectorial Directorate has had nine terms since FAPES was created. First, Dalton Valentim Vassallo, who holds a post-doctorate degree in Health Sciences, took office from June 17, 2005 to June 24, 2007. Then, Marcos Adolfo Ribeiro Ferrari, PhD in Industrial and Technological Economics, held the position from September 18, 2007 to March 2, 2009. Luiz Fernando Schettino, PhD in Forestry Science, took office on March 26, 2009 and remained there until July 1 of the same year. Aureliano Nogueira da Costa, PhD in Soils and Plant Nutrition, became Technical-Scientific Director on July 10, 2009 and remained in the position until January 3 of the following year. André Marques dos Santos, who has a PhD in Agricultural Sciences, took office from February 26, 2010 to June 23 of the same year. Then, Valéria Fagundes, who has a post-doctorate degree in Life Sciences, took office on June 24, 2010, serving until February 29, 2016. Since then, FAPES has had three more Technical-Scientific Directors: Rodrigo Ribeiro Rodrigues, PhD in Immunoparasitology (May 13, 2016 to March 14, 2019); Denise Rocco de Sena, PhD in Exact and Earth Sciences (May 29, 2019 to August 31, 2021); and PhD in Computer Science Celso Alberto Saibel Santos, who has held the position since October 4, 2021.

The Innovation Sector Directorate is headed by Doctor of Production Engineering Elton Siqueira Moura, who took up the position when it was created in 2019.

FAPES SCIENTIFIC-ADMINISTRATIVE COUNCIL

The FAPES Scientific-Administrative Council (CCAF) was created by Complementary Law No. 290, acting as a deliberative and regulatory body, and is included in the organizational structure of FAPES. Its members are appointed by Concitec and approved by the State Governor. Based on the guidelines of this council, the CCAF approves the operational procedures that the Agency adopts when applying the financial resources it manages.

Since its creation, FAPES has had specific rules that regulate its actions. The resources are granted after a selection of proposals that were submitted in a public call. The CCAF – composed of nine members, with representatives from the academic, productive and governmental segments – is the one that defines the operational modalities through a public call, which are established in the application plan, respecting the current contents in the terms agreed with the agencies granting resources. All proposals are evaluated by specific consultants and judged by the Advisory Board. Finally, Direx approves or rejects these requests for financial support.

When it began operating in 2005, FAPES operated by meeting the spontaneous demand for research projects and scholarships, in addition to selecting projects through public calls. The first Call for Proposals issued was the so called Universal 001/2005. Requests from spontaneous demand were subject to technical and scientific merit analysis, carried out by at least two consultants from out of state designated for this purpose. Subsequently, they were forwarded to the CCAF for assessment and approval of the requests, provided that the requirements and demands established in specific regulations for each type of support were met.

As of 2010, with the growth in demand for resources for STI and in view of the equality and transparency of its actions, FAPES began to promote research, innovation and grant projects only through selection, with the publication of public calls for proposals. In the calls for proposals, the proposals for funding requests are submitted to at least two consultants from out of state designated for this purpose, for analysis and opinion on the technical and scientific merit. To qualify the proposals, the documentation is analyzed by FAPES technical team responsible for the Call for Proposals, under the coordination of the Technical-Scientific and Innovation Directorates. The merit analyses of the proposals are then conducted with the support of the Advisory Boards.

ADVISORY BOARDS AND COMITEE OF SPECIALISTS

On March 29, 2010, Decree 2.492-R was published, which provides for the Advisory Committees. These were established in Article 5 of Complementary Law No. 490, dated July 22, 2009, and are organized by areas of knowledge. After being approved by the CCAF upon proposal from the Direx, these committees, under the coordination of the technical-scientific director, aim to "assess the technical-scientific merits of requests, review and issue opinions on appeals, and evaluate reports; and other related activities [25]".

The organization of these committees is based on the following areas: Agricultural Sciences; Exact and Earth Sciences; Human Sciences; Health Sciences; Biological Sciences; Applied Social Sciences; Engineering; Linguistics, Language Studies and Arts; Innovation and Extension. They are composed of members appointed by the Executive Board and approved by the CCAF. Individuals who make up both the Committees and the Advisory Boards must be doctoral researchers or professionals with proven experience in their field of expertise. The goal of both is to evaluate the merit of projects and technical-scientific, extension, and innovation reports. The recruitment of researchers for the composition of the Advisory Boards occurs through Public Calls, and applications are submitted on the SigFAPES platform.

Figure 4 - FAPES PRESIDENT-DIRECTORS FROM 2004 TO 2024

21/01/2005 TO 19/03/2007

GUILHERME HENRIQUE PEREIRA
PhD in Economic Sciences

03/04/2007 TO 10/05/2007

CLEBER BUENO GUERRA
Agricultural Engineer

16/05/2007 TO 17/09/2007

MARIA TEREZA COLNAGHI LIMA
Administrator

24/09/2007 TO 02/03/2009

LUCIANO TERRA PEIXOTO
PhD in Physics

03/03/2009 TO 31/12/2009

MARCOS ADOLFO RIBEIRO FERRARI
PhD in Industrial and Technological Economics

PHOTOS: FAPES COMMUNICATIONS OFFICE.

04/01/2010 TO 07/02/2011

AURELIANO NOGUEIRA DA COSTA
PhD in Soil and Plant Nutrition

08/02/2011 TO 05/01/2015

ANILTON SALLES GARCIA
PhD in Electrical Engineering

06/01/2015 TO 31/12/2018

JOSÉ ANTONIO BOF BUFFON
Master's in Economic Sciences

01/01/2019 TO 24/02/2019

LUCIA APARECIDA DE QUEIROZ ARAUJO
Administrator

27/02/2019 TO 28/02/2021

DENIO REBELLO ARANTES
PhD in Physics

01/03/2021 TO 09/01/2023

CRISTINA ENGEL DE ALVAREZ
PhD in Architecture and Urbanism

10/01/2023 TO 12/01/2024

DENIO REBELLO ARANTES
PhD in Physics

15/01/2024

RODRIGO VAREJÃO ANDREÃO
PhD in Systems Optimization and Security

Source: FAPES Communications Office [30].

HISTORY OF FAPES PRESIDENTS

From 2005 to 2024, FAPES had 12 presidents. The first was Guilherme Henrique Pereira, who served from January 21, 2005, to March 19, 2007. A PhD in Economic Sciences, he also held the position of Secretary of State for Science and Technology during his tenure at FAPES. As the first president directing the establishment of an Agency to support science and technology in the State, his main concern was with the staff structure. The goal was to create a technical team of specialists capable of developing projects and programs in line with government investments in the field of STI.

Pereira recalled that when the law creating FAPES was published, the Agency did not yet have facilities to operate until he secured the building of Cohab, which was being decommissioned, to house the headquarters of the former SECT and FAPES. Since the Agency also lacked equipment, Guilherme Pereira managed to obtain some computers on loan so that the staff could start working. "The Secretary of Education, Professor Lelo Coimbra, had purchased hundreds of computers to equip schools, but there was no logistics to distribute them all at once. They were in storage, and they were transferring the computers gradually [2]."

Reflecting on his administration, Pereira emphasized the creation of the Nossa Bolsa Program, which he described as the "first smart program in the public sector in Espírito Santo." The then-president highlighted that one of the program's positive aspects was the simplification of the registration process, as all steps could be completed online. "We managed to develop Nossa Bolsa without the student needing to physically go anywhere. They could register for the program from anywhere in the world, as long as they had a computer and internet access [2]."

On April 3, 2007, agricultural engineer Cleber Bueno Guerra took over the presidency of FAPES, a position he held until May 10 of the same year. At that time, Guerra was already the administrative-financial director of the institution and had experience in the public agricultural sector in Espírito Santo, serving as the State Secretary of Agriculture and as President of the Espírito Santo Agricultural Research Corporation (Emcapa). For him, his contribution as a manager of FAPES was to bring the agricultural sector closer to the area of science and technology, in addition to the institution's implementation process. "The very dynamism of implementing Science and Technology in the State, from SECTI and also FAPES, promoted the proximity of the agricultural sector with Academia in this regard [31]."

Administrator Maria Tereza Colnaghi Lima was the third president of the institution, serving from May 16, 2007, to September 17 of the same year. When she took office, she was the administrative-financial director of FAPES, a role she returned to after her presidency, for approximately 13 years. According to her, her greatest contribution to FAPES was the management of Funcitec and resources in collaboration with other institutions, as well as the development of internal regulations to ensure proper resource management. "It was a significant advancement to operate Funcitec in accordance with the law. There were struggles and meetings with technicians from the Treasury and Planning Departments [32]."

Doctor in Physics Luciano Terra Peixoto took over as president of FAPES on September 24, 2007, and remained in office until March 2, 2009. During his tenure, the institutional program for granting postgraduate scholarships was implemented, and an integrated regulation regarding the forms and conditions of support from FAPES was developed, focusing on the scientific merit of the proposals and the interests of the State. "I hope the hallmark of my administration was the pursuit of efficiency in public

spending on science and technology. This means prioritizing investments with the greatest expectation of return for society as a whole, distinguishing results in the short, medium, and long term [33]."

On March 3, 2009, Marcos Adolfo Ribeiro Ferrari took over the presidency of FAPES and held the position until December 31 of the same year. A PhD in Industrial and Technological Economics, he worked to strengthen the alliance between FAPES, the productive sector, and Academia. During his tenure, there was already a significant presence of the private sector within FAPES's Scientific Administrative Council (CCAF), but the instruments to consolidate this alliance had not yet been created. Beginning in 2009, calls for proposals were developed to establish technological partnerships between these entities.

One of the results of what Ferrari called the "tripartite alliance" was the project for the Research, Innovation, and Development Center (CPID), conceived with the idea that newly graduated professionals from postgraduate programs would have job opportunities and remain in the state, considering that many move to other states or countries in search of employment. Thus, the CPID involved the participation of the private sector, the state government, along with FAPES, and Academia (UFES and IFES). In this project, the contribution of Academia is in the training of human resources so that the Science and Technology sector can continue to develop in the state [34]. In light of this, Marcos Ferrari highlighted as a hallmark of his management the change in the relationship between scientific research, technological research, and innovation[1] in a context of collaboration among government, the productive sector, and Academia.

Doctor in Soil and Plant Nutrition Aureliano Nogueira da Costa was the fifth president of FAPES, serving from January 4, 2010, to February 7, 2011. During his tenure, the 1st State Conference on Science, Technology, and Innovation (CECTI) took place, as mentioned earlier. In the view of the then-president, this event marked not only the trajectory of STI in the state but also the history of FAPES. "Bringing all this knowledge, across all areas of knowledge, to Espírito Santo was literally the cornerstone to initiate this process of science, technology, and innovation and to legitimize the capacity that the state possesses" [35].

As a hallmark of his management, Costa considered the effort to simplify processes and invest in knowledge, with the qualification of the institution's professionals, so that they could handle challenges and reconcile demands, with the ability to define priorities.

On February 8, 2011, Professor Anilton Salles Garcia took office as president and remained in the position until January 5, 2015, making him the longest-serving president of FAPES to date (3 years and 11 months). Garcia was one of the protagonists in the creation of FAPES. Since the 1990s, he has been involved in structuring the innovation ecosystem in Espírito Santo, playing a key role in the creation of the TecVitória incubator, in the implementation of entrepreneurship courses in undergraduate programs, and in the rollout of Empretec in collaboration with Sebrae in Espírito Santo.

According to him, the main challenge he faced at the beginning of his tenure was to eliminate the counter service and transform FAPES's processes into formal calls for proposals. He also pointed out the journey he undertook during his time as president of the institution to ensure that innovation, which was still a novelty

[1] Scientific research aims to discuss and develop new knowledge about natural phenomena, while technological research seeks practical solutions to problems that involve society, in an objective manner and with a focus on invention [47]. Innovation consists of the "introduction of novelty or improvement in the productive and social environment that results in new products, services or processes or that includes the addition of new functionalities or characteristics to an existing product, service or process that can result in improvements and an effective gain in quality or performance" [48].

Aureliano Nogueira da Costa (standing) during the 1st CECTI, in 2010

PHOTO: FAPES WEBSITE

PHOTOS: AURELIANO NOGUEIRA DA COSTA'S PERSONAL ARCHIVE

at the time, became part of FAPES's development policy and the language of researchers. "The hallmark of my management is having incorporated Innovation into the DNA of FAPES" [1].

José Antonio Bof Buffon, who holds a Master's degree in Economics, was the President of FAPES from January 6, 2015 to December 31, 2018. Upon taking over the management, he identified that the institution needed to have more products focused on innovation and that would interface with the business sector. At the time, Buffon participated in a congress of the Brazilian National Council to State Funding Agencies (Confap) and learned about the Santa Catarina Innovation Synapse Program. From there, he took the initiative to replicate the idea and launched FAPES Call for Proposals No. 1/2017 - Innovation Synapse Program - ES Connection, with the objective of encouraging entrepreneurship by granting resources for the development of innovative ideas. According to the then president, FAPES' goal was to receive around a thousand proposals, but the result exceeded expectations. "There were more than 1,800 proposals. I remember staying up until midnight, pressing F5 on the computer screen every minute, and the number of proposals just kept going up. The methodology was the same as in Santa Catarina, with minor adjustments, but the mobilization and engagement came from the people of Espírito Santo" [36].

Buffon also highlighted that, during his administration, FAPES increased its participation in international cooperation. "We started to attend all Confap calls, with a grant to support internationalization. We didn't do the massive volume that we should have done, but it was an important institutional step for FAPES to start to routinely participate in these internationalization calls" [36].

For José Antonio Bof Buffon, in addition to the Innovation Synapse and the search for internationalization, the hallmark of his administration was FAPES's greater engagement with the issue of innovation, with the participation of the people of Espírito Santo, especially the academic and business sectors, also establishing a partnership with the state government. "We managed to convince the government that it was necessary to have more resources for innovation" [36].

Administrator Lucia Aparecida de Queiroz Araujo took over the management of FAPES on January 1, 2019 and remained in the position until February 24, 2019. When she joined FAPES in 2008, she took on the role of Research and Scientific and Technological Dissemination Manager, a role she held until 2018. The following year, Araujo accepted the challenge of becoming the Administrative-Financial Director and has remained as Director ever since. During her career at FAPES, the administrator believes that the work carried out to qualify the institution's human resources, as well as its outsourced employees, left an important mark [37].

As Administrative-Financial Director, Lucia Araujo highlighted the responsible financial management developed throughout her tenure as Executive Director. She highlighted the simplification of the accountability process over the years, in addition to the prior guidance that a FAPES team, through the board of directors, provides to researchers as soon as a call for proposals is launched, in order to clarify all the procedures to be adopted [37].

Physics PhD Denio Rebello Arantes was President of FAPES for the first time from February 27, 2019 to February 28, 2021. On January 10, 2023, he took office for the second time, ending his term on January 12, 2024. As soon as he assumed the presidency, Arantes was concerned with giving more prominence to innovation, which was already being implemented, but, according to him, was not yet institutionalized. Thus, he created the Innovation Directorate, which also incorporated Extension in order to foster innovative ideas and actions [38].

For Denio Arantes, the hallmark of his management is the way he initiated efforts to reduce hierarchization within FAPES, making the relationships between positions much more horizontal, which favored the organizational climate. "It is very much linked to the way I am, having a very open relationship, both internally and externally, with everyone. The way of relating internally has changed a lot within FAPES" [38].

It is important to highlight that it was Denio Arantes' administration that faced the challenges brought about by the Coronavirus pandemic. And the first concern of the then CEO was the health of FAPES' staff. According to him, the state government had allowed a percentage of employees to work in person, however, Arantes decided that everyone would work remotely. "I said, 'This is 100% and I'll handle the 100% thing.' We sent everyone home and, in some cases, we had to borrow computers. With everyone working from home, the IT staff created the necessary conditions and we resolved the few things that we were still doing in person. So, we spent the critical period of the pandemic with everyone at home," [38], he explained.

Cristina Engel de Alvarez, PhD in Architecture and Urbanism and full professor at the Federal University of Espírito Santo (UFES), served as president of FAPES from March 1, 2021 to January 9, 2023. In her words: "AFAPES was a true gift in my career" [38]. For Engel, her mission at FAPES was to continue what had already been started in the previous administration and to work on other issues that, in her view, deserved greater attention from the institution. Among them was developing affirmative policies for more vulnerable communities, such as young women, and making bureaucratic requirements for researchers in public notices more flexible.

In this context, one of the highlights of Engel's administration was the launch of the "Women in Science" public notice. "It is aimed especially at young women who naturally end up leaving to become mothers and who later have difficulty returning. It is an initiative that was a huge success, because to this day I meet young women who are grateful" [39].

For Cristina Engel, the hallmark of her administration was dialogue, both with the internal and external public, involving the state government and federal and municipal agencies, private entities, associations and institutions in general. "No one has ever failed to be welcomed in my office. As a result, FAPES has expanded its influence, gained even more trust, and has begun to be welcomed with open arms at all levels" [39], he highlighted.

Rodrigo Varejão Andreão, PhD in Systems Optimization and Security, took over as president of FAPES on January 15, 2024. The CEO pointed out that one of the institution's top priorities is to promote Espírito Santo on the national and international scene so that the state of Espírito Santo is recognized and considered a reference in some areas. In this way, FAPES has sought to resume partnerships with federal and international agencies, given that this form of cooperation has the potential to mobilize the entire science, technology, and innovation ecosystem. Andreão cited as an example the graduate programs in Espírito Santo, which need to strive to achieve grades that indicate a high international standard for doctoral programs. He also emphasized that "to develop these programs for grades 6 and 7, it is necessary to internationalize, to establish networks outside the state" [40].

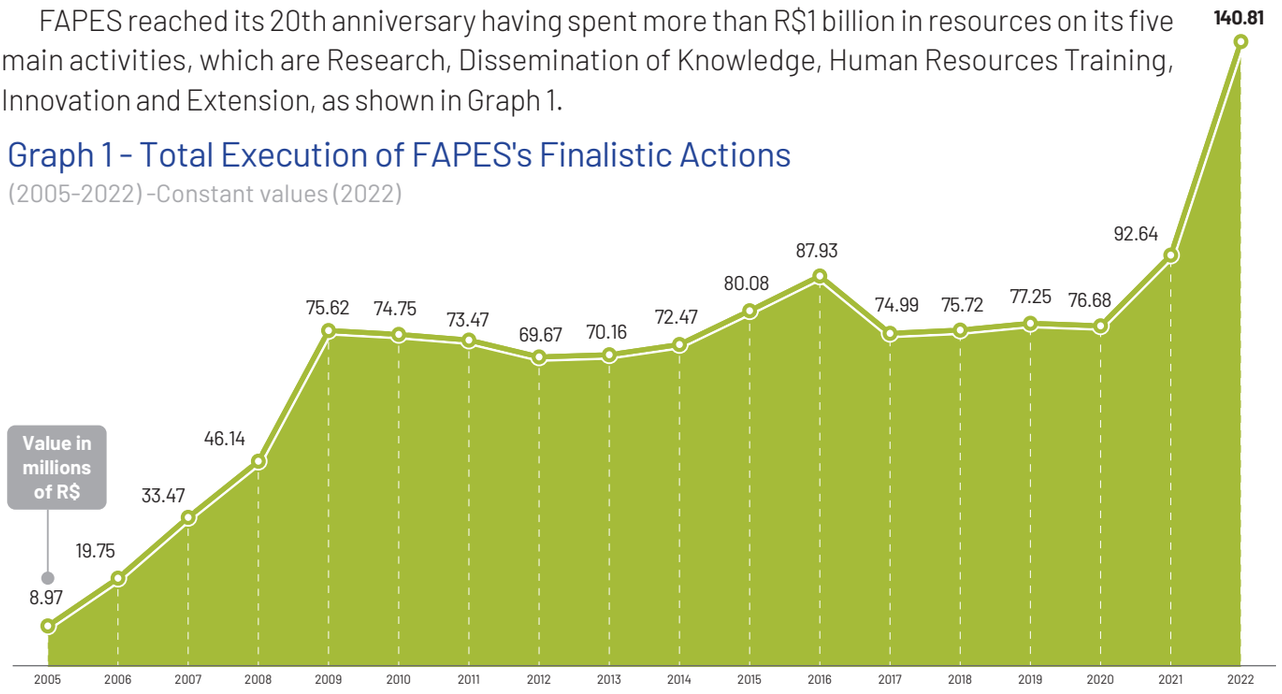
Within the science, technology and innovation ecosystem, FAPES plays a fundamental role, given that it is a development institution. In view of this, Rodrigo Varejão highlighted the importance of the actions that FAPES has been carrying out over the past 20 years, given their comprehensive nature. This is because they reach everyone from elementary school students and researchers who develop research and projects through public notices to people from vulnerable communities who benefit from FAPES programs and research. "Our goal is to bring science and technology to all people from Espírito Santo, so that everyone has the opportunity to participate in our actions" [40].

FINANCIAL RESOURCES

FAPES reached its 20th anniversary having spent more than R$1 billion in resources on its five main activities, which are Research, Dissemination of Knowledge, Human Resources Training, Innovation and Extension, as shown in Graph 1.

Graph 1 - Total Execution of FAPES's Finalistic Actions

(2005-2022) -Constant values (2022)



Source: Gepof/FAPES [41].

From 2005 to 2022, total resources executed by FAPES increased from almost R$9 million per year to more than R$140 million (at 2022 prices), respectively.

The Budget and Financial Planning Management Department (Gepof) is responsible for the financial execution of resources, the hiring and payment of scholarships, projects and grants, and the payment of the Agency's administrative expenses. The department also monitors and analyzes the financial statements of beneficiaries of resources from FAPES and Funcitec and from various partnerships, such as agreements and cooperation.

FAPES SOURCE

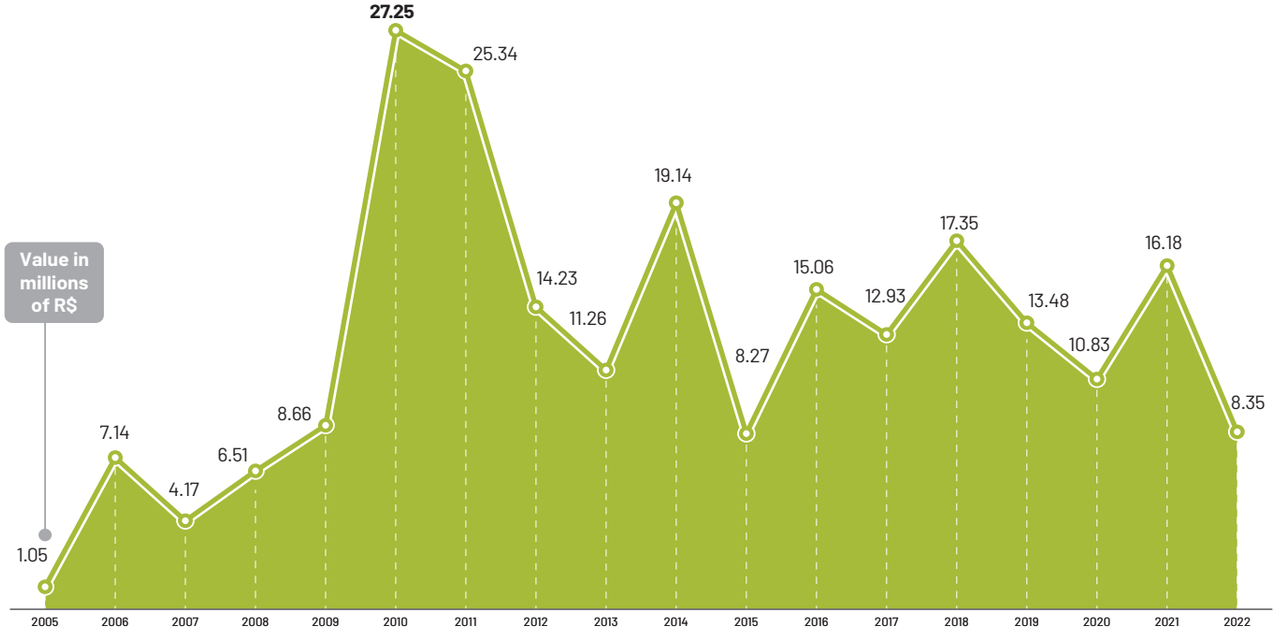
In addition to executing its own resources and agreements made with international, national, and state entities, the main resource managed by FAPES is from Funcitec, which will be detailed further in this chapter.

The resources of FAPES, approved by the Annual Budget Law (LOA), are allocated to cover expenses related to personnel and charges, operational costs, and the contributions of agreements made by the institution with federal agencies and other bodies. In recent years, federal funding agencies in STI have adopted the practice of decentralizing their regular federal programs to the states for execution by Research Funding Agencies, aiming to provide greater reach for their funding resources across the country. The execution of FAPES's resources resulting from ongoing agreements and collaborations with municipal, state, and federal public bodies, as well as with private entities, depends on the formalization of agreements or contracts with these bodies, which are usually established every two years. The amount of resources can vary considerably each year due to the duration of the agreements, which are generally set for a validity period of 24 to 48 months, and the time required to formalize new contracts. The resources of FAPES consist of allocations

specified in the state's LOA, defined by the acquisition of extra-budgetary resources from other funding bodies, public and private institutions.

As a research funding institution, FAPES has been actively working to secure resources from federal and state partners. In addition to fundraising, the institution monitors the acquired resources and accounts for these amounts. The execution of FAPES's resources from its operationalization in 2005 until 2022 is shown in Graph 2.

Graph 2 - Execution of Resources from FAPES Source
(2005-2022) - Constant values (2022)



Source: Gepof/FAPES [41].

As can be seen in Graph 2, although the amounts executed by FAPES are not regular, its resources have evolved when comparing the initial and final years of the series. This is explained by the fact that these amounts are also composed of counterpart funds from agreements with other entities. So, during times of significant resource disbursements, such as in 2010, there are peaks in the execution of resources from the FAPES Source.

FUNCITEC

The main source of resources for FAPES is undoubtedly Funcitec. According to Complementary Law No. 290, FAPES became responsible for managing the financial resources of Funcitec. Investments in STI resulting from Funcitec resources are derived from the allocation specified in the State's Annual Budget, set at 0.5% (half a percent) of the state's net revenue available each month, which corresponds to the total monthly ICMS (Tax on Circulation of Goods and Provision of Services) collected by the state, minus the regulatory transfers designated for municipalities and other existing fiscal funds in the state government.

These resources are credited to a specific account at the Development Bank of Espírito Santo (Bandes), which is responsible for their financial management and legal representation, including exercising rights related to its assets, securities, and financial instruments.

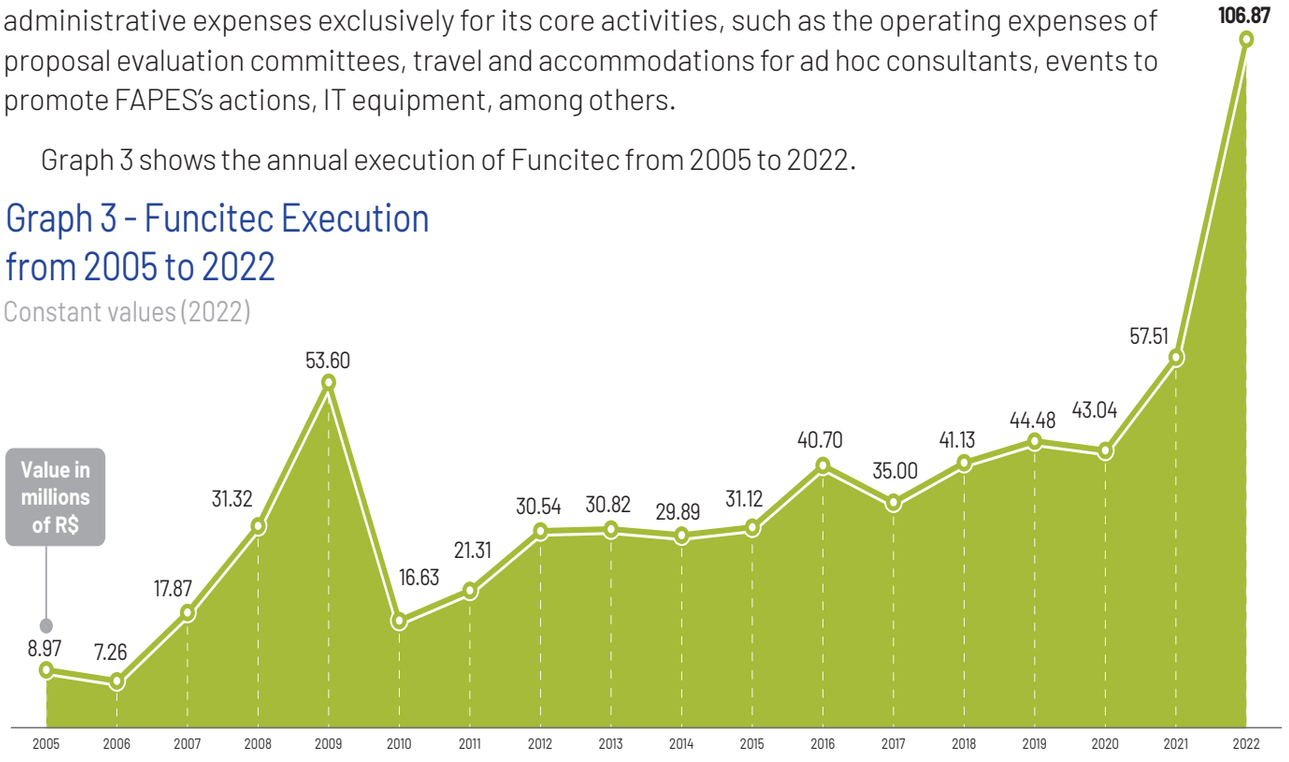
At least 95% of Funcitec's resources are invested in STI, supporting individuals or legal entities, public or private, that submit proposals of recognized technical-scientific merit to FAPES in response to specific calls, grouped into different activities, such as: scholarships at various levels, from elementary education to postgraduate studies, support for research and innovation development, dissemination and popularization of science, among other activities.

Up to 5% of Funcitec's resources may be invested in supporting the operation of FAPES, with administrative expenses exclusively for its core activities, such as the operating expenses of proposal evaluation committees, travel and accommodations for ad hoc consultants, events to promote FAPES's actions, IT equipment, among others.

Graph 3 shows the annual execution of Funcitec from 2005 to 2022.

Graph 3 - Funcitec Execution from 2005 to 2022

Constant values (2022)



Source: Gepof/FAPES [41].

The significant drop in the use of Funcitec resources from 2009 to 2010 is explained by the change in the rules for applying the fund's resources, which, as of 2010, became exclusive to science, technology and innovation-related actions, transferring the resources from the Nossa Bolsa Program to the State Treasury Source without any connection to the fund.

In 2010, the State Secretariat of Economy and Planning unified the classification of the source of financial resources for funds linked to state revenue. As a result, after this change, the Treasury Department began to strictly follow the provisions of the Funcitec legislation, releasing the full percentage of 0.5% of the State's Net Revenue to the fund, until the 10th of each month, for exclusive allocation to science, technology and innovation.

In the research process for writing this book, it was noted how all the presidents who have served at FAPES emphasized Funcitec. It is indeed a significant achievement for Espírito Santo to have a fund that has resources, which, once committed, are accounted for as executed in the state accounts. This means that once the resource enters the account at Bandes, the bank responsible for its operationalization, it does not return to the government's treasury the following year if it has not been executed. This ensures a continuity of resources for the areas of science, technology, and innovation in the state.

NOSSA BOLSA PROGRAM

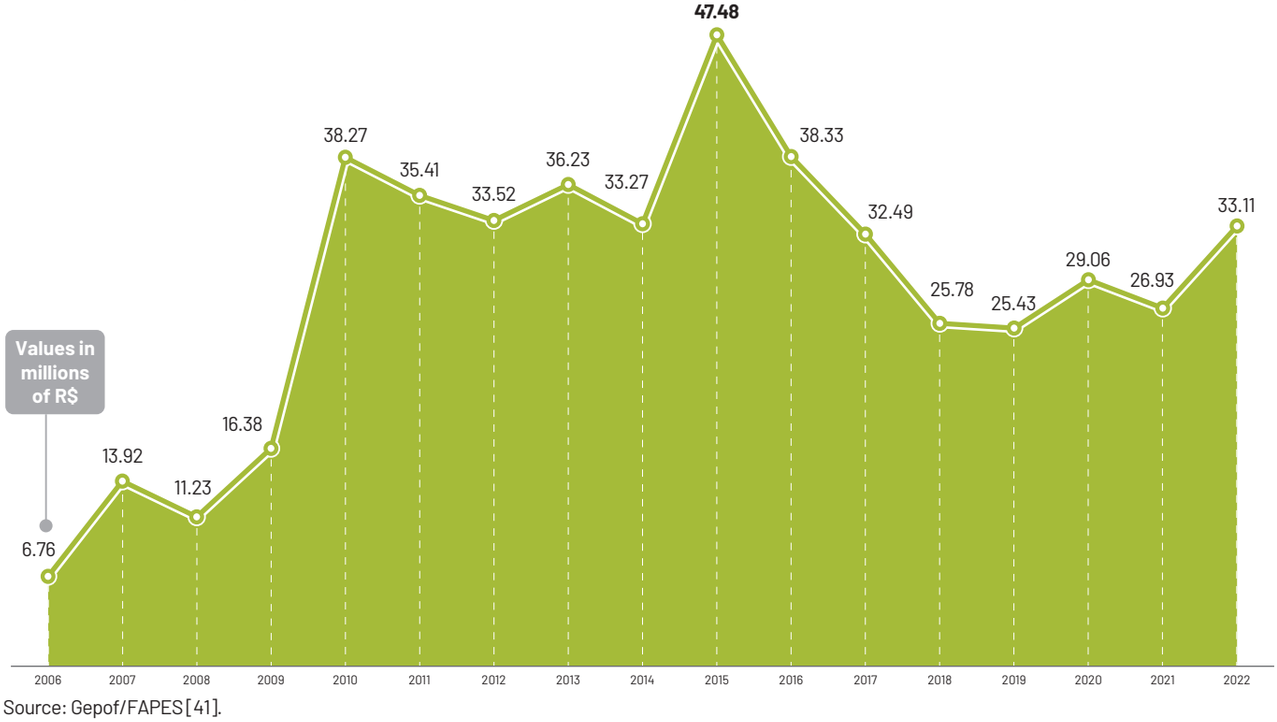
Since the implementation of its activities, FAPES has been working on the development of actions to promote STI. In this context, the year 2006 was very important in FAPES's history, as a program was created that has changed—and continues to transform—the lives of many students from Espírito Santo: the Nossa Bolsa Program. Established by Law No. 8,263 on January 25, 2006, it grants undergraduate scholarships to students who have attended public or philanthropic schools during high school. This is, therefore, a partnership between the state government and private educational institutions located in Espírito Santo, which offer a reduction in tuition as a counterpart. The entire application process is conducted online, making the entire process computerized. Candidates for the scholarships are ranked based on their scores from the National High School Exam (Enem). In 2017, FAPES reorganized the Nossa Bolsa Program to include the granting of scientific and technological initiation scholarships and master's scholarships for graduates.

The financial resources for granting scholarships through the Nossa Bolsa program come from the allocation specified in the State's Annual Budget, as defined in the Multi-Year Plan (PPA), where the number of scholarships to be granted and the ordinary resources from the State Treasury for the execution of the program are outlined.

Given the significant volume of resources for the Nossa Bolsa Program, it is important to highlight the amount of resources executed in this program over the years.

Graph 4 - Execution of the Nossa Bolsa Program from 2006 to 2022

Constant values (2022)



Source: Gepof/FAPES [41].

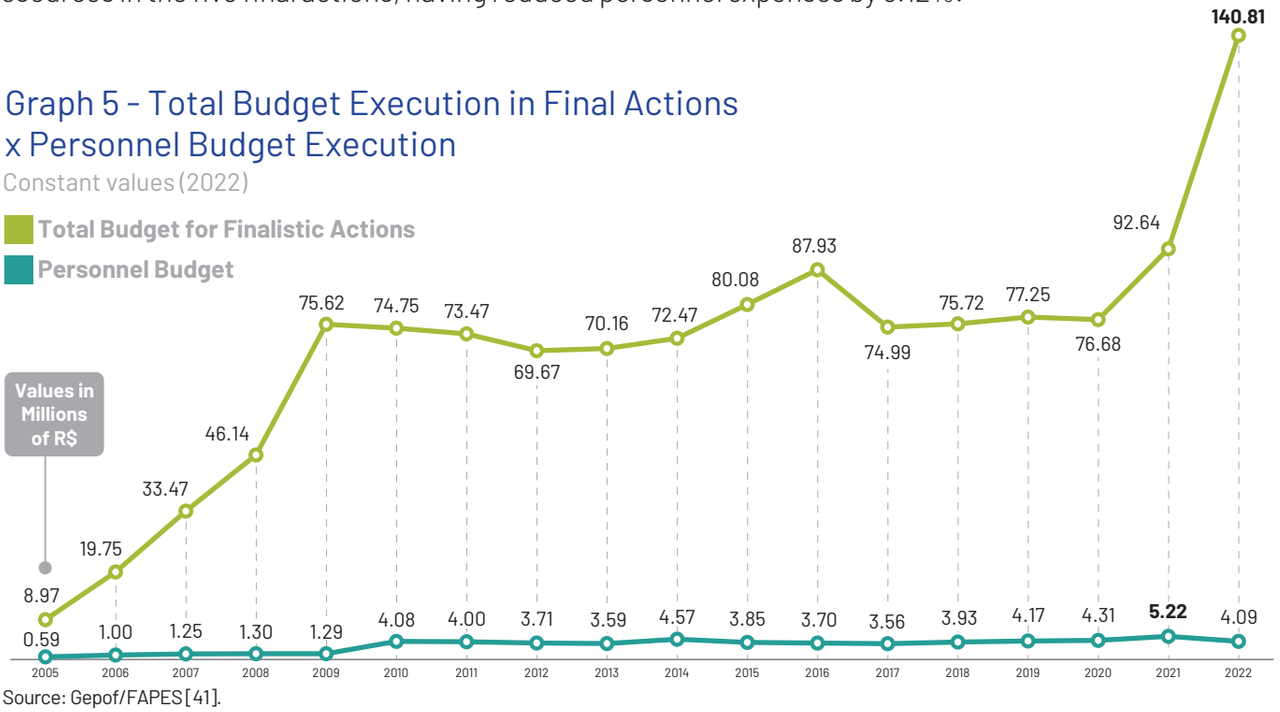
As can be seen in Graph 4, there is also an irregularity in the execution of resources from the Nossa Bolsa Program, mainly due to scholarship holders dropping out or suspending their courses. However, even with this situation, it can be seen that, since 2006, FAPES has already executed almost R$500 million through Nossa Bolsa.

EFFICIENCY IN RESOURCE MANAGEMENT

Over the years, one thing that has drawn attention at FAPES is the efficiency in executing resources in final actions with the human resources it has. In these two decades of existence, total execution has grown significantly, as previously shown, keeping expenses with human resources practically constant, when compared to execution in final actions. From 2020 to 2022, FAPES almost doubled the execution of total resources in the five final actions, having reduced personnel expenses by 5.12%.

Graph 5 - Total Budget Execution in Final Actions x Personnel Budget Execution

Constant values (2022)



Source: Gepof/FAPES [41].

FAPES IN THE NATIONAL CONTEXT

As mentioned at the beginning of this chapter, FAPES was the 19th Research State Funding Agency created in the country. Since 2022, all states in the federation have a Research Funding Agency and they have been fundamental instruments in the execution of the growing state resources for science, technology and innovation in Brazil.

Traditionally, research in Brazil has been funded by federal sources. In the 1950s, the National Council for Scientific and Technological Development (CNPq) and the Brazilian Federal Agency for Support and Evaluation of Graduate Education (Capes) were created, and in 1967, the Financing Agency for Studies and Projects (Finep), institutions responsible for financing scientific and technological activities in the country.

However, in more recent years, especially after the 2000s, with the growth in the number of research funding agencies, there has been an increase in the participation of subnational entities in the financing of STI activities in the country [42].

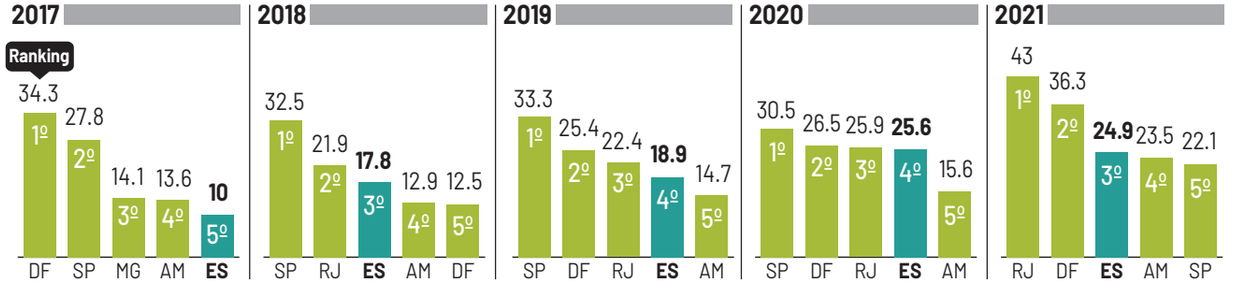
As shown in Chapter 1, the second decade of the 2000s was traumatic for national science. The MCTI budget suffered successive cuts and many states increasingly assumed a leading role in coordinating and financing STI activities.

Studies coordinated by researchers from the Federal University of São Paulo, with the collaboration of researchers from different parts of the country, also highlight the importance of state governments in financing national STI. The authors showed that, in 2020, these governments were responsible for financing 14% of the scholarships for training researchers in Stricto Sensu postgraduate courses in the country, surpassing the participation of CNPq, which accounted for 13% and falling behind Capes, which financed 73% of master's and doctoral scholarships in Brazil [42].

In the last five years, the Espírito Santo agency has stood out in the ranking of the country's Research Financing Agencies in terms of the per capita budget execution of its programs, as can be seen in Graph 6.

Graph 6 - List of the 5 federative units with the highest budgets executed by FAPES per capita

(Between 2017 and 2021)



Note: *Values deflated by the IPCA, at January 2022 prices.

- The state of Roraima is not included in this ranking, as its Research Funding Agency was only founded in 2022.
- The state of Acre was left out of the ranking, as it was not possible to locate the data in the source provided.
- The other states (Rio Grande do Norte – 2017, 2019, 2020; Tocantins – 2017, 2018; Amapá – 2019,2020; Ceará and Sergipe – 2017) are not included in the ranking in the years indicated, as it was not possible to locate the data in the source provided.

Source: Prepared by the author based on data from Unifesp (2024) [44] and estimated population data from IBGE, between 2010 and 2022 [45].

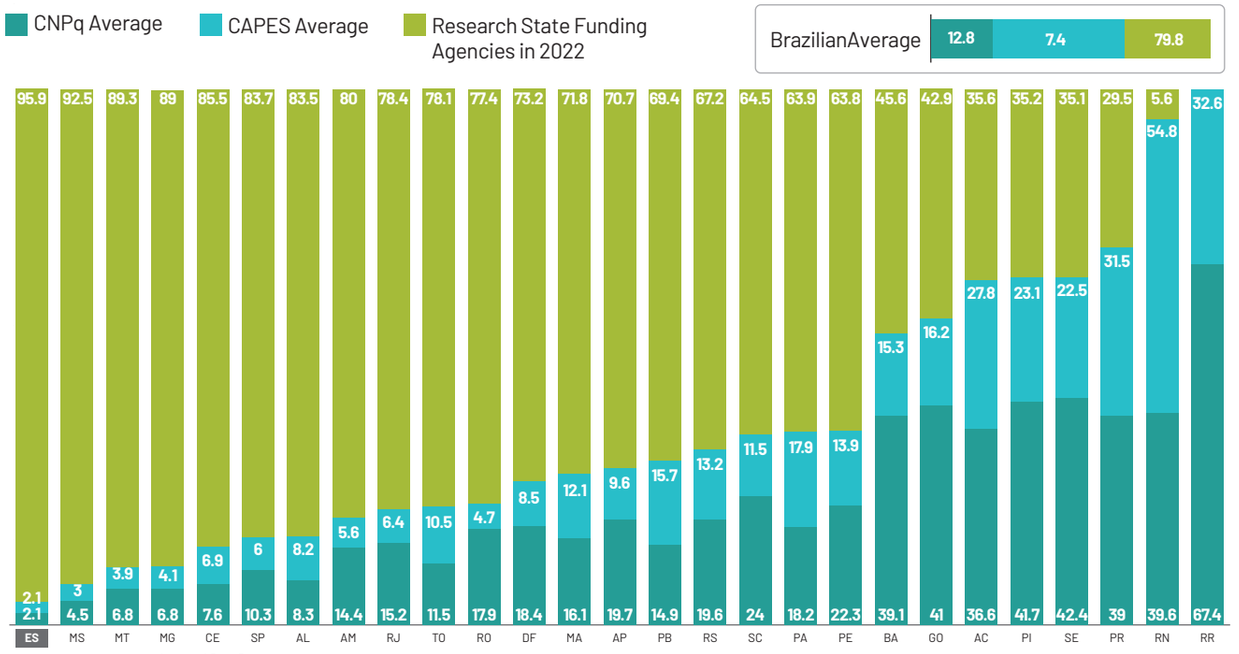
As can be seen in Graph 6, in 2017, FAPES was the 5th agency with the highest investment per person in STI in Brazil, reaching 3rd place in 2018 and 2021. In the latter year, it was behind only Rio de Janeiro and the Federal District.

In 2022, FAPES continued to lead most of the indicators of investment in STI among the other research funding agencies in the country. Using public data from these agencies, Dellagostin [46] showed the contribution of each of the agencies in 2022, highlighting FAPES' investment, which represents more than 74% of all total investment applied in STI in the state, compared to the 26% coming from CNPq and Capes combined.

Specifically for the Finalistic Action of Research, FAPES also stood out on the national scene. The data for the year 2022 show the contributions of CNPq, Capes and research funding agencies to the financing of research grants in the states. In Brazil, in that year, state funding agencies were responsible for approximately 80% of research grants, and in Espírito Santo, FAPES accounted for almost 96% of these same results for the state of Espírito Santo, positioning itself as one of the institutions that contributes the most in percentage terms to research grants among the other research funding agencies.

Graph 7 - Percentage of Each Agency's Contribution to Research Funding

In %

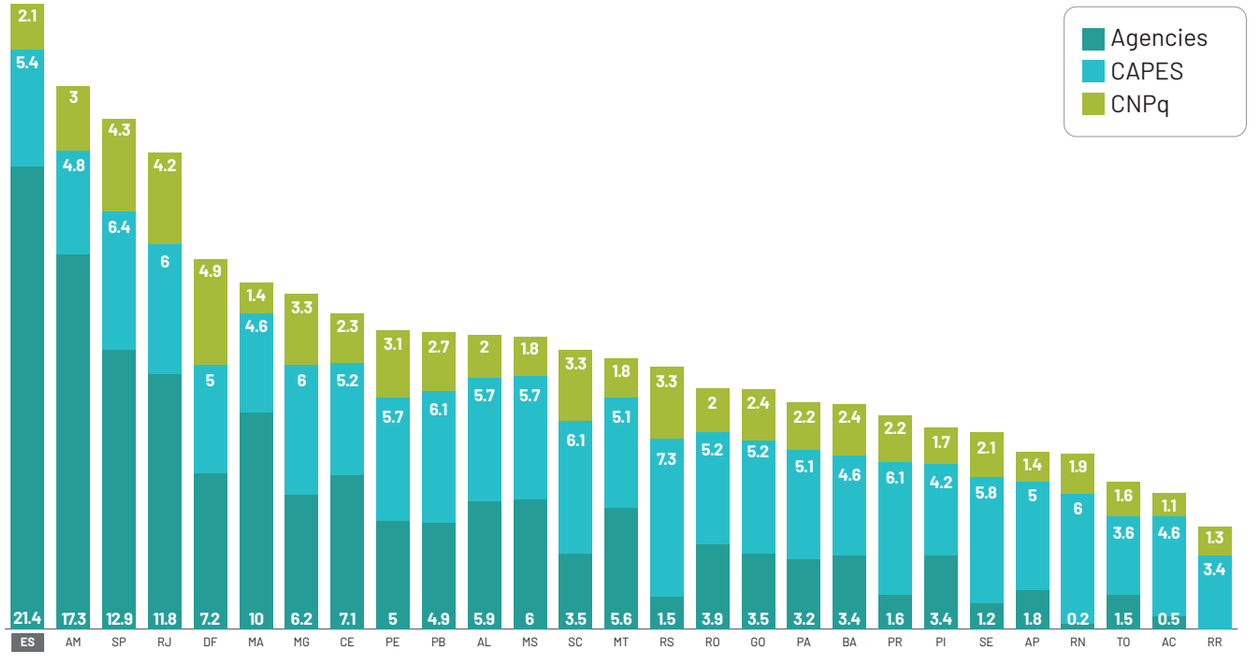


Source: Dellagostin (2023) [46].

Also in terms of Investments per Researcher, on average (2020-2022), FAPES stood out nationally, as shown in Graph 8.

Graph 8 - Value per researcher (Graduate Student + Graduate Faculty) – average 2020-2022

Values in thousands of R$

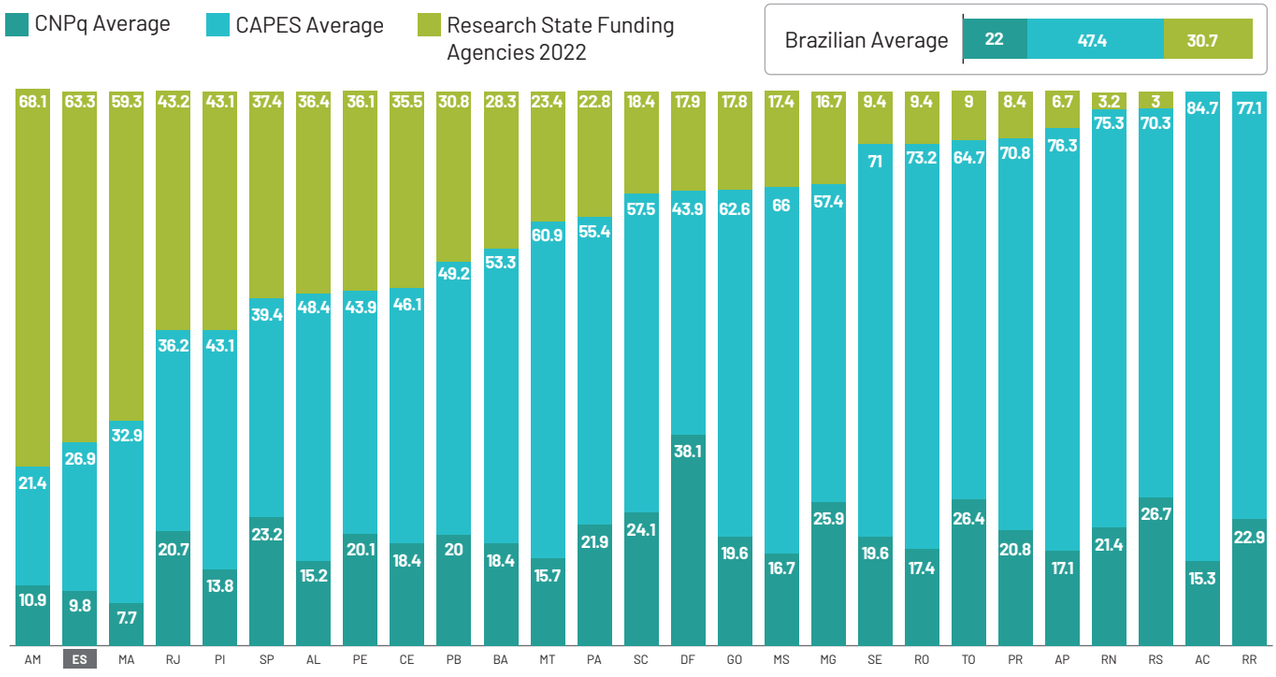


Source: Dellagostin (2023) [46].

In the finalistic action of Human Resources Training, FAPES ranked among the top in Brazil in 2022. In the country, the Research State Funding Agencies contributed 30.7% of the scholarships in 2022, with Capes being the main national funding agency, supporting 47.4% of the scholarship funding. In Espírito Santo, the main funding agency for scholarships is FAPES, which accounted for 63.3% of scholarships to beneficiaries from Espírito Santo in 2022, placing second in the country.

Graph 9 - Percentage Contribution of Each Agency in Scholarships

In %



Source: Dellagostin (2023) [46].

Throughout its 20 years of existence, FAPES has played a fundamental role in the development of science, technology and innovation in Espírito Santo. As a funding agency, the investments made were crucial for the structuring of laboratories and the entire infrastructure for public and private teaching and research institutions, in addition to having been fundamental in the integration of STI institutions with technology-based companies. FAPES participated in the formulation of policies and programs to promote STI that are based on the premise of social well-being, development focused on all micro-regions of the state, the generation of jobs and income and universal access to education.

Behind us is the memory of many who dreamed and worked for the establishment of a Research Funding Agency in Espírito Santo, and today it is possible to see the fruits of that labor in the detailing of the programs and projects in its five finalistic actions. This is the theme of the next chapter.

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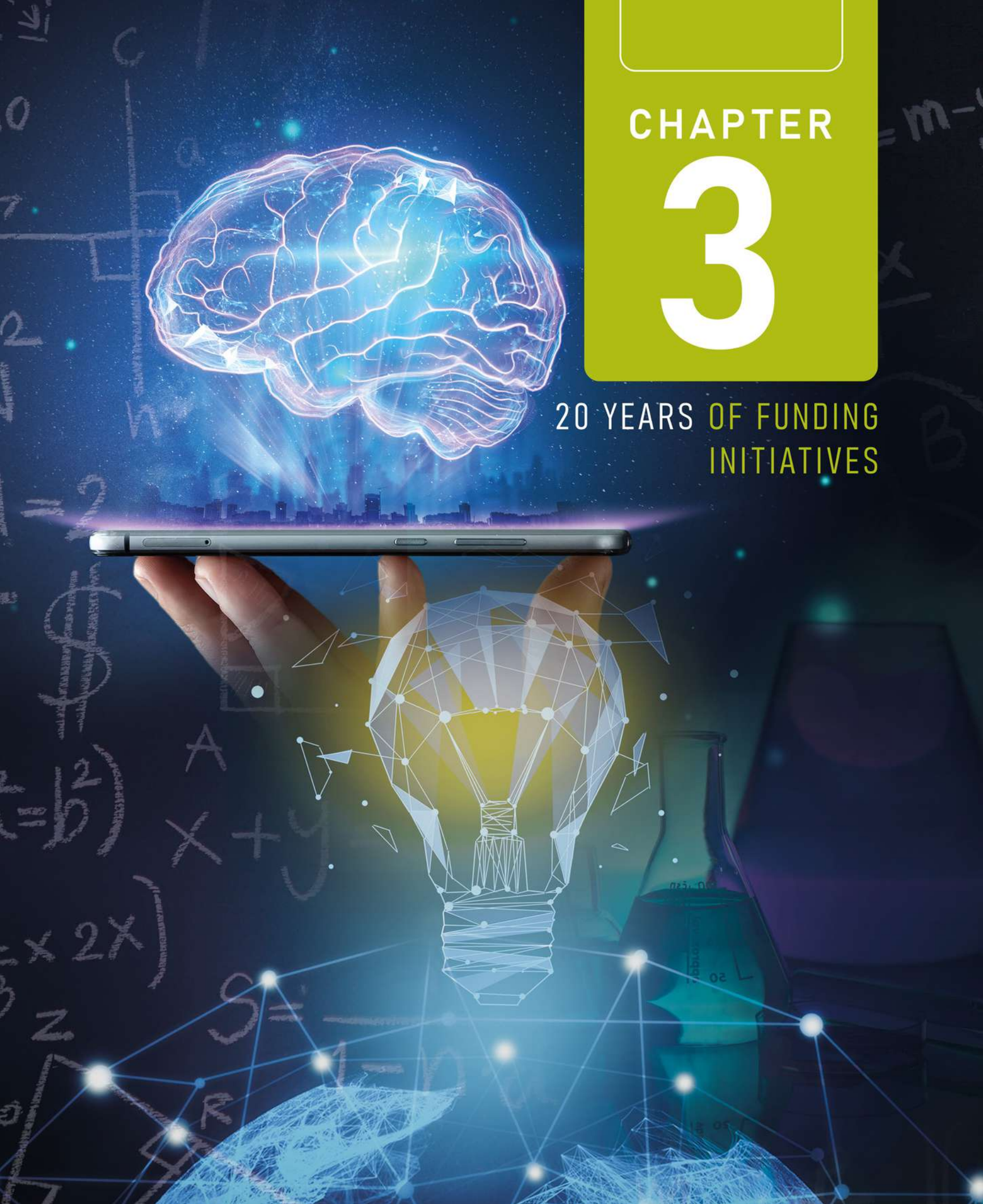


CHAPTER 3

20 YEARS OF FUNDING INITIATIVES

FAPES' TRAJECTORY: ACHIEVEMENTS AND IMPACT ON THE SOCIETY OF ESPÍRITO SANTO

Over the course of its 20 years of existence, FAPES has achieved many achievements in its core activities, divided into: Research, Dissemination of Knowledge, Human Resources Training, Innovation and Extension. These achievements were not limited to the institution. Without a doubt, the people of Espírito Santo benefited the most, as they will be able to enjoy the results generated from the resources invested by the foundation in Espírito Santo.

An example of this are the projects funded by FAPES, within the scope of the Research Program for the Brazilian Unified Health System (SUS) and Shared Management in Health (PPSUS), the result of a partnership between the State Secretariat of Health (Sesa), the Ministry of Health and the National Council for Scientific and Technological Development (CNPq). PPSUS Call for Proposals 09/2020 included 18 projects that have already shown satisfactory results, directly impacting the quality of care for people served by the SUS network [1].

These results include: development of innovative tests for the treatment of diseases; training of health professionals for early diagnosis of cancer and methods that increase the effectiveness of treatment; an application that reduces the risk of sequelae of Covid-19 and studies that have proven the harmful effect of excess medication in the fight against the Coronavirus; and the creation of prototypes for people who have suffered a stroke or had to have a lower limb amputated [1].

These projects are just a few of the many that make up the other areas. In this chapter, we will learn about FAPES programs and projects, distributed in the aforementioned final actions. Since this involves a variety of information that involves monetary values, all were corrected by the Broad Consumer Price Index (IPCA), calculated by the Brazilian Institute of Geography and Statistics (IBGE), at 2022 prices.

In 2022 alone, 30 calls for proposals were launched and more than R$140 million in resources were invested [2]. This amount represents an exponential leap for the institution, considering that in 2005, in its first year of existence, just over R$10 million was invested in research development [2]. The following pages will present some of FAPES's most notable programs, starting with Research and Dissemination of Knowledge.

RESEARCH

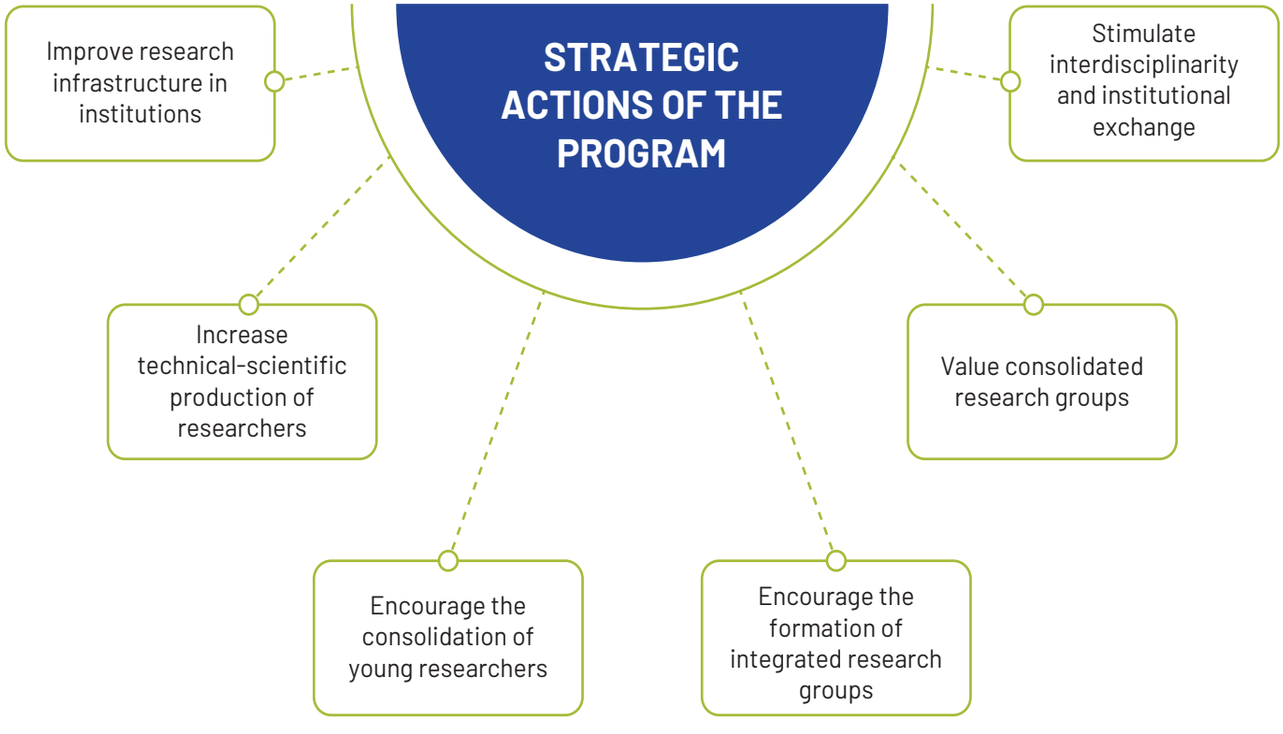
RESEARCH: AT THE SERVICE OF THE POPULATION OF ESPÍRITO SANTO

The projects supported by FAPES, in addition to strengthening the academic community and the network of researchers, result in research that provides solutions to problems in various areas, placing the population as one of the main beneficiaries of these investments. Throughout this section about the finalistic action Research, the reader will be able to learn a little more about the studies that have been developed with FAPES support with a view to enabling the generation of technical-scientific knowledge to strengthen the Espírito Santo innovation ecosystem and the academic community, in addition to solving real problems experienced by society.

Thus, the research supported by FAPES addresses the treatment of diseases, environmental issues, social inclusion, investigations into viruses that cause epidemics and pandemics, such as the coronavirus, as well as calls for proposals that support scientific activities and strengthen Espírito Santo study centers that need financial support and infrastructure to carry out their projects.

In the context of research funding, the Scientific and Technological Research Support Program (Pró-Pesquisa) financially supports projects and programs in all areas of knowledge and grants resources to researchers individually or to research groups [3]. Pró-Pesquisa includes: Universal; Primeiros Projetos Program (PPP); Support Program for Emerging Research Groups (Pronem); Support Program for Groups of Excellence (Pronex), and the Technical Support Scholarship (AT).

Figure 1 - Strategic actions of Pró-Pesquisa



Source: Prepared based on information available in the FAPES Activity Report (2005)[4].

The Pró-Pesquisa Program has the following Calls for Proposals:

- Universal Call for Proposals;
- First Project of Researchers: support for the first project of a young PhD;
- Emerging Research Groups: support for projects developed by researchers from consolidating research groups;
- Groups of Excellence: support for projects developed by researchers from established research groups;
- Technical Support Scholarship (BAT): scholarship for developing research support activities;
- Visiting Researcher Scholarship (BPV): scholarship for visits of researchers from out of state to higher education institutions in Espírito Santo.

FIRST ACHIEVEMENT

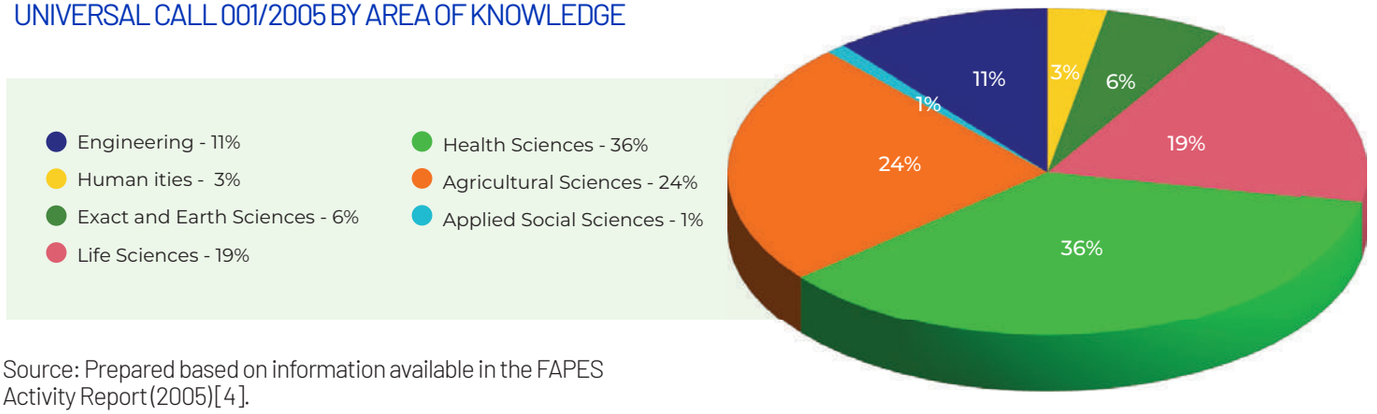
The first achievement of FAPES — and of the Espírito Santo community — in terms of research came with the Universal Call for Proposals, launched on April 11, 2005, when the state planned to invest R$ 1.8 million to support projects focused on science, technology, and innovation (STI) in Espírito Santo. This public call earned its name precisely because it encompasses all areas of knowledge[1].

As soon as FAPES opened the call for the first annoucement, the institution did not anticipate that the demand would be much greater than the projected investment amount. There were 285 project submissions with a demand exceeding R$ 17.9 million [4].

After evaluating the projects and confirming their importance for promoting research in Espírito Santo, the state government decided to double the initially planned investment, contributing R$ 3.6 million for 56 researchers [4].

The selected projects came from different institutions: 158 from UFES researchers, 26 from Incaper proposers, and 101 from other higher education institutions, mostly private [4]. The distribution of these 285 projects by area of knowledge can be seen in Chart 1.

CHART 1 - DISTRIBUTION OF THE 285 RESEARCH PROJECTS FROM UNIVERSAL CALL 001/2005 BY AREA OF KNOWLEDGE



Source: Prepared based on information available in the FAPES Activity Report (2005)[4].

[1] At the time of this call, the areas were divided into: Exact Sciences and Engineering; Biological Sciences and Health Sciences; Agricultural and Environmental Sciences; and Social Sciences. Currently, they have been restructured into: Agricultural Sciences, Life Sciences, Health Sciences, Exact and Earth Sciences, Human ities, Applied Social Sciences, Engineering, and Linguistics, Languages, and Arts.

FIGURE 2 – OBJECTIVES OF UNIVERSAL CALLS FOR PROPOSALS

1. Support the improvement of research infrastructure in higher education, research, development, or innovation institutions located in the state of Espírito Santo;
2. Contribute to the increase of technical-scientific knowledge;
3. Contribute to the increase of technical-scientific production of researchers;
4. Encourage the consolidation of research groups;
5. Promote the consolidation of young researchers in institutions of Espírito Santo;
6. Stimulate institutional exchange;
7. Contribute to the scientific and technological development of the state of Espírito Santo, working with research funding and scholarships.

Among the various research projects supported by FAPES through the Universal Call is the development of a method to identify the effects of crack on a laboratory rat, thereby determining how this drug acts in a human organism. This is the project titled "New Direct Inhalation Method for Crack and Its Molecular and Behavioral Repercussions in Rats," coordinated in 2014 by UFES pharmacology professor Lívia Carla de Melo Rodrigues. The professor emphasized that FAPES played a fundamental role in the development of the research at the university [5].

"FAPES is currently essential to the realization of the dream of doing Science in Espírito Santo. Thanks to this funding agency, I have been able to transform a space at UFES into a Research Laboratory. At LANEP (Laboratory of Neurotoxicology and Psychopharmacology), which I coordinate, we have developed a line of research on the neurotoxicity of drugs of abuse and, thanks to resources obtained through calls for proposals launched by FAPES, we have already equipped it and have carried out a series of research projects." [5]

LÍVIA CARLA DE MELO RODRIGUES
PROJECT COORDINATOR

PHOTO: LÍVIA RODRIGUES/PERSONAL ARCHIVE

Between 2005 and 2022, ten calls for proposals were launched. The resources allocated to calls for proposals of this type come exclusively from Funcitec. During this period, 1,001 projects were contracted, with an investment of R$67,763,218.75.

CALLS FOR PROPOSALS IN THE UNIVERSAL MODALITY:

INVESTIMENT OF R$ **67.8** MILLION

1,001 RESEARCH PROJECTS

HEALTHCARE SOLUTIONS

A person affected by tuberculosis can have their treatment facilitated by a technology developed in the previously mentioned PPSUS. The app "My Latent Tuberculosis Treatment" defines strategies for the doctor and the patient to better control the disease, preventing its progression.

The app was created by the Epidemiology Laboratory at Ufes, in partnership with the University of São Paulo (USP) in Ribeirão Preto, and was developed for the Android operating system. Professor Ethel Maciel from Ufes is the project coordinator.

"We hope that the app developed in the PPSUS project will assist in the process of monitoring and assisting people with tuberculosis infection, facilitating their monitoring during drug treatment and thus reducing the chances of disease progression. Furthermore, its implementation is low cost and allows interaction between the patient and the health professional. By providing continuous monitoring of the patient, the app can help in the successful completion of treatment of the disease." [6]

ETHEL MACIEL
PROJECT COORDINATOR

PHOTO: AMANDA MILAN/SVSA/MSL

It was also within the scope of PPSUS that researchers from UFES brought an unprecedented solution for patients with chronic kidney disease undergoing hemodialysis. Students from the Graduate Program in Nutrition and Health at UFES established a threshold for the conicity index, which is used to determine how abdominal circumference, considering height and weight, can be a risk factor for certain diseases. The result of this research, achieved for the first time in Brazil, may indicate whether obesity in the abdominal region is a determining factor for people to develop some type of chronic kidney disease and require hemodialysis treatment.

Since 2005, seven PPSUS calls have been held, with a total of 90 projects and an investment of R$ 9,649,666.08, including resources from Sesa and the Ministry of Health. SUPPORTING THE

PPSUS CALLS FOR PROPOSALS:
2005-2022

90
PROJECTS

INVESTIMENT OF
R$ 9.6
MILLION

STRUCTURING, CONSOLIDATION, AND EXCELLENCE IN RESEARCH

Since the beginning of its operations, FAPES has supported activities aimed at structuring, consolidating and maintaining the excellence of research groups in Espírito Santo. To this end, it issues periodic calls for proposals, covering the various stages in which these groups are found, in order to reach the largest possible number of areas of research excellence in the state.

PRIMEIROS PROJETOS PROGRAM

FAPES, through the Primeiros Projetos (PPP) Program, funded research aimed at developing a wheelchair controlled by brain signals for people with mobility difficulties or those who have lost this capability. This technology could benefit victims of Stroke and individuals with other types of motor disabilities, such as Amyotrophic Lateral Sclerosis (ALS) and Guillain-Barré syndrome.

The project's idea was to create a robotic wheelchair that responds to commands from the brain or from small facial muscle movements, using a minimal number of electrodes. This movement occurs through a brain-computer interface. The project coordinator is Professor Richard Junior Manuel Godinez from IFES Serra Campus.

"The system aims to benefit people who do not have many financial resources, as well as institutions that promote inclusion, precisely because it is low-cost."

RICHARD JUNIOR
PROJECT COORDINATOR

PHOTO: RICHARD GODINEZ'S PERSONAL ARCHIVE. RICHARD GODINEZ

The project "Development of a low-cost brain signal acquisition system for controlling a robotic wheelchair" was approved in Call 004/2017.

The PPP is a program for young researchers aimed at the nucleation of new research groups. In this sense, the PPP seeks to provide financial support to recent PhDs in the process of consolidating their scientific and technological careers. The topics can cover any area of knowledge, and proponents from any higher education institution, public or private, located in Espírito Santo, can use the project budget for the acquisition, installation, modernization, expansion, or recovery of scientific and technological research infrastructure.

From 2006 to 2022, four calls were launched, resulting in the approval of 332 projects and a total investment of R$ 11,700,486.82.

PPP CALLS FOR PROPOSALS: 2006-2022 — **332** PROJECTS — INVESTIMENT OF R$ **11.7** MILLION

SUPPORT PROGRAM FOR EMERGING RESEARCH GROUPS

The Program to Support Emerging Research Groups (Pronem) aims to strengthen and consolidate the emerging research groups in Espírtio Santo by supporting projects in scientific, technological, or innovation research, exclusively coordinated by CNPq level 2 productivity scholarship holders (PQ - Productivity in Research or DT - Technological Development and Innovative Extension).

With the network of researchers strengthened, it becomes possible to develop studies that can provide solutions for people's lives. This is what happened with researchers from UFES who, with the support of FAPES, created a smart bandage whose technology identifies the acidity level at the site of the injured skin, indicating the most appropriate treatment.

The project is coordinated by Anselmo Frizera, a professor in Electrical Engineering at UFES. He explained that tests on humans have not yet been conducted and that the purpose of the research was to create a prototype and validate the technology, optical fiber and photonics, with the goal of monitoring wounds.

" The optical fiber used is made of a polydimethylsiloxane (PDMS) matrix that, equipped with a dye, is inserted into the fabric of a gauze and in a bandage, creating a smart bandage."

ANSELMO FRIZERA
PROJECT COORDINATOR

PHOTO: ANSELMO FRIZERAS PERSONAL ARCHIVE

The project "Research and Innovation Center in Photonics and Advanced Sensing" was approved under CNPq/FAPES Call No. 23/2018 – Pronem.

From 2017, when the first public call for Pronem was announced, until 2022, three calls were launched. During this period, 45 projects were funded with an investment of approximately R$ 8,941,440.79.

PRONEM CALLS FOR PROPOSALS: 2017-2022 — **45** PROJECTS — INVESTIMENT OF R$ **8.9** MILLION

SUPPORT FOR GROUPS OF EXCELLENCE IN RESEARCH

The Support Program for Groups of Excellence (Pronex) aims to support consolidated research groups with proven scientific quality, based on the production and qualifications of their members in any field of knowledge.

Pronex was created by CNPq in 1996, and ten years later, it began to include the participation of Espírito Santo. Since then, seven calls have been launched: 011/2006; 002/2007; 012/2009; 010/2010; 013/2011; 006/2017, and 024/2018. During this period, 33 projects were funded with a financial contribution of R$ 27,701,117.38.

To consolidate the stricto sensu graduate programs that have an Academic or Professional Doctorate and a score of 5 from Capes, FAPES created, in 2020, the Program for Supporting the Excellence of Graduate Education in Espírito Santo (Proapex). Among the actions of this program is to encourage PPGs with a score of 5 to advance to scores of 6 or 7, as well as to promote the improvement of their research laboratory infrastructure. The resources from Proapex come from the State Fund for Science and Technology (Funcitec) and can also be used for the payment of master's, doctoral, scientific initiation, technical support, postdoctoral, and visiting researcher scholarships.

One of the programs benefiting from Proapex resources was the UFES Social Policy program. The PPGPS received approximately R$ 1.5 million from the Proapex call - 07/2020 for the period of 2020 to 2025. According to Professor Daniel Sampaio, the funds from this FAPES program have favored the internationalization of the university's PPGPS, enabling the financing of students and professors from the program.

"Partnerships have been established with countries such as Argentina, Canada, China, Greece, the United Kingdom, among others. It is important to highlight that the PPGPS/UFES achieved a score of 6 in the latest quadrennial evaluation by Capes (2017-2020), surpassing the main goal, which was to achieve a score of 6 in the current quadrennial (2021-2024). Additionally, the journal "Argumentum" reached the highest stratum (A1) in the last evaluation." [8]

DANIEL SAMPAIO
PROFESSOR OF PPGPS/UFES

PHOTO: ANTONINHO PERRI

PRONEX CALLS FOR PROPOSALS:
2006-2022

33
PROJECTS

INVESTIMENT OF
R$ **27.7**
MILLION

SUPPORT FOR CONSOLIDATING RESEARCH GROUPS IN ESPÍRITO SANTO

With exclusive resources from the state government, FAPES also launched calls to expand the consolidation of Research Groups in Espírito Santo. Recently, in 2022, two calls were issued: one to support Emerging Research Groups and another aimed at supporting Groups of Excellence in Research.

The Call 20/2022 - Support for Espírito Santo Emerging Research Groups is targeted at groups coordinated by CNPq Level 2 Productivity Scholars (PQ or DT), aiming to contribute to the strengthening and consolidation of emerging groups based in higher education or research institutions (IES/P) located in Espírito Santo.

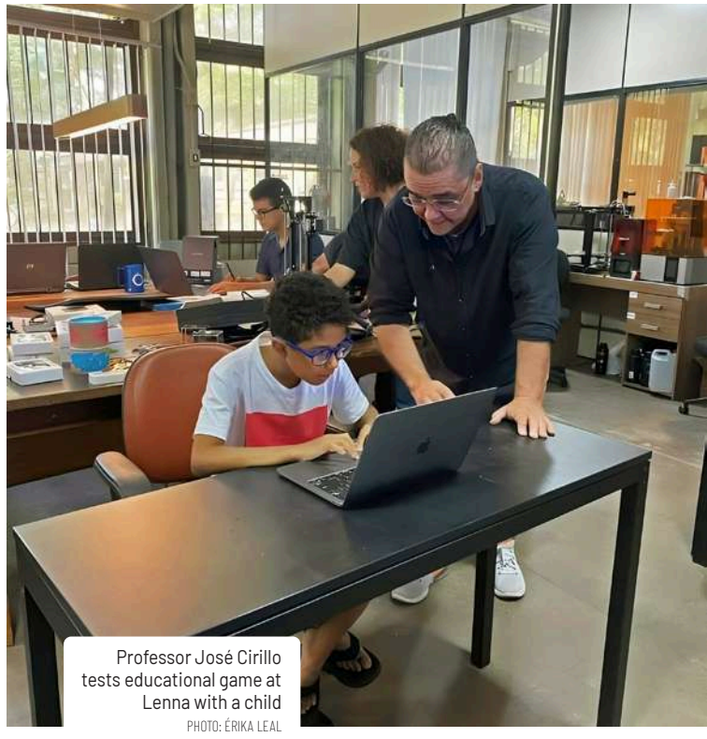
The purpose of the Support Program for Groups of Excellence in Research is to assist the development of scientific and technological research projects across all major areas of knowledge. These projects must be coordinated by Level 1 Productivity Scholars (PQ or DT) from CNPq, who are affiliated with a higher education or research institution (IES/P) located in the state of Espírito Santo. Each researcher must demonstrate significant leadership within their research area, as well as national and international presence, and sustained excellence in technical-scientific production and in human resources training, aiming to contribute to the strengthening and consolidation of Centers of Excellence in Research in Espírito Santo.

By the year 2022, two calls were published: 19/2022 – Support for Espírito Santo Groups of Excellence in Research and 20/2022 – Support for Espírito Santo Emerging Research Groups. The first call accounted for 28 projects with a total value of R$ 17,352,766.39, while the second presented 46 projects with resources amounting to R$ 8,436,993.32. Together, the two calls totaled 74 projects with a value of R$ 25,789,759.71.

MEMORY AND INCLUSION

Researcher José Cirillo, coordinator of the Arts Research and Extension Laboratory (Lenna), had a research proposal approved in Call for Proposals 20/2022 – Espírito Santo Emerging Research Groups. The name of the project is "Urban ecosystems and culture: between memory, art and history in the Training of Basic Education Teachers in the Central-West of Espírito Santo", which proposes the preservation of the culture of Espírito Santo while functioning as a tool for social inclusion.

The objective of this project is to value and make more accessible the listed monuments of Espírito Santo by reproducing them in miniature, allowing visually impaired people to access these historical monuments and appreciate them through touch. Professor Cirillo also had projects approved in two other FAPES calls for proposals: 12/2022 - Universal Extension ; and 21/2022 - Support for Infrastructure for Research, Development and Innovation in Interdisciplinary Laboratories [9].



Professor José Cirillo tests educational game at Lenna with a child
PHOTO: ÉRIKA LEAL

During the project, the idea of creating a "supplementary educational kit" emerged, which consists of board games with 3D miniatures of monuments so that the history and culture of Espírito Santo can be worked on in the classroom [9].

> *"We believe that through this work in the classroom, starting from early childhood education, by fostering an emotional connection between students and these objects, we are, in practice, also working on heritage education. With this innovation, we are creating strategies for the preservation and conservation of these monuments." [9]*

JOSÉ CIRILLO
PROJECT COORDINATOR

PHOTO: JOSÉ CIRILLO'S PERSONAL ARCHIVE

CALLS FOR ESPÍRITO SANTO EMERGING RESEARCH GROUPS AND GROUPS OF EXCELLENCE:
2022

74
PROJECTS

INVESTIMENT OF
R$ 25.8
MILLION

SUPPORT FOR SCIENTIFIC ACTIVITIES

To support the implementation of specialized technical activities, FAPES created the Technical Support Scholarship (AT). The scholarships are funded by Funcitec and have helped improve the development of scientific activities in educational, research, or development institutions, whether public or private, located in Espírito Santo. These activities can take place in scientific collections (zoological, herbarium, microbiological, museums, archives, among others) or in multi-user research laboratories.

To access the scholarship, the researcher must hold a doctorate degree and be actively employed at the educational or research institution to which they are affiliated. By 2022, three calls for proposals had been launched: 017/2012; 006/2016; and 26/2018. In the last two calls, scholarships were awarded to 56 projects, with a financial contribution of R$ 1,574,400.00.

TECHNICAL SUPPORT SCHOLARSHIP CALLS FOR PROPOSALS:
2012-2022

56
PROJECTS

INVESTIMENT OF
R$ 1.5
MILLION

FUNDING RESEARCH FOCUSED ON SOLUTIONS FOR THE STATE'S DEMANDS

THEMATIC CALLS

Starting in 2006, FAPES began launching thematic calls to address demands in specific topics, aiming to create indicators and instruments for impact evaluation and improvement of public policies. At the time, these demands came from partner institutions, such as CNPq, or were initiated by the state government due to the needs of Espírito Santo in addressing issues in certain areas [10]. Thus, in June 2006, FAPES published its first thematic call, 008/2006, on the theme of Water and Development, with the goal of contributing to state development in the field of water resources. In this call, FAPES supported research projects that promoted the development of technologies to assist in the planning of multiple uses of water resources. Of the 26 projects submitted, 18 were approved, requiring resources of R$ 464.8 thousand, a figure higher than initially allocated.

In the following year, FAPES launched Call 003/2007, with the theme Culture and Education, aimed at researchers and master's students. The intention of this call was to develop research exploring cultural identities and historical-cultural heritage, as well as topics related to education concerning curriculum, school community, and literacy, among other subjects. In total, 13 projects were approved, requiring an investment of R$ 235.3 thousand.

STATE PUBLIC POLICIES

In 2011, FAPES identified a growing need for specific calls in partnership with state government secretariats and created the State Public Policies Program (PPE), which aims to support projects in multiple areas to address problems raised by these secretariats. "Today, if there is a problem within the government, FAPES is sought out. Currently, this is an important mark. For example, if there is any issue involving science and technology, or other areas as well, FAPES is called upon" [11].

Among the PPE calls published between 2011 and 2020, notable ones include those in the following areas: Tourism Economy; Prevention, Protection, and Social Defense; Biodiversity of Espírito Santo; Agriculture; Coastal Management; Management and Competitiveness; and Public Security. In total, covering the period from 2011 to 2020, there were eight calls, totaling 124 projects, which required an investment of R$ 31,398,104.08.

PPE:
2011-2022

124
PROJECTS

INVESTIMENT OF
R$ **31.4**
MILLION

INVESTMENT IN INFRASTRUCTURE TO CREATE SOLUTIONS

Increasing the energy efficiency of air conditioning units, developing new materials for spintronics, and improving genetic processes in local fruits, as well as utilizing robotics to enhance interaction for children with Autism Spectrum Disorder (ASD), are some of the results from research developed through two structuring projects executed by FAPES. These are the Structuring Research and Technological Development: From Development and Characterization of Materials to Analysis of Espírito Santo Agribusiness Products; and the Center for Research, Innovation, and Development (CPID).

Both projects were designed to promote better infrastructure for research laboratories in Espírito Santo, making it possible to develop research that can impact society, academic production, and the internationalization of the involved institutions.

The first Structuring Call, called Estruturante 1, was contracted in 2005 through an agreement between FAPES and Finep, and it was completed in 2010 under the scientific coordination of Prof. Dr. Edson Passamani Caetano from the Physics Graduate Program at UFES. The project was implemented in 2006, through the direct administration of FAPES, with UFES and Incaper as co-executors.

In addition to Professor Passamani, the project also involved Dr. José Aires Ventura, a researcher from Incaper, and Prof. Dr. Patrícia Fernandes, who leads the Biotechnology laboratory at UFES, as scientific sub-coordinators.

Passamani explained that Estruturante 1 had two subprojects: Development and Characterization of New Materials—coordinated by UFES—and Analysis of Espírito Santo Agribusiness Products, under the executive coordination of Incaper. "The project was fundamental for consolidating the Espírito Santo Center for New Materials (NNMES)," the professor emphasized.

NNMES was created in 2007 and is part of the Physics Graduate Program. It consists of three laboratories at UFES and brings together researchers from the university as well as professionals from other states and countries who conduct high-impact research. Among its actions is the creation of new materials that can provide solutions for problems in various areas, such as the environment (remediation of contaminated effluents); development and characterization of nanomaterials for cancer treatment applications, for example; and spintronics, a technology based on controlling the spin of electrons. Spintronics gained traction from the 2000s, while electronics (controlling the charge of electrons), which is still relevant, dates back to 1905 with the development of Fleming's valves.

Professor Passamani highlighted an example of a project from the center that works on the development and characterization of refrigerated solids to replace chlorofluorocarbon (CFC) gases, which are used as refrigerants in air conditioning units and refrigerators. These gases are harmful to the ozone layer, and according to the professor, the energy efficiency of the compression-expansion cycles of gases is at least 20% lower compared to that generated by magnetic refrigeration systems. This issue has been studied at the center using equipment acquired through the call Estruturante 1.

"The Estruturante 1 project enabled a substantial change in the research infrastructure at Ufes in the area of new materials. Previously, there was a significant dependency on using equipment from other institutions in Brazil and abroad, which affected the training of human resources at Ufes. As an example of this change within the institution, I cite the acquisition of the PPMS (Physical Properties Measurement System)—installed in the Mössbauer Spectroscopy and Magnetometry Laboratory (LEMAG) of the Physics Department—which operates over a wide temperature range [from -270 °C (liquid helium) to +723 °C] and in high magnetic fields (up to 9 T). It allows for the characterization of various physical properties relevant to understanding materials and their applications. Its purchase was fundamental for our research and for the scientific strengthening of Ufes groups, as the PPMS was very expensive and no other project would have sufficient resources to acquire it," stated Passamani.

PPMS equipment is the only one in Espírito Santo
PHOTO: EDSON PASSAMANI'S PERSONAL ARCHIVE

The acronym PPMS refers to Physical Properties Measurement System. This equipment is used to measure electrical, magnetic and thermal transport properties, which are essential for characterizing new materials that have been produced by research groups at UFES, IFES, and institutions in Brazil and abroad, which UFES researchers have scientific interactions with. These characterizations determine the understanding of the physical phenomena involved and make it possible to design their varied applications. The professor also emphasized that the resources invested by FAPES through Estruturante 1 and other calls for proposals, such as Pronex, have been essential for the training of highly qualified masters, doctors and post-doctorates who pass through the university and have strongly favored the internationalization of research, through partnerships with educational institutions abroad. "There is a direct impact on the society of Espírito Santo, as it now has highly qualified researchers and professionals to meet educational demands at different levels of education and in the production sector, since companies have sought us out to try to solve problems related to the environment and specific problems with materials."

"FAPES is an institution that has contributed since 2005 to the scientific and technological development of the state of Espírito Santo, providing resources for projects that make a difference, both in the area of Education, which pertains to the training of human resources, and in the applied aspect, where the knowledge of teachers from different educational institutions in the state can be utilized for the benefit of society."

EDSON PASSAMANI
COORDINATOR OF THE UFES PHYSICS LABORATORY

PHOTO: EDSON PASSAMANI'S PERSONAL ARCHIVE

TECHNOLOGY AT THE SERVICE OF SOCIETY

The structuring project Estruturante 2 - CPID, is the first research center in Espírito Santo and has been the place for the development of several studies that meet the demands of different sectors of society. It is at this research center that the first Photovoltaic Energy Research Plant in Espírito Santo is located, which was inaugurated in 2021 and functions as a base for studies on this topic [12].

The plant was installed to make the CPID building self-sufficient in terms of electricity consumption.
PHOTO: MAX WENDER

FAPES's participation in the call for structuring projects, known as Estruturante 2 - CPID, took place in 2007. The CPID is the result of a partnership between Finep; the Ministry of Science, Technology and Innovation; the state government through SECTI, FAPES, and the Institute of Environment and Water Resources (Iema); IFES, and UFES. Located in the city of Cariacica, the Research Center was inaugurated in July 2018, focusing on the areas of Environmental Engineering, Equipment Technology, Basic Industrial Technology (BIT), and Information and Communication Technology (ICT). The investment in the project exceeded R$ 34.3 million [13].

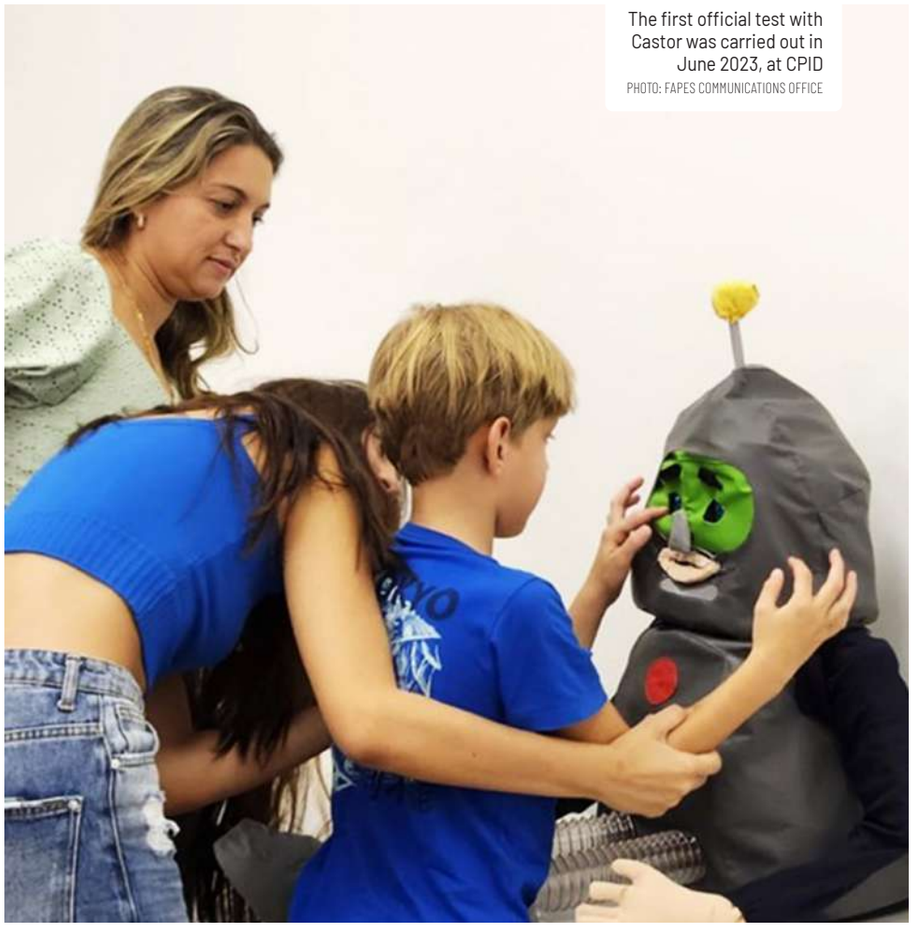
The facility has seven laboratories equipped with cutting-edge technology, where researchers can develop research and projects that promote greater interaction between Academia and the Espírito Santo business sector through the creation and enhancement of more competitive products and processes in the productive sector.

At that Research Center, a device was developed to assist in identifying cardiac problems and to allow users to conduct their own examinations. Called POF Wave, the device was created using a 3D printer by researchers from the Telecommunications Laboratory (LabTel) at UFES [14].

It detects the user's heart pulse wave, pulse speed and heartbeats by measuring the pressure at two different points on the body. The expectation is that the first prototype of the POF Wave, with all functionalities, will be completed in 2024, with the hope of being commercialized the following year [14].

POF Wave Device
PHOTO: ADVERTISEMENT

Another technology developed at the Research Center is Castor, the robot, which aims to assist in the therapy of children with autism. It was developed in Colombia and improved based on research conducted at LabTel, at UFES. The first test was conducted with the robot and two children, aged 2 and 8, in June 2023, at CPID, and the results were positive [15].



The first official test with Castor was carried out in June 2023, at CPID
PHOTO: FAPES COMMUNICATIONS OFFICE

The physical characteristics of the robot simulate those of a human through Compliant Soft Robotics technology, which controls commands such as arm and neck movement through an integrated minicomputer. In addition to moving, Castor emits sounds, blinks , and makes facial expressions. The forecast is that the robot will be available on the market starting in 2025 [15].

The cited cases show that scientific and technological production has been expanding in the State through CPID, contributing to the growth of Espírito Santo Science and Technology System. This is the result of cooperation among various institutions that promote STI in the State, as well as significant investment in human resources and collaboration between researchers from Espírito Santo and scientists from other states and countries [16].

Prototype of the Castor Robot
PHOTO: FAPES COMMUNICATIONS OFFICE LAND

CPID NUMBERS:

INVESTIMENT OF
R$ 34.3
MILLION

BUILT AREA
3,664
M^2

LAND
16,442
M^2

80K
LITERS OF RAINWATER
is the storage capacity of the CPID reservoirs. The water is used to maintain the green area of the space.

Source: Prepared by the author based on data available on the FAPES website [13].

"CPID was conceived with the aim of equipping the state with research, development, and innovation infrastructure. The plan is for it to serve as a coordinating element between academia, the productive sector, and the State government in this drive for innovation." [17]

PHOTO: MÁRCIO CÓ'S PERSONAL ARCHIVE

MÁRCIO CÓ
COORDINATOR OF THE CPID IMPLEMENTATION PROJECT FROM 2013 TO 2017

FUNDING FOR A LABORATORY THAT IS A REFERENCE IN THE STATE

In partnership with the Ministry of Science, Technology and Innovation (MCTI) through the Public Call MCTI/Finep/Infrastructure NB-3 of 2020, FAPES invested R$ 1,164,324.74 in the infrastructure of the Level-3 Biosafety Laboratory (Lab NB-3-UFES), while the MCTI contributed with R$ 1,099,247.73. According to the classification of the Brazilian Health Regulatory Agency (Anvisa), NB-3 represents the highest level for educational institutions. This laboratory was inaugurated in 2022 and it is the first to have this level of biosafety in the state.

At Lab NB-3-UFES, research is conducted with microorganisms that pose a high risk during manipulation, such as the COVID-19 virus, Sars-Cov-2. This laboratory is located in the Infectious Diseases Center (NDI) at the Health Sciences Center (CCS) in Maruípe. Its structure includes biosafety cabinets, flow cytometers, centrifuges, ultrafreezers, and biological incubators, among other equipment.

The laboratory is used for research on Coronaviruses and other areas, such as tuberculosis, leprosy, Ebola virus, and HIV. The laboratory's structure supports activities of eight graduate programs at the university. These are: PPG Infectious Diseases; PPG Biotechnology; PPG Physiological Sciences; PPG Biochemistry and Pharmaceutical Sciences; PPG Physical Education; PPG Chemistry; and PPG Public Health.

Lab NB-3-UFES is coordinated by Professor Dr. Daniel Gomes, who is a faculty member in the Graduate Program in Infectious Diseases at UFES.

"Few universities and institutes in Brazil have had the opportunity to build a laboratory with this level of safety. Today, Espírito Santo is one of the few states authorized and certified to handle organisms of high biological risk. And without the financial support from FAPES, we would not have been able to structure this laboratory."

PHOTO: PROFESSOR DR. DANIEL GOMES'PERSONAL ARCHIVE

PROFESSOR DR. DANIEL GOMES
COORDINATOR OF LAB NB-3-UFES

TAKING CARE OF THE MAINTENANCE OF RESEARCH HERITAGE

Another Call that assists researchers from Espírito Santo in investing in infrastructure is the Equipment Maintenance Program. Its objective is to support scientific, technological, and innovation infrastructure by providing financial resources aimed at executing projects focused on the preventive and/or corrective maintenance of multi-user equipment located in laboratories of higher education, research, development, and/or innovation institutions, whether public or private nonprofit, located in the state.

By 2022, four announcements had been published: 18/2012; 06/2013; 16/2019; and 08/2021. A total of 97 benefited proponents, with a total investment of R$ 3,800,888.92.

EQUIPMENT MAINTENANCE CALLS FOR PROPOSALS:

97 BENEFITED PROPONENTS

INVESTIMENT OF R$ **3.8** MILLION

VALUING HUMAN RESOURCES IN RESEARCH: ESPÍRITO SANTO RESEARCHER SCOLARSHIP (BPC)

The Espírito Santo Researcher Scolarship Program (BPC) supports doctoral researchers affiliated with public or private higher education institutions located in the state of Espírito Santo. The purpose is to award grants to those with outstanding productivity among their peers and with the ability to lead research groups.

The BPC is part of the Support Program for Research Productivity (Pró-Produtividade), which began in 2012 with the goal of promoting research productivity and researchers, both in terms of quality and quantity. The Pró-Produtividade has the following goals:

- Value and recognize Espírito Santo researchers with outstanding scientific and technological production;
- Stimulate the increase of technical-scientific production among Espírito Santo researchers;
- Induce an increase in the number of researchers from Espírtio Santo with productivity scholarships in research or technological development and innovative extension from CNPq;
- Increase the representation of the Espírito Santo scientific community in federal decision-making bodies; and
- Enhance the visibility of the Espírito Santo scientific community both in the country and abroad.

Until 2022, there were four calls for proposals: 014/2012; 004/2015; 18/2018 and 006/2021. There were 191 scholarships and R$ 8,022,820.52 invested by Funcitec.

BPC CALLS FOR PROPOSALS:
2012-2022

191
SCHOLARSHIPS

INVESTIMENT OF
R$ 8.0
MILLION

RESEARCH FEE

The Research Fee is also a Pró-Produtividade initiative, whose purpose is to grant financial assistance to CNPq level 2 Research Productivity (PQ) or Technological Development and Innovative Extension (DT) scholarship holders, linked to a Higher Education or Research institution, public or private non-profit, located in the state.

By 2022, four calls had been published: 15/2012; 02/2015, 019/2018 and 04/2021. A total of 144 Research Fee scholarships were granted during this period, resulting in an investment of R$4,099,667.03.

RESEARCH FEECALLS FOR PROPOSALS:
2012-2022

144
GRANTS

INVESTIMENT OF
R$ 4.1
MILLION

WOMEN IN SCIENCE

The 21st century brings with it an agenda that all governments must adopt: to design and implement public policies aligned with the 17 Sustainable Development Goals set forth by the United Nations [18][19].

The Women in Science Call was conceived within the context that only 28% of researchers worldwide are women, according to statistics provided by the United Nations Educational, Scientific and Cultural Organization (UNESCO) [20]. Thus, FAPES, through this call, aims to reduce the inequality between men and women in the scientific field, aligned with Sustainable Development Goal (SDG) number 5, which refers to gender equality, with the goal of achieving gender equality and empowering all women [21].

In this context, female researchers from Espírito Santo now have the opportunity to expand their fields of knowledge and research with projects in science, technology, and innovation. In 2022, FAPES launched the Women in Science Call, which aims to support scientific research, technological development, and/or innovation projects in major areas of knowledge, exclusively coordinated by female researchers affiliated with higher education institutions, whether public or private nonprofit, located in Espírito Santo.

The Call 14/2022 has already yielded good results. One of them is the extension project Assistive Technology and Occupational Therapy (TATO_i3D), which trains students in the Occupational Therapy Program at UFES to use 3D printers to produce orthotic devices, adaptations, and prosthetics to improve the quality of life for those who need them [22].

The project "Assessment of Satisfaction and Occupational Performance of Users of Assistive Technology Devices Produced on the 3D Printer" received an investment of R$ 50,000 and is coordinated by Professor Mariana Midori Sime [22].

"This is a very important recognition for extension projects. It represents the effort and dedication of the entire team, collaborators and supporters. FAPES plays a fundamental role in the development of TATO_ i3D and is also part of our achievement." [22]

MARIANA MIDORI SIME
PROJECT COORDINATOR

PHOTO: MARIANA MIDORI SIME'S PERSONAL ARCHIVE

45 proposals were approved and the total approved budget was R$2,118,505.81.

WOMEN IN SCIENCE CALL FOR PROPOSALS: 2022

45 APPROVED PROPOSALS

INVESTIMENT OF **R$ 2.1** MILLION

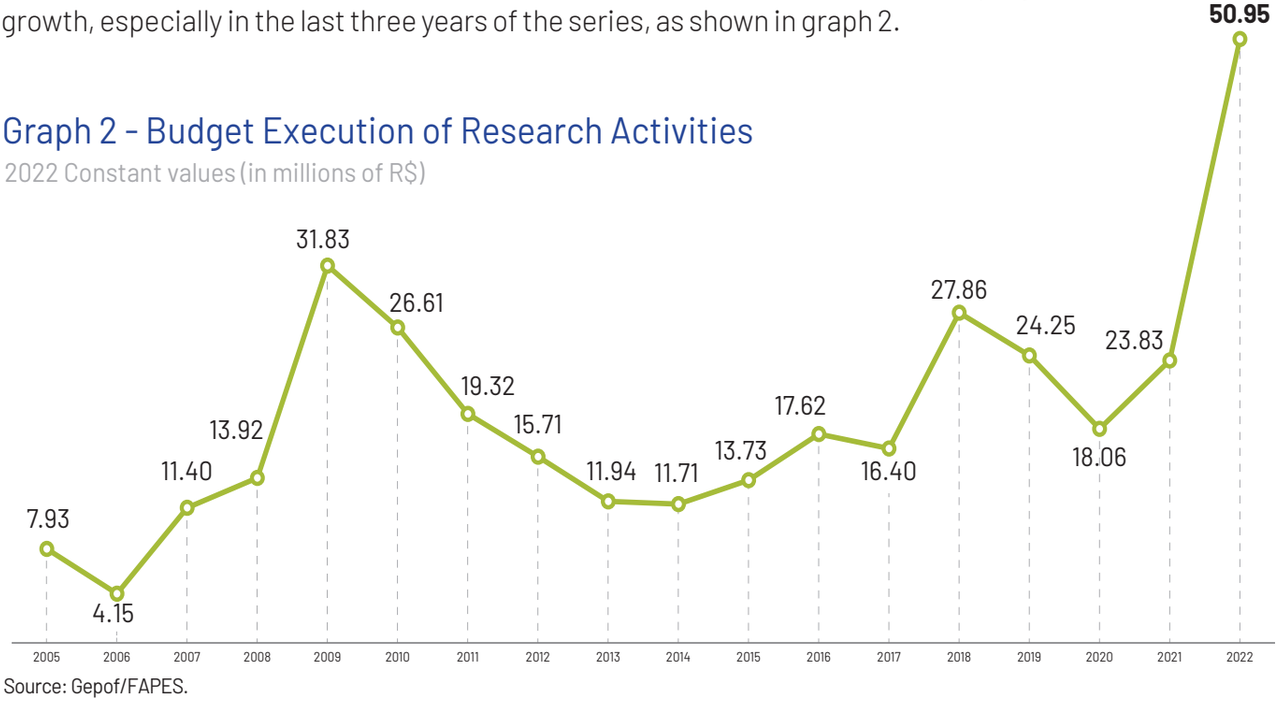
RESEARCH NUMBERS

Figure 3 (on page 91) summarizes the research programs and calls for proposals launched by FAPES over its 20 years of operation.

From 2005 to 2022, FAPES invested R$347.3 million in this finalistic action, with progressive growth, especially in the last three years of the series, as shown in graph 2.

Graph 2 - Budget Execution of Research Activities

2022 Constant values (in millions of R$)



Source: Gepof/FAPES.

As can be seen in Graph 2, from 2021 to 2022, the amounts spent on the finalistic action Research more than doubled, rising from R$23.8 million to R$51 million, positioning FAPES as the funding agency that invests the most resources per researcher, among students and postgraduate professors in Brazil, according to data from 2020 to 2022 [23].

Throughout this section, we have seen the importance of FAPES in promoting studies that bring effective results for the population. The institution's trajectory, from the launch of the Universal Call in 2005 to the recent Women in Science Call, highlights the commitment of the Espírito Santo agency to scientific and technological advancement in the state. The success of these programs is notable not only for the number of projects financed and resources provided, but also for the innovative solutions generated over the years, encompassing areas such as STI, health, education and socioeconomic development. In this sense, FAPES establishes itself not only as a funding agency, but as a fundamental pillar in the construction of a sustainable future for Espírito Santo, driving research in the most varied spheres.

FIGURE 3 – RESEARCH PROGRAMS AND CALLS FOR PROPOSALS LAUNCHED BY FAPES FROM 2005 TO 2022

* PPE: State Public Policies

DISSEMINATION OF KNOWLEDGE

POPULARIZING SCIENCE

The means of communication that are used, the language that is employed, and the lack of extensive dissemination of scientific results by the researchers themselves are some factors that make the scientific dissemination process in Brazil still modest [24]. In the process of producing and developing research, scientific communication is just as important as data collection and analysis [25], as it is through communication, using accessible language, that scientific results become democratic [24].

Scientific dissemination plays a crucial role in the democratization of knowledge and in building a more informed and engaged society. In this context, FAPES takes on a critical role as a partner in disseminating the results of research and innovation projects. As will be seen in this section, the Support Program for Scientific and Technological Dissemination aims to propagate scientific, technological, and innovation knowledge by funding the publication of bibliographic material, participation and organization of scientific, technological, and innovation events, as well as the development of projects aimed at popularizing science at local, national, and international levels. Thus, this program significantly contributes to promoting scientific and technological advancement in Espírito Santo.

In addition to all the support programs for research and innovation, FAPES also acts as a partner in disseminating the results of research and innovation projects developed in the state of Espírito Santo. This action can be understood as a response to the limited expressiveness of the scientific dissemination process in Brazil [24].

Since its creation, FAPES has supported the organization of events related to science, technology, and innovation through financial assistance, as well as participation in events aimed at supporting researchers and undergraduate and graduate students in technical-scientific events.

Pedro Rosseto was one of the beneficiaries of FAPES's Calls for Participation in Events in recent years, both as a professor at IFES Cariacica campus and as a graduate student at UFES. It was through this support that the educator presented his research at two significant international conferences in the academic field. These are the XIV Ibero-American Congress of Mechanical Engineering (CIBIM 2019) in Cartagena de Indias, Colombia, and the 35th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2022) in Copenhagen, Denmark.

With the support from FAPES, it was possible to present the work and disseminate part of the research developed throughout the doctoral program. All of this greatly contributes to the internationalization of our institutions and our work, in addition to allowing for a significant exchange of information and learning with professors and researchers from various universities in Brazil and around the world. I would also like to highlight how easy and quick the process for participating in these calls is."

PEDRO ROSSETO
PROFESSOR OF IFES CARIACICA CAMPUS

PHOTO: PEDRO ROSSETO'S PERSONAL ARCHIVE

Until 2010, financial support occurred through spontaneous demand, via the individual expression of interest of the proposers, who submitted their proposal for "internal evaluation by the agency." The strategy of support through open calls emerged as a form of universal and transparent policy. Since 2010, FAPES has launched 20 calls for support in organizing and participating in events.

From 2005 to 2022, FAPES supported the organization of 737 technical-scientific events. It is worth mentioning FAPES's action in encouraging participation in short-duration technical-scientific events, such as congresses, symposiums, workshops, seminars, exhibitions, fairs, scientific journeys, lecture series, forums, among others, both in the country and abroad. From 2005 to 2022, 729 proposals were supported, including national and international events.

SCIENTIFIC PUBLICATION

In addition to supporting the organization and participation in events, FAPES also has a program to support the publication of articles, aimed at strengthening the technical-scientific production of Higher Education and Research Institutions (IES/P) in Espírito Santo. By seeking to expand this production, promote relevant studies for Espírito Santo society, and contribute to the consolidation of research and graduate courses in the state, the program also aims to disseminate the innovative activities of local IES/P. Additionally, it promotes national and international exchanges of scientific, technological, and innovation knowledge, aiming to increase the visibility and impact of academic contributions originating in Espírito Santo.

Since 2019, 70 proposals distributed among seven IES/P have received support for article publication, with the Federal University of Espírito Santo being the institution with the highest volume of resources in this program. Agricultural and Health Sciences were the fields of knowledge that stood out in the number of articles published with FAPES's support.

In summary, the numbers show FAPES's role in popularizing and democratizing science in Espírito Santo. Various actions enable the results of diverse work in the field of science and technology to become known, thus valuing the work of researchers and their importance in scientific, technological, and innovation development.

729
NUMBER OF PARTICIPATIONS IN EVENTS SUPPORTED BY FAPES

737
NUMBER OF EVENTS ORGANIZED WITH SUPPORT FROM FAPES

70
NUMBER OF ARTICLE PUBLICATIONS SUPPORTED BY FAPES

HIGHLIGHTS OF SCIENTIFIC DISSEMINATION

Among the programs in this area, it is worth recalling "TV é Ciência," which was a television program supported by FAPES from 2007 to 2011, aimed at making STI popular. The first episode aired on March 13, 2007. The program was broadcast twice a week on TVE (Greater Vitória and Aracruz); on TV Sul from Cachoeiro de Itapemirim; on TV Litoral from São Mateus; and on TV Norte from Colatina. During this period, there were 176 episodes of 30 minutes each, representing an average of 44 episodes per year.

The program's goal was to disseminate research conducted in the state, showcase the increasing importance of science in people's daily lives, and convey information about significant local, national, and international scientific and technological events.

From 2012 onwards, "TV é Ciência" began to be broadcast nationally on TV Brasil and was carried out in partnership with the State Secretariat of Science, Technology, Innovation, and Professional Education of Espírito Santo (SECTI), the Federal University of Espírito Santo, and the Divulga Ciência Institute. The program was produced by Vídeo & Arte, directed and presented by journalist Lucyano Ribeiro, with the last episode aired on July 28, 2016.

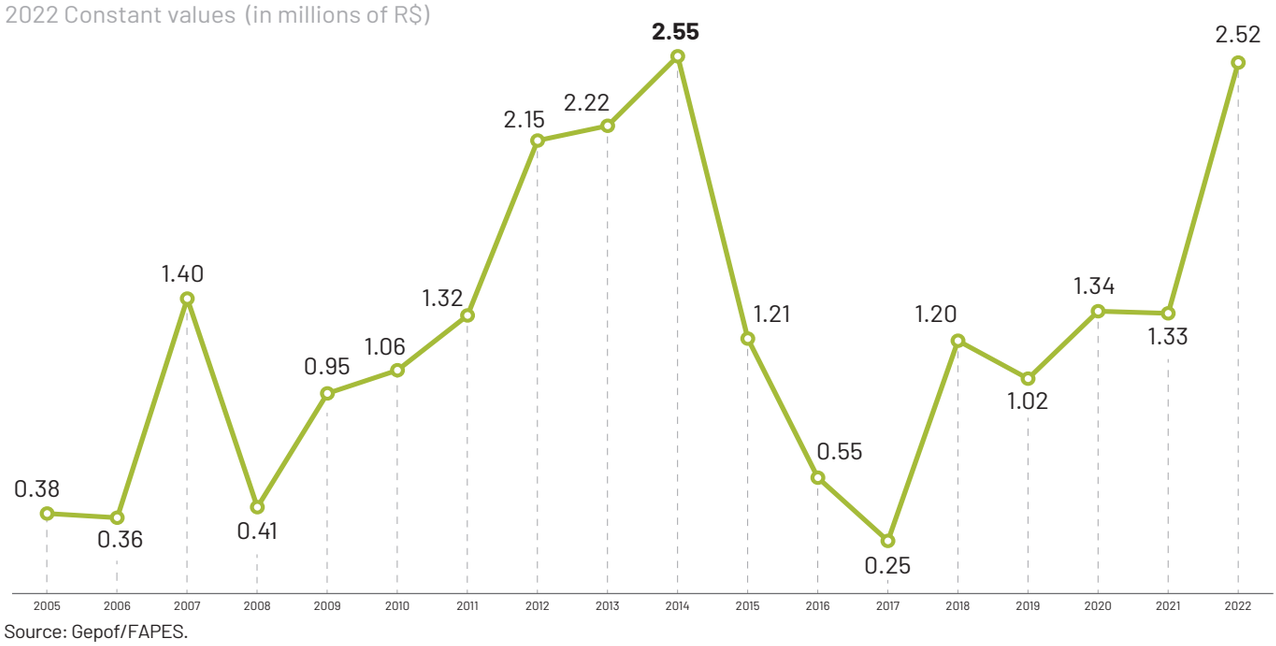
In 2022, FAPES launched Call 017/2022 – Support for the Editing and Publication of Scientific Journals. This Public Call targeted scientific journals from Espírito Santo higher education institutions, both public and private, as well as new journals that had published at least two issues by the time of the announcement. In the end, 16 proposals were selected, totaling an investment of R$ 381,332.90.

From 2005 to 2022, FAPES allocated R$ 22.3 million for the area of dissemination. However, it is important to note that during this period, investments made by the institution in this area fluctuated, even recording declines on some occasions. Notably, the period from 2015 to 2017 faced budgetary difficulties in the state government, resulting in limited resources for actions aimed at disseminating science, technology, and innovation, as presented by the state itself in the Evaluation Report of the Multiannual Plan of 2015. The years 2020 and 2021 also stand out for the decrease in investments due to the Coronavirus pandemic. Graph 3 shows how funding for scientific dissemination changed over the years.

Through strategic programs and financial support for events, publications, and research projects, the Espírito Santo fuding agency plays a significant role in promoting science, technology, and innovation. In this sense, the numbers reveal a panorama of intense activity and investment, highlighting the relevance of FAPES in the popularization and democratization of scientific knowledge.

Graph 3 - Budget Execution of Dissemination

2022 Constant values (in millions of R$)



Source: Gepof/FAPES.

HUMAN RESOURCES

INVESTING IN PEOPLE FOR 20 YEARS

Training and capacity building in Human Resources is essential for STI to take place, as people are central to this process. This is because there can be no production of knowledge and technology without people. Based on this premise, FAPES allocates a considerable financial investment for human resource training. In addition to scholarships directly included in research projects, FAPES has scholarship programs to students and researchers, ranging from awakening the scientific and technological vocation of young students with Junior Scientific Initiation scholarships, and Scientific, Technological, and Innovation Initiation scholarships, to postgraduate training scholarships.

Scholarship holders also receive support for technical improvement through access to resources that enable them to engage in activities such as internships and technical-scientific visits, which complement their training. As a way to accelerate technical-scientific progress, FAPES initiated the Masters and Doctors Retention Program, aimed at strengthening priority areas of knowledge in Espírito Santo, in line with the directive for decentralization and the retention of these professionals in institutions across various micro-regions of the state.

Below you will find details about the following programs: Junior Scientific Initiation Program (PIC Jr); Scientific and Technological Initiation Program – Pró-Iniciação; Postgraduate Training Program (Procap); Technical Improvement Program – Pró-Estágio; Masters and Doctors Retention Program (Profix), and Nossa Bolsa Program.

PIC JR

The first experience in conducting research is never forgotten. The earlier the contact with this world of ideas, experiments, results, successes, and failures, the better. Today's Junior Researcher could be tomorrow's Doctor. This is the spirit of the Junior Scientific Initiation (ICJ) scholarship modality, created by the National Council for Scientific and Technological Development (CNPq) in 2003, which aims to awaken scientific vocations and encourage potential talents in students enrolled in public middle and high schools. In addition to having a social inclusion aspect, it represents an opportunity for participating students to connect with universities and research centers.

In Espírito Santo, its implementation began in 2005, when the first agreement between CNPq and FAPES was signed. Since then, the Agency has launched 15 calls and enhanced the program with monitoring scholarships and support for ICJ projects, as well as creating scholarships for ICJ project coordinators and ICJ scholarship tutor professors, aiming to provide complementary support to the program's actions, with an investment of over R$ 27 million. More than 750 ICJ projects have been developed with students from public middle and high schools.

Professor and researcher at UFES, Lívia Carla de Melo Rodrigues coordinated a PIC Jr project focused on high school and college students who had the opportunity to address anxiety and stress through meditative practices.

PRÓ-INICIAÇÃO

"I am very grateful to FAPES for believing in a project that promoted health and well-being for students, teachers, and other staff members at a high school and college in Vila Velha. Since the pandemic, mental health issues have become important for everyone. In this sense, we brought meditative practices to this audience. We have received incredible feedback, with more self-care and improved quality of life. The support from FAPES and its concern for the theme of health and well-being is very important."

LÍVIA CARLA DE MELO RODRIGUES
PROJECT COORDINATOR

High school students practice meditation to combat anxiety and stress in a Pic Jr project, coordinated by teacher Lívia Carla de Melo Rodrigues
PHOTO: LÍVIA CARLA DE MELO

Higher education students find opportunities at FAPES to enter the world of scientific and technological research through the Scientific and Technological Initiation (ICT) scholarships, granted individually for projects or within the Institutional Programs for Scientific Initiation Scholarships (Pibic) and Technological and Innovation Initiation Scholarships (Pibiti).

Within the Pibic and Pibiti programs, scholarship holders are selected directly by the higher education institutions to which they are linked and will be guided by their professors in developing a specific project. FAPES calls aim to support public or private institutions of education or research located in Espírito Santo by granting quotas of ICT scholarships linked to the Pibic and Pibiti programs, with the goal of stimulating the development of scientific and technological research; awakening scientific vocation; encouraging potential talents among undergraduate students through R&D activities in various fields of knowledge and specialties; and facilitating interaction between professors and researchers with students interested in a research career.

Since 2008, 15 calls have been launched with the granting of 3,860 scholarships and exclusive investments from Funcitec of over R$ 20 million. The allocation of ICT scholarships involved 27 higher education institutions across their various campuses. These scholarships were distributed across various courses and fields of knowledge.

15 CALLS

3,860 SCHOLARSHIPS

INVESTMENT OF **R$20** MILLION

PROCAP

FAPES has strengthened and consolidated graduate programs in Espírito Santo. In the early years, the main actions addressed spontaneous demands that came directly from the graduate programs. Starting in 2008, FAPES established the Graduate Training Program (Procap), offering regular scholarships for Master's and Doctoral degrees. In 2012, the agency instituted the Bench Fee for Doctoral scholarship holders, aimed at financing activities strictly related to the academic schedule of the scholarship holder and their thesis. The allocation of scholarship quotas to the stricto sensu graduate programs of public or private higher education or research institutions located in Espírito Santo aims to support the training of human resources at Master's and Doctoral levels, thereby boosting the scientific and technological development of the state and contributing to the consolidation of its graduate courses.

By 2022, 36 calls had been launched, totaling 2,585 Master's scholarships, with a duration of 24 months, and 755 Doctoral scholarships, with a duration of 48 months, and a total investment of around R$ 181 million.

36 CALLS

2,585 MASTER'S SCHOLARSHIPS

755 DOCTORAL SCHOLARSHIPS

INVESTMENT OF **R$181** MILLION

"FAPES' role in developing human resources is crucial. Procap is essential because when a student receives a grant, they can spend more time in research without having to worry about financial sustainability. If they have this opportunity, it allows them to stay longer in the laboratory, have more time to produce data, and this will result in higher quality and larger scientific production. Therefore, Procap is essential for increasing the scientific production of all higher education institutions that have the opportunity to receive FAPES grants."

DENISE COUTINHO ENDRINGER
DEAN AND FULL PROFESSOR AT THE UNIVERSITY OF VILA VELHA (UVV)

PHOTO: FAPES 20 YEARS PROJECT TEAM

PRÓ-ESTÁGIO

The Technical Improvement Program aims to support the qualification of the technical-scientific staff of institutions located in the State of Espírito Santo through inter-institutional exchange for internships and technical visits at local, national, and international levels. In addition to promoting a qualitative leap in the technical-scientific knowledge of Espírito Santo researchers, it seeks to stimulate an increase in the technical-scientific production of researchers and students. This financial aid is granted by FAPES to the audience engaged in R&D activities, enabling them to undertake internships or technical-scientific visits, either in Brazil or abroad, aimed at improving or developing techniques or processes and acquiring specific knowledge related to ongoing projects. Internship aid is intended for researchers, students, and technicians from public or private institutions located in Espírito Santo, while the technical-scientific visits are intended for PhD holders.

Since the program's implementation in 2011, 12 calls have been launched, funding 401 internships/visits, with a total investment of nearly R$ 4 million. Support for internships and technical-scientific visits has occurred across all areas of knowledge.

12 CALLS

401 INTERNSHIPS/ VISITS FUNDED

INVESTIMENT OF **R$4** MILLION

PROFIX

The Masters and Doctors Retention Program aims to attract, integrate, and retain masters and doctors in Espírito Santo institutions. Its strategic actions include strengthening and diversifying the areas of these groups, increasing the technical-scientific output of researchers involved in research groups at institutions in Espírito Santo, boosting sectors considered strategically important for the economic and social development of the state, and reducing inequalities in science, technology, and innovation (STI) in microregions with low scientific, technological, and innovation development in Espírito Santo.

The goal of FAPES is to retain professionals with experience and/or recognized competence in the fields of science, technology, and innovation (STI), with the purpose of addressing two aspects. The first aligns with the regionalization principles established by the Federal Government and aims to attract researchers from other regions of the country or the world to Espírito Santo. The second stems from the state policy of regionalization, seeking to attract researchers, whether trained or residing in Espírito Santo or coming from other regions of the country or abroad, to work in institutions located outside the municipalities that are part of the Metropolitan microregion.

PARTNERSHIP BETWEEN FAPES AND CNPQ

Among the actions, the Regional Scientific and Technological Development Scholarship (DCR) is an instrument of CNPq, which since 2006 has had FAPES as a partner for financing DCR projects in Espírito Santo and as a complement to the DCR grant, with the launch of four calls for proposals and investments of R$28.2 million, of which R$21 million came from CNPq. All partnerships are monitored and evaluated technically and financially by CNPq, with the participation of ad hoc technicians and consultants, in addition to site visits.

PARTNERSHIP BETWEEN FAPES AND CAPES

In 2006, FAPES launched a call for proposals in partnership with Capes, aiming to award scholarships for stricto sensu postgraduate courses, ensuring the training of human resources needed by Espírito Santo, for a total value of R$3 million, of which R$2 million was raised from Capes. In 2014, FAPES launched another call for proposals in partnership with Capes, for a value of R$22,525,200.00, of which R$17,712,000.00 came from this institution and R$4,813,200.00 from Funcitec.

NOSSA BOLSA PROGRAM

The Nossa Bolsa Program was created by Law 8,263/2006 and reorganized by Law 9,263/2009. It is a social program of the Government of the State of Espírito Santo, which grants scholarships for undergraduate studies in private higher education institutions to residents of Espírito Santo who have completed all of their high school education in public schools located in the state.

Scholar selection is based on the ranking in the Enem (National High School Exam), requiring a minimum score of 450 points in the exam for the respective year of the announcement, and it is necessary for the family to have a per capita income of no more than three minimum wages. With this program, the government enables students who are low-income graduates of public high schools to access higher education; contributes to the formation of qualified professionals for priority sectors of the Espírito Santo economy; and promotes economic and social development through knowledge and encouragement for scholarship holders to enter the job market.

Paulo Vitor Bruno Onezorge, 34 years old, is an example of someone whose life was transformed by the Nossa Bolsa program. He received the scholarship from the program in 2009 to study Accounting at Fucape Business School. Due to his good performance during his undergraduate studies, Onezorge was named the top student in his class, which secured him a master's scholarship in Accounting granted by the educational institution. He stated that he takes pride in his journey. "My life changed the moment I realized that education transforms".

" I realized that Nossa Bolsa was an opportunity to transform my life through education. The program is much more than social inclusion. It is professional inclusion, economic inclusion, and transformation. I believe that the Nossa Bolsa program has the ability to unite the social and professional aspects, something that is truly transformative."

PAULO VITOR BRUNO ONEZORGE
FORMER SCHOLARSHIP HOLDER OF THE NOSSA BOLSA PROGRAM

FORMER SCHOLARSHIP HOLDER OF THE NOSSA BOLSA PROGRAM

Dandara Cabral, 31 years old, also experienced a radical change in her life after being awarded the Nossa Bolsa Program in 2011. She completed her undergraduate degree in Biological Sciences in 2015, and since then, her life has never been the same. She has already completed a master's degree and is currently, in 2024, pursuing a Ph.D. in Environmental Oceanography at UFES. "Access to the Nossa Bolsa program represented an open door to opportunities, to breaking the cycle of poverty, to personal development, and to perseverance in ensuring that, although I was the first in my family to attain higher education, I certainly would not be the only one," Cabral stated.

The range of opportunities in the academic world has opened up for the biologist, to the point that she has already received a scholarship from FAPES to develop scientific research projects with students from public basic education through the PIC Jr program, as well as having visited the research center at the University of Algarve in Portugal through FAPES's program that supports technical-scientific visits and internships.

"This opportunity has not only fueled my desire to dream bigger, but also has solidified my belief in the transformative power of public education policies. It is wonderful to see the government of Espírito Santo encouraging more young people to have access to it. Thanks to this initial push, the world of science has become not only more attractive, but also accessible."

DANDARA CABRAL
FORMER SCHOLARSHIP HOLDER OF THE NOSSA BOLSA PROGRAM

PHOTO: DANDARA CABRAL'S PERSONAL ARCHIVE

To maintain the benefits of the program, scholarship recipients are required to attend classes regularly; achieve a minimum of 75% approval in the subjects taken during the semester; not suspend their enrollment; and remain compliant with their academic, disciplinary, and financial commitments to the educational institution.

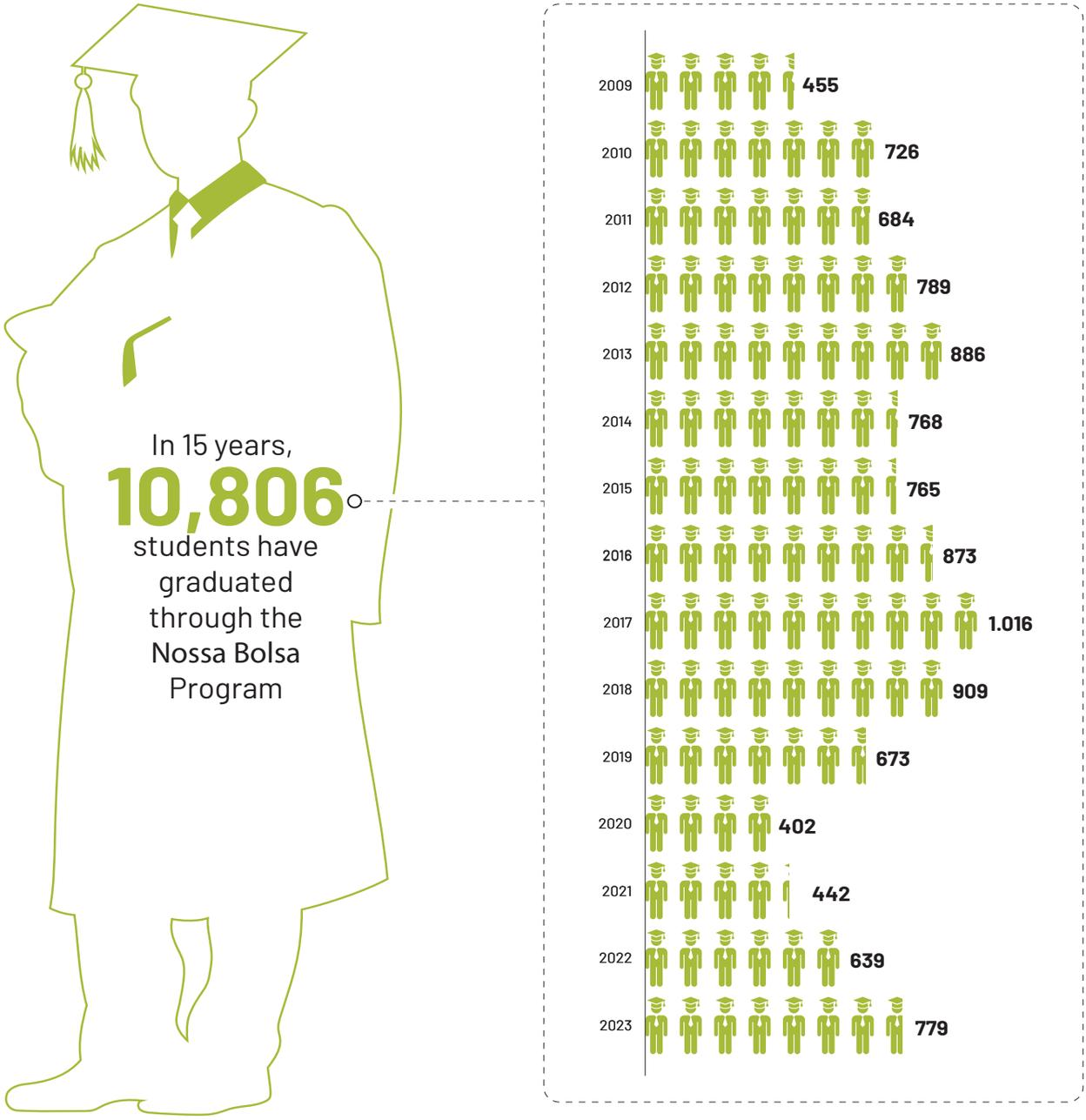
FAPES extended the program's actions with the creation of the Dedication Scholarship in 2009, which provides a quarterly scholarship of R$ 300.00 to assist with expenses related to the students' academic life for those with full scholarships. As regulated by Decree No. 4181-R, dated December 12, 2017, this scholarship is intended for students enrolled in the courses of Nursing, Engineering, Computer

Science, Medicine, Dentistry, Pharmacy, and Physical Therapy. To maintain the scholarship, students must achieve an arithmetic average of 7.0 or higher in the courses taken during the semester and must not have an employment relationship.

From 2006 to 2022, FAPES allocated approximately R$ 341 million to the Program. In 2022 alone, R$ 33.1 million was allocated, representing a 30% increase compared to the previous year, which amounted to approximately R$ 25.4 million. From 2009 to 2023, the Nossa Bolsa program recorded a total of 10,806 graduates, as shown in the following figure.

Figure 4 - Number of graduates in the last 15 years through the Nossa Bolsa Program

(In number of people)



Source: Nupex/FAPES.

A total of 24,735 scholarships were offered from 2006 to 2022. The offering of 3,609 scholarships in 2022 represented an increase of 200.58% compared to the previous year, which had 1,021 scholarships, according to data released in the calls issued by FAPES.

A wide variety of undergraduate courses is available for the program's scholarship recipients to choose from. Since 2006, over 80 different courses have been offered, covering all areas of knowledge, including Medicine, which has already graduated 17 scholarship holders during this period.

The program has a vast network of partner institutions. As a counterpart for participating in the program, these institutions offer a reduction of at least 20% in tuition fees for the courses offered, although in general, the discount is greater than this proportion.

***NOSSA BOLSA* PROGRAM:**

MORE THAN
20,000
SCHOLARSHIPS FROM 2006 TO 2022

3,609
ONLY IN 2022

INNOVATION

INNOVATION FOR COMPETITIVENESS

As will be shown in this section, the finalistic action of Innovation is central to the work of this funding agency. It will be discussed below that, in 2006, at the beginning of its journey, FAPES took a crucial step to foster technological innovation in the state by launching the Technological Partnership Call for Proposals, bringing researchers closer to the business environment and encouraging the development of innovation projects in collaboration with local micro and small businesses. Since then, the Espírito Santo institution has been carrying out other programs and projects, fostering innovative ideas and training entrepreneurs in the development of new products for local, national, and international markets.

The year of FAPES's creation coincides with the institutionalization of the Brazilian Innovation Law, Law No. 10,973, of December 2, 2004. There is no doubt that this legal framework for innovation in Brazil was a turning point in the financing of innovations in the productive environment.

This legislation allowed the direct provision of resources to companies for the development of innovations, called Economic Subsidy for Innovation, which refers to non-reimbursable resources for the development of innovative products and processes. The Law also created the Technological Innovation Centers (NITs), responsible for the management of intellectual property in Scientific and Technological Institutions (ICTs). It is also worth mentioning that it began to encourage researchers to establish relationships with companies, among other measures.

The first decade of this century was marked by an increase in resources for innovation in Brazil [26], and the State Research Foundations (FAPs) were important in distributing the execution of resources across the states. The creation of FAPES enabled Espírito Santo to participate more actively in the national competition for federal public resources for innovation. FAPES was both the proposing institution for projects to attract resources from the Financing Agency for Studies and Projects (Finep), CNPq, and the MCTI for innovation, as well as the one that provided resources as a counterpart. Furthermore, there were times when it supported other institutions in Espírito Santo to seek resources.

From 2005 to 2022, FAPES invested over R$ 130 million in innovative activities in the state and has been standing out each year as the Research and Innovation State Funding Agency in the country in the execution and evaluation of programs such as Tecnova, Centelha, Seedes, support for Technological Innovation Centers, among others.

FAPES IS BORN WITH INNOVATION

The first call for proposals launched by FAPES to encourage innovation in companies was the Technological Partnership. In order to attract researchers to the business environment, FAPES launched two Technological Partnership calls in 2006, with the objective of financially support technological innovation projects developed by researchers, individually or in groups, and also in cooperation with micro and small companies located in Espírito Santo, separately or in collaboration.

The projects had to meet a demand from the productive sector, with the purpose of solving technological bottlenecks in Local Production Arrangements (APLs). The goal was to increase the competitiveness of the Espírito Santo productive sector in the areas of food and beverage; aquaculture and fishing; coffee; civil construction; forestry; fruit growing; metalworking; livestock; oil; energy and chemicals; ornamental rocks;

furniture and clothing. With this, FAPES took the first step towards bringing ICTs closer to companies in technological innovation projects, aiming to create an environment conducive to the development of innovations in Espírito Santo companies. In addition, it intended to contribute to the creation and strengthening of a culture that values research, development and innovation activities, aimed at solving problems related to business environments, providing an increase in the professional scope for researchers in various areas of knowledge through applied research.

Although R$3.5 million was allocated from Funcitec to support Technological Partnership projects, less than 10% was used to support two approved projects, highlighting the fragility of the university-business relationship in the state at that time.

The first years of FAPES's work in financing innovative activities were not easy. The Agency was not known by businesspeople and companies did not have expertise in developing projects to raise funds for innovation. In this context, the expressions "economic subsidy for innovation", "counterpart from the financed company" and "cooperation with universities" were unknown to the business community.

"It was very difficult to convince the community that the State Government had financial subsidy resources to invest in innovation projects. These are non-refundable resources that do not need to be "returned" to FAPES. The company only needs to prove that it has developed the project and completed all the planned stages. The Government is, therefore, sharing with entrepreneurs the risks involved in innovative activities."

ÉRIKA LEAL
1ST INNOVATION MANAGER AT FAPES

PHOTO: ÉRIKA LEAL'S PERSONAL ARCHIVE

After much persistence and publicity work, in 2006, with resources from Finep and FAPES, 16 projects were contracted under the Innovative Company Program, which included projects from the Innovation and Relations with the Production Sector Department.

This type of support occurred in two phases: in the first, resources were made available for the preparation of a business plan and a Technical, Economic and Commercial Feasibility Study (EVTEC) of the proposed innovation, with support for ten projects. In the second, these projects competed for the resources made available for phase II (construction of prototypes) and six of them were contracted. This type of support is relevant when it comes to innovative projects, since EVTEC aims to reduce the financial, commercial and technical uncertainties inherent to innovations [27].

Practically all of the programs executed by the FAPES innovation area were the result of partnerships with the Federal Government. Another attempt to implement a federal program that is a relevant instrument for supporting the development of innovative products and services is the Human Resources in Strategic Areas Program (RHAE).

The RHAE, which originated at the National Research Council (CNPq)/MSTI in 1987, is characterized as a mechanism for bringing scientific and technological research closer to the business reality, and is made

possible through a set of technology development grants. It was created specifically to bring together qualified personnel for research, development and innovation (RD&I) activities in companies, in addition to training and qualifying human resources [28].

In 2008, Espírito Santo signed an agreement with CNPq to implement the RHAE in the state, with R$1.1 million contributed by CNPq and R$550 thousand by FAPES as a counterpart.

Once again, the demand for resources was very limited. In an attempt to use the available resources, the Agency had to launch two calls for proposals to implement the RHAE in the state, one being Call for Proposals 008/2008 and the other 009/2009. Together, they benefited only three projects, with R$180,000 being allocated. In other words, once again, just over 10% of the resources provided for in the Call for Proposals were used.

FINANCING FOR INNOVATION AWAKENS THE INTEREST OF LOCAL BUSINESSES

In 2005, Decree No. 5,563/2005, which regulates the Brazilian Innovation Law, established economic subsidies for innovation activities and, from then on, Finep began to operate the Program to Support Research in Companies – PAPPE Economic Subsidy – in partnership with the states [29].

Economic subsidies are one of the ways in which the public sector uses to share the costs involved in R&D activities with the productive sector. It is also a way to stimulate private investment in innovation, since, in order to have access to economic subsidy resources, beneficiaries must provide a minimum contribution.

In Espírito Santo, the program was officially launched in April 2008, with the objective of supporting, in the form of non-reimbursable resources (economic subsidies), research, development and innovation projects for processes and products developed in companies.

A real task force was created to publicize the program in the state and train entrepreneurs to prepare projects. The partnership between stakeholders such as Findes, Sebrae-ES and Development Bank of Espírito Santo (Bandes) was essential, as these institutions provided human resources to help publicize PAPPE, as well as to advise entrepreneurs on how to prepare projects to participate in Call for Proposals 006/2008 – PAPPE Economic Subsidy [29].

This was the first time in the history of FAPES that a call for proposals aimed at supporting the productive sector received a demand greater than the amount offered. The resources requested, totaling R$29,628,711.82, were equivalent to more than four times the amount available in the Call for Proposals, that is, R$6.7 million (R$4.5 million from Finep and R$2.2 million from FAPES) [29].

From this first call for proposals, important companies in the innovation scene in Espírito Santo were supported and continue to operate to this day, such as Mogai, which later created the spin-off Olho do Dono, also with FAPES resources. Mogai has been growing so much – an average of 85% per year – that it is already seeking new investors and aims to open a headquarters in the United States or Canada [30].

It is also possible to mention Aplysia and Fluir, reference companies in the environmental area in Espírito Santo, as well as Imatic, incubated at TecVitória, which, years later, after constant contributions of resources from FAPES in its innovation calls for proposals, would develop in Espírito Santo and become PicPay.

The company Aplysia, in fact, developed a project with support from FAPES that contributed to the recovery of the Mangaraí River, in the city of Santa Leopoldina, Espírito Santo. This is the project "ReNaturalize: Solution for Renaturalization of Water Bodies", financed by FAPES in partnership with Finep through the Tecnova Program, under Call for Proposals 013/2013.

The technique used by the company consists of using eucalyptus trunks tied with steel cable, placed at certain points in the river. This methodology made it possible to reduce the speed of the river water by up to 20 times, so that infiltration into the water table would be greater. This solution is already widely used in England and was brought to Brazil for the first time, and is also unprecedented in all of Latin America. With this, Espírito Santo, through Aplysia, became a pioneer in the use of this technique in the country. According to research data, in ten months, 67 tons of sediment were retained in just 200 meters of the Mangaraí River.

" This FAPES call for proposals was extremely important for the realization of this project. ReNaturalize is a very innovative project that required resources and at least three people dedicated full time. It was necessary to look for the methodology outside of Brazil, because until then there was no similar project in the country. So, we went to Europe to bring this technique and without the support of FAPES it would not have happened. "

TATIANA HEID FURLEY
VICE PRESIDENT OF INNOVATION AT APLYSIA AND
COORDINATOR OF THE RENATURALIZE PROJECT

PHOTO: ADVERTISEMENT / APLYSIA

Aplysia team installing the wooden structure for the ReNaturalize project, on the Mangaraí River, in Santa Leopoldina
PHOTO: APLYSIA

In 2013, continuing to provide resources to companies in the form of Economic Subsidies for Innovation, FAPES launched Tecnova-ES. Several meetings were held to improve the format of this program.

One of these meetings was recorded in an article published on the FAPES website on October 9, 2012, when Finep representative Marcelo Camargo met with other state entities to present Tecnova.

At the time, the then President-Director of FAPES, Anilton Salles Garcia, highlighted that "the proposal discussed provides improvements in the Agency's performance, which may launch a new call for proposals to subsidize innovation projects in micro and small companies" [31].

> ***" This project that we are discussing today allows the State to invest in high value-added projects, in fundamental areas directly linked to the development of Espírito Santo, such as oil, gas, energy and information and communication technologies." [31]***
>
> **ANILTON SALLES GARCIA**
> FORMER PRESIDENT DIRECTOR

PHOTO: FAPES COMMUNICATIONS OFFICE

Representatives from other state institutions, such as the State Secretariat of Science, Technology, Innovation and Professional Education (SECTI), Aderes, Findes and Banestes, also participated in the meeting, in addition to the TecVitória incubator.

Marcelo Camargo, from the Finep Subsidy Operations Department, reports that the objective of the Finep partnership with the Research Funding Agencies is to strengthen the state innovation system in the country. He also highlights that Espírito Santo is a promising region. "Espírito Santo has a fantastic partnership that promises to integrate several state agents, such as FAPES, secretariats, banks and incubators. In this way, we hope to make this agreement a reality and receive several proposals, allowing federal resources to be combined with state resources, contributing to the efficient development of research and innovation" [31].

R$22.9 million was earmarked for this agreement, of which R$15.3 million came from Finep and another R$7.6 million came from FAPES. The Tecnova-ES Call for Proposals was intended to support the development of innovative products (goods or services) and/or processes, new or significantly improved for the local, national and international markets by Brazilian micro and small businesses based in Espírito Santo, aiming at the development of economic sectors considered strategic in federal and state public policies and adhering to the state's public innovation policy.

FAPES contracted 38 companies in all micro-regions of the state, in seven priority areas, with emphasis on the area of Information and Communications Technology (ICT).

In 2021, FAPES launched Tecnova II Callfor Proposals, supporting another 30 projects. In this call, an additional R$7.9 million was made available, of which R$5.3 million came from Finep and R$2.6 million from FAPES. And, it was from this call for proposals that Lume Robotics developed a

prototype of an autonomous microbus, the first in Latin America, with capacity for 21 passengers [32]. This startup developed the technology in partnership with Marcopolo, the Brazilian multinational, through the Tecnova II Call for Proposals [32]. "This solution is capable of providing the vehicle with autonomy and of driving the vehicle completely without any human intervention or supervision, neither on board nor remotely. Therefore, the solution has all the capabilities that a human driver has, making the vehicle fully autonomous. In fact, this is the only solution of its kind in the entire Southern Hemisphere" [33].

"FAPES plays a fundamental role, because in addition to financially supporting this type of technological evolution, which is developed within universities, it also encourages and supports this development. Within universities, there is a great deal of pressure to develop technologies, but these will not always become products destined for the market. FAPES comes in to support this second phase, which is the transformation of technology into a product that meets the real demands of society, encouraging both resources and the organization and development of the infrastructure necessary for this evolution of technology into a product."

RÂNIK GUIDOLINI
EXECUTIVE DIRECTOR OF LUME ROBOTICS

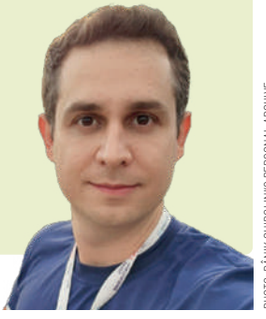


PHOTO: RÂNIK GUIDOLINI'S PERSONAL ARCHIVE

Technology developed in the autonomous microbus is unique in the Southern Hemisphere
PHOTO: MARCOPOLO, MERCEDES-BENZ AND LUME

The Espírito Santo startup Dersalis was also selected in the Call for Proposals 02/2021 of the Tecnova II Program and developed a monitoring bracelet, aimed at the industrial environment, which allows the continuous and real-time collection of vital data from workers during working hours. By accessing the employee's heart rate and body temperature, for example, it is possible to know about the signs of fatigue and stress that can harm the employee's health. Thus, the technology can help the company in rapid interventions to preserve the health of the worker.

" We observe the need for research in the work environment, but it is very expensive. So, in fact, we need encouragement and good supporters, and FAPES has been doing that, making this work possible."

ANDRÉ ROCHA SOARES
FOUNDING PARTNER OF DERSALIS

PHOTO: ANDRÉ ROCHA SOARES/PERSONAL ARCHIVE

While still providing financial support to companies in the form of an Economic Subsidies for Innovation, FAPES had already launched the First Call for Technological Innovation in 2009, with resources from Funcitec, as shown in chapter 2, with resources from the State Government being allocated directly to companies.

Seeking to support projects in line with the strategic sectors of Espírito Santo, FAPES also supported projects focused on the areas of Logistics, Food and Beverage, within the scope of the Call for Proposals (LAB).

Call No. 10/2019 granted non-reimbursable resources, through economic subsidies, for the development of innovative products, goods, services or processes by companies from Espírito Santo. Each proposal could be awarded up to R$365 thousand. R$2.2 million was made available to finance the six projects awarded. The resource came from the Espírito Santo State Science and Technology Fund/Espírito Santo Mobilization for Innovation (Funcitec/MCI) [34].

The projects focused on presenting proposals that include solutions and improvements for the shelf life of products or in the logistics area to improve axle load prediction [34].

More recently, FAPES launched two Calls for Proposals to support innovative companies and Spin-offs. In both Calls, the first in 2020 and the second in 2022, 97 projects were supported. The resources came from Funcitec/MCI, designated for exclusive use in innovation projects.

The then technical-scientific director of FAPES, Denise Rocco de Sena, emphasized at the time that financially supporting the private sector, in partnership with ICT researchers, stimulates the expansion of the technology sector in Espírito Santo. "FAPES strengthens its encouraging role, supporting projects that seek to increase the innovation and competitiveness activities of companies in Espírito Santo, and boosting the economy of Espírito Santo, an action that is even more necessary in a pandemic", highlighted Denise Sena.

THE INNOVATION TRAIL: FROM THE INITIAL INCENTIVE TO ENDEAVOR TO THE ACCELERATION OF STARTUPS

One of the hallmarks of the work of FAPES's Innovation Directorate is its constant support for innovative entrepreneurship in Espírito Santo. According to Almeida and Grassi (2022), innovative entrepreneurship can be defined

> [...]as a skill of the entrepreneur who can create something from almost nothing or expand paths that were previously rigid economic(and/or social)relations, which would impose restrictions on the activities considered desired by entrepreneurs(BAGGIO; BAGGIO, 2014; BARLACH, 2009). Or, even as "the generation and development of ideas, incorporating economic, social and artistic activities in a coherent context of creativity, especially in environments of change and uncertainty, creating new opportunities"(UENO, 2011, p. 25)[35].

One of the forms of innovative entrepreneurship refers to startups. Over the years, FAPES has supported these companies in the most diverse phases of their business, as shown in Figure 5, preventing these organizations from falling into the "Valley of Death". Some programs will be highlighted below.

FIGURE 5 – THE INNOVATION TRAIL

Source: Prepared by the author based on information from Dinov/FAPES.

INNOVATION SYNAPSE

The Santa Catarina Reference Center for Innovative Technologies Foundation (Certi) created the Innovation Synapse Program (PSI) [35]. In 2008, together with the Santa Catarina State Research Funding Agency (FAPESc), the Certi Foundation carried out the first PSI operation in the state of Santa Catarina, and in 2019, the Program was already in its sixth operation in this Federation Unit. After 2015, the PSI also reached the states of Amazonas, Espírito Santo and Paraná.

Around 2015, it was considered the largest Entrepreneurship program in the country. In each regional edition, it received more than a thousand innovative ideas, fostering the culture of entrepreneurship. Sinapse, which had already generated more than 400 successful companies in the states of Santa Catarina and Amazonas, when it began to be implemented in Espírito Santo, achieved the highest number of ideas submitted in the history of the Program since its creation in 2008.

After three selection stages, FAPES subsidized each of the 45 companies selected for the final stage. Among the innovative ideas selected in the Program is a project from the São Camilo University Center, which aims to use waste from the extraction and polishing process of rocks to produce glass, with the objective of addressing the problem of excessive waste generation [36].

Without a doubt, one of Synapse's main contributions was the fact that it was the embryo for the creation of the Centelha Program in the Federal Government.

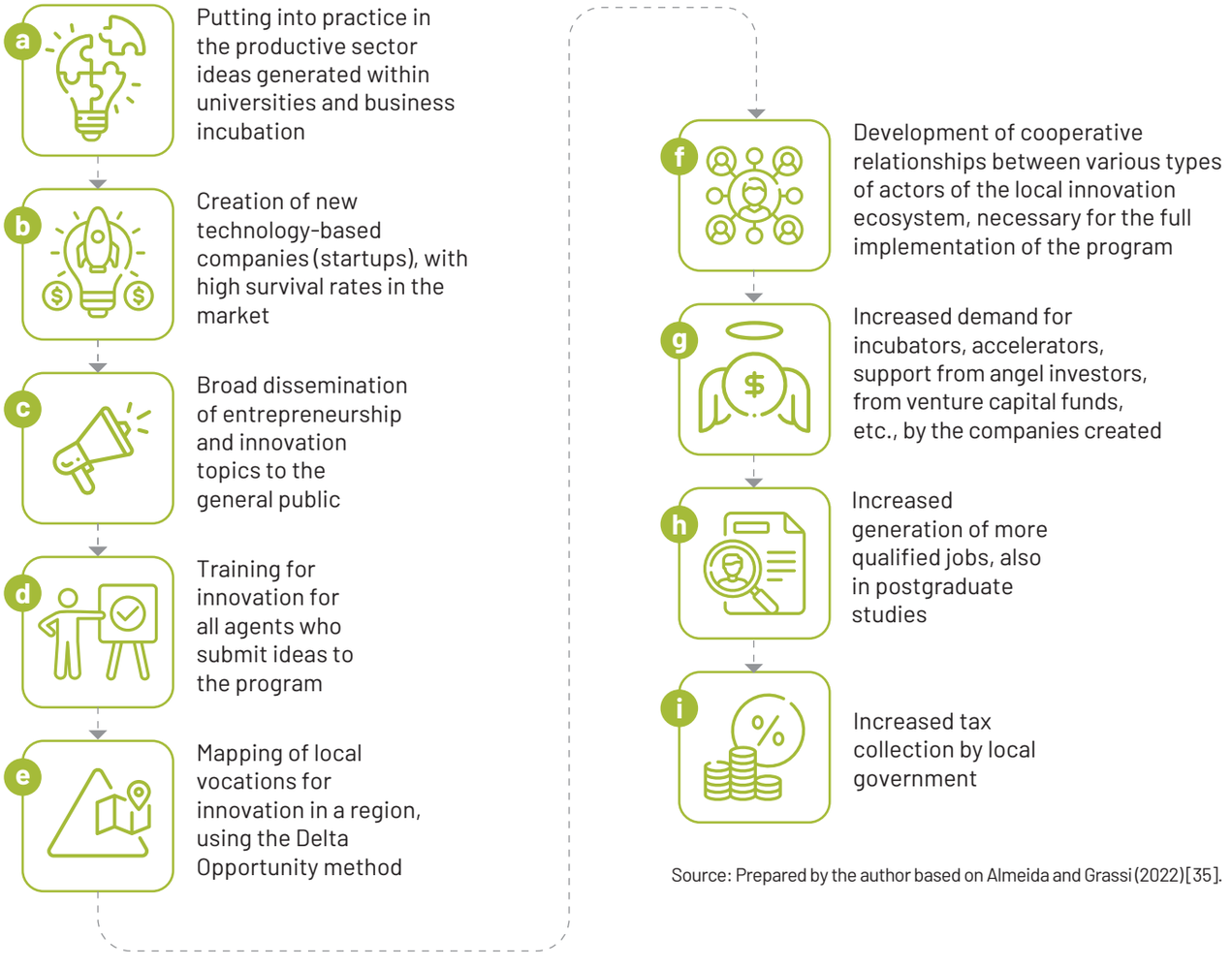
Companies from the Espírito Santo Innovation Synapse begin the pre-incubation stage of the Program in 2018

PHOTO: FAPES ARCHIVE

FAPES Executive Board signs contract with companies from Innovation Synapse. From left to right, the technical-scientific director, Rodrigo Rodrigues; the President Director, José Antônio Bof Buffon, and the administrative-financial director, Maria Tereza Colnaghi Lima

PHOTO: FAPES ARCHIVE

Figure 6 - Results of the Synapse Program for the Innovation Ecosystem



Source: Prepared by the author based on Almeida and Grassi (2022) [35].

CENTELHA PROGRAM

"Centelha", which means flame or spark, represents the purpose of this program: to transform innovative ideas into successful businesses. Thus, the Centelha Program has as its strategic guideline, and also in its slogan, to be "the first impulse for those who want to endeavor" [37].

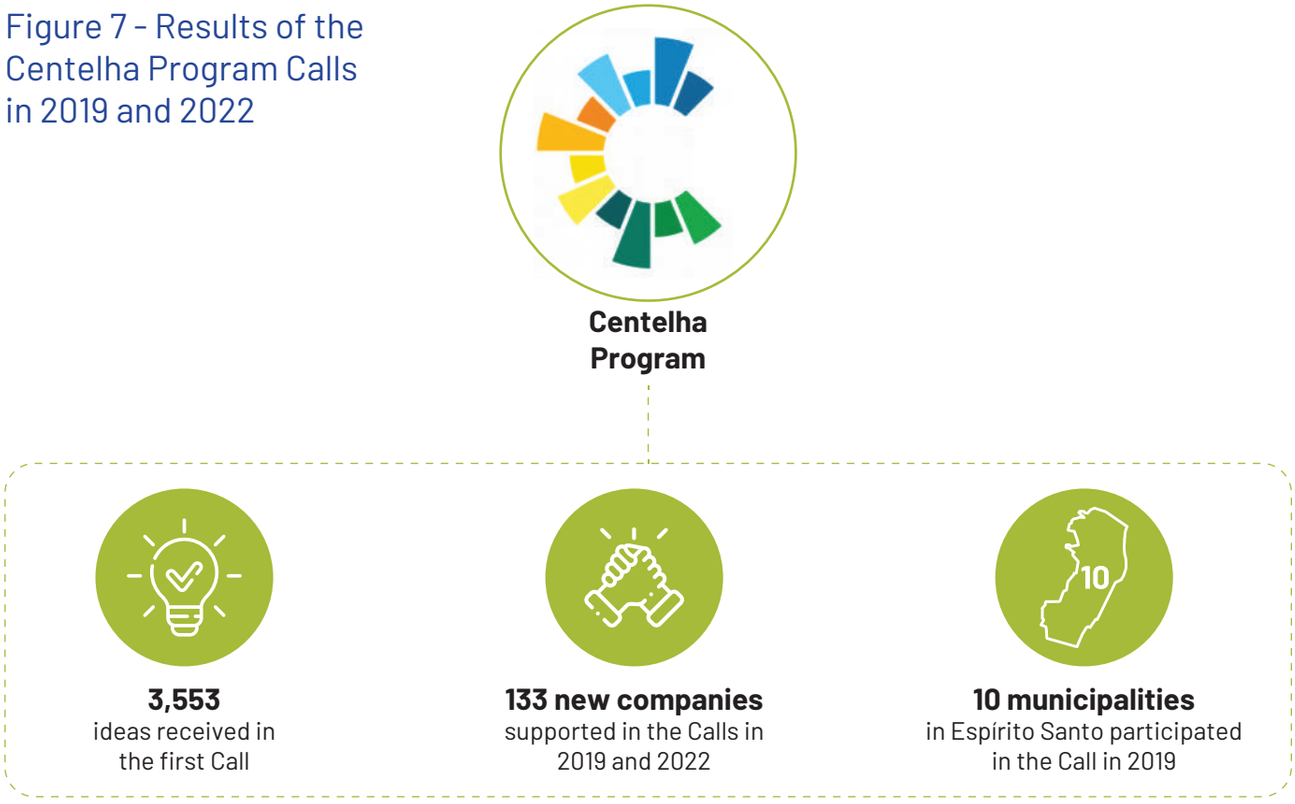
The Centelha Program aims to stimulate the creation of innovative enterprises and disseminate the entrepreneurial culture in the country. The initiative is promoted by the Ministry of Science, Technology and Innovation (MCTI) and the Financing Agency for Studies and Projects (Finep), in partnership with the National Council for Scientific and Technological Development (CNPq) and the Brazilian National Council to State Funding Agencies (Confap), operated by the Foundation for Reference Centers in Innovative Technologies (Certi). In Espírito Santo, it is executed by the Espírito Santo Research and Innovation State Funding Agency (FAPES).

FAPES joined the Centelha Program in Espírito Santo in 2018 and began its implementation in 2019. In the two editions already held, the institution stood out both in the number of ideas submitted and in startups approved in the country.

Centelha I, with a call for proposals launched in 2019, had the largest number of ideas submitted in the entire history of the Program. There were 3,553 ideas from ten municipalities in Espírito Santo. In the 2019 Call for Proposals, 53 new companies were supported in Espírito Santo.

In 2022, FAPES launched the second edition of Centelha, supporting another 80 new companies. Figure 7 shows the main numbers of the program in Espírito Santo.

Figure 7 - Results of the Centelha Program Calls in 2019 and 2022



Source: Certi Foundation [37].

"Joining the CENTELHA Program in 2018 allowed us to exponentially increase the goals and results to be achieved in the field of innovative entrepreneurship. With a strong and synchronized performance with universities, science and technology institutes, the S system and other state actors, the state achieved record numbers in the first wave of the program. Espírito Santo was the state with the largest number of ideas submitted in the entire country, as well as the one that hired the most companies, voluntarily providing financial resources that allowed 53 projects to be supported, 82% more than Paraná, the second state that hired the most."

MARCELO CAMARGO
SUPERINTENDENT OF APPLIED RESEARCH AND TECHNOLOGICAL DEVELOPMENT AT FINEP

PHOTO: FINEP

One of the startups supported by Centelha, Jade Autism, believes that innovation can transform lives. The company uses technology to help children and adolescents with autism and other cognitive disabilities and has already won international awards [38]. Using a mobile app, the child interacts with the screen through a game while the system collects data about their behavior. With this information, the system encourages the player to make associations with everyday images, such as animals, numbers, letters, objects, and colors. All of this data is then used to send reports to the psychologists of these children and adolescents, which enables more effective treatment [38].

In 2020, Jade Autism received an award in the category of Best Social and Environmental Impact at the Supernova Challenge in Dubai, United Arab Emirates [38]. In 2023, the startup won the biggest prize at Web Summit Rio, which is considered the largest innovation and technology event in the world [39].

Jade Autism has already won international awards
PHOTO: ADVERTISEMENT

In order to regionalize innovation activities, in 2023, FAPES launched a version similar to the Centelha Call for Proposals in the Central-Western Region of Espírito Santo, called the Gênesis Program.

The aim of this Call for Proposals is to stimulate the development and competitiveness of the entrepreneurship and innovation ecosystem in the Central-Western microregion of Espírito Santo, making it a reference in the state and regional economy through technical and financial support for innovative solutions with the potential to become technology-based ventures or startups with a high local socioeconomic impact, stimulating the birth and maturation of new businesses [40].

IMPACT BUSINESSES

Following the Innovation Trail, entrepreneurs from Espírito Santo can benefit from the Socio-Environmental Impact Business Program (NIS). Its objective is to support businesses with a socio-environmental impact by granting economic subsidies (non-reimbursable resources) in order to strengthen the Espírito Santo ecosystem of impact businesses, promoting the development and/or improvement of innovative products (goods or services) and/or processes, aiming to solve or reduce socioenvironmental problems in the state.

Sustainable architecture that generates clean energy and comfort for users. This is the proposal of the sustainable bus stop opened by the Espírito Santo startup Endelevo in the Ilha do Príncipe neighborhood, in Vitória. The shelter is located in the Ilha do Príncipe neighborhood and has solar panels on the roof, in addition to a wind turbine. The clean energy generated powers devices so that users can charge their cell phones while they wait for the bus. Behind the bus stop, climbing plants were planted near a fence to generate greater thermal comfort in the space.

The company was born from FAPES' Centelha Program and follows the innovation trail of a startup, expanding its business. Through the financial support of R$ 70 thousand received in the Call No 09/2022 – Support for Innovative Socioenvironmental Impact Businesses in Espírito Santo, Endelevo developed the sustainable bus stop project.

" FAPES, through the Call for Proposals for Support for Businesses with Socioenvironmental Impact, made it possible to financially implement the Endelevo Regenerative Support pilot project. This is a concept applied to a bus shelter that consists of plant-based sunshades integrated with solar and wind systems to generate decentralized clean energy that, in the case of the bus shelter, lights the shelter and provides power to recharge cell phones. In addition, the energy generated enables the installation of security systems and informative and interactive advertising totems, allowing for the transmission of updated bus schedules and real-time communication with the sectors responsible for local security during times of greatest vulnerability."

JOÃO VITOR VALDO FREIRE
EXECUTIVE DIRECTOR OF ENDELEVO

PHOTO: JOAO VITOR VALDO FREIRE'S PERSONAL ARCHIVE

The bus stop is a prototype developed by Endelevo, through Call for Proposals No. 09/2022 for Support for Innovative SocioEnvironmental Impact Businesses in Espírito Santo

PHOTO: ENDELEVO

The resources made available for the execution of the NIS come from the Espírito Santo State Science and Technology Fund – Espírito Santo Innovation Mobilization (Funcitec/MCI). The investment earmarked for the Program was R$3.1 million, of which R$2.1 million has already been allocated in the 1st cycle, in 2022.

In the first cycle, 27 projects were awarded a 12-month deadline to execute their proposals. Of the 27 startups that received up to R$70,000 each to develop their projects, 23 completed their solutions to socioenvironmental problems within the stipulated 12-month deadline. In April 2024, they participated in the evaluation that selected the projects for the 2nd cycle. As a result, 13 startups were awarded up to R$100,000 and completed their projects within one year. FAPES's Innovation Director, Elton Moura, is responsible for launching the call and stated that one of the objectives of the unprecedented public call is to solve or reduce socioenvironmental problems in the state.

ACCELERATING WITH INNOVATION: SEEDES

One of the goals established in the Innovation Manifesto of the Espírito Santo Mobilization for Innovation (MCI) is to have 1,000 startups residing in Espírito Santo by 2030. In this sense, the Startup and State Entrepreneurship in Development in Espírito Santo (Seedes), the first Espírito Santo startup acceleration program, aims to strengthen up to 30 startup projects of various businesses in the operational or development phase, supporting entrepreneurs who want to develop them in the State of Espírito Santo, thus contributing to the achievement of the goal established by the MCI.

The Program was launched in June 2022, through Call No. 13/2022. The objective of the call is to select startups with innovative ideas, products or services that are already operating and maturing, but that need resources and support.

In this call for proposals, Seedes offered six months of acceleration through mentoring, training, dissemination, immersion and networking activities, in order to develop the entrepreneurial mindset of the partners of the businesses involved in the Program. Up to R$100,000 was also made available for each project. The investment in the Call for Proposals was R$3 million, from Funcitec/MCI. The acceleration of the 30 startups was carried out by IEBT Innovation, a Minas Gerais company that also carried out the acceleration of the SeedMG Program.

Of the 30 accelerated startups, 13 were from five different states: Minas Gerais, Rio de Janeiro, São Paulo, Rio Grande do Sul and Pernambuco. From Espírito Santo, there were 17 startups from five cities: Vitória, Vila Velha, Serra, Aracruz and Cachoeiro do Itapemirim. The 30 companies had a combined revenue of R$9.7 million during the six months of acceleration in the Program and employed 107 people. They also attracted R$600,000 in investments during the acceleration process.

"The ecosystem needs to have the entire cycle that a startup goes through, from the birth of an idea to the process of scaling the startup to make it strong in the market. And Seedes offers this process. Acceleration is the period in which the startup, which needs support to get out of that initial business process, can actually scale its product or service and make a profit, generating jobs. This means economic development for Espírito Santo and for the country." [41]

DENIO ARANTES
FORMER PRESIDENT DIRECTOR

PHOTO: FAPES COMMUNICATIONS OFFICE

" We worked based on our experience, but in a very intuitive way. And now, after Seedes, with the mentoring, lectures and workshops, we know that methodologies are very important to carry out our work in a more agile and efficient way, being essential for the success of our startup." [41]

RONEY ELIAM
CEO OF THE ESPÍRITO SANTO STARTUP MULTIFIDELIDADE

PHOTO: RONEY ELIAM'S PERSONAL ARCHIVE

" We receive a series of information, emotions and experiences that we digest throughout the process, to then apply them in practice and reap the results. But I think the greatest lesson is to have the humility to look inside our business, see the mistakes and weaknesses and work on them later." [41]

PHOTO: GUILHERME LONGO'S PERSONAL ARCHIVE

GUILHERME LONGO
FOUNDER OF THE MINAS GERAIS STARTUP BUSKAR.ME

Representatives of startups during the workshop "Seedes: Cap Table Definition", held from April 24 to 28, 2023
PHOTO: ADVERTISEMENT

PITCH GOV

A partnership between the Secretariat of Management and Human Resources (Seger) and FAPES resulted in the creation of the Pitch Gov.ES Program. It takes place within the scope of the Laboratory of Innovation in Management (LAB.ges), of Seger, and was launched with the objective of uniting government and startups with the purpose of generating innovation and providing solutions to challenging issues related to public management [42].

The idea for the creation of this program arose during collaborative workshops that included the participation of civil servants who raised a series of issues in various areas that deserved greater attention. Thus, startups from all over Brazil can suggest solutions to various challenges through a public call for proposals. The investments for this program come from Funcitec, with MCI acting [42].

In 2021, the State Government, through Seger and FAPES, and the Brazilian Association of Startups (ABStartups) launched the open innovation competition, with the results of the 15 selected startups announced on May 14 [43].

The call for proposals was to select startups that would test the solutions they proposed for the 16 challenges listed by the public administration of Espírito Santo [43]. The competition received 445 proposals from startups from various states in the country.

"This is a culture that we are implementing in our state. We need to know how to identify what we need, because agencies are not always able to identify all the solutions. That is why it is important to launch this challenge so that we can solve the bottlenecks and become an increasingly competitive state." [43]

RENATO CASAGRANDE
STATE GOVERNOR

PHOTO: HÉLIO FILHO/SECOM

" Beyond the importance of the result, which is indeed fundamental, after all, having startups working together with the Government is a totally innovative initiative, it is worth noting that, at the beginning of the process of implementing the Program, the Government agencies were forced to think about their ways of working, about the efficiency generated in their agencies and, from this, seek to summarize what their problem was through a question that could be answered with a technological solution developed by a startup. This was also a fundamental exercise for the evolution of the State Government." [43]

CRISTINA ENGEL
FORMER PRESIDENT DIRECTOR

PHOTO: FAPES COMMUNICATIONS OFFICE

"Here we have the Espírito Santo Mobilization for Innovation (MCI), which unites the Academia, the State Government and the productive sector. This model guarantees a solid construction of the ecosystem, with the Fund to Finance Innovation, Funcitec/MCI, being an important ally of companies in the development of projects. This dialogue between various actors has been very productive and is something that is already rooted in Espírito Santo. We will continue with this synergy between the Federation and the public authorities."

CRIS SAMORINI
PRESIDENT OF THE FEDERATION OF INDUSTRIES OF ESPÍRITO SANTO (FINDES)

PHOTO: GILVAN GONÇALVES

ENVIRONMENTS THAT PROMOTE INNOVATION ARE SUPPORTED BY FAPES

SUPPORT FOR INCUBATORS

When FAPES was created in 2004, the state had the TecVitória Business Incubator – created in 1995, as seen in chapter 1 –, which has always been a partner of FAPES in its actions. In 2008, TecVitória had expertise in incubation activities and, through financial support from FAPES, supported the implementation and start of operations of IFES Serra Campus Incubator.

In the following years, with the expansion of IFES and UFES to the interior of the state, the network of incubators grew in Espírito Santo and FAPES has always been a fundamental partner in structuring the incubated centers [44].

Among these cases, researchers from IFES and UFES, when studying the evolution of IFES incubators and the development of the innovation ecosystem in Espírito Santo, concluded:

[...] the IFES budget alone would not have the capacity to structure, maintain, and provide for the growth of a business incubator, with the contribution of the state government being fundamental to its growth process. In this sense, since its foundation to the present date, the partnership of more than 10 years between the Federal and State spheres of government was found to be positive by this research [44, p. 104].

With the aim of ensuring the sustainability of financing for business incubators in all institutions in Espírito Santo, FAPES published Resolution No. 301, dated January 27, 2022, which regulates the granting of scholarship quotas to support the management and development of business incubators in the state of Espírito Santo [45].

SUPPORT FOR TECHNOLOGICAL INNOVATION CENTERS (NIT)

In 2006, FAPES launched a challenge to promote the institutionalization of STI activities in Espírito Santo, with the aim of stimulating the management of Technological Innovation in Teaching and/or Research Institutions based in the State, through financial support for the structuring and/or consolidation of their Technological Innovation Centers (NITs).

FAPES supports the three Technological Innovation Centers originating from public scientific and technological institutions in Espírito Santo, namely IFES' Innovation Agency (Agifes/IFES), UFES' Technological Innovation Institute (Init/UFES) and the Incaper's Technological Innovation Center.

Initially, financial support for these Centers was provided through public calls and today FAPES supports these institutions through the Network Program of State Technological Innovation Centers, which was established by FAPES Scientific-Administrative Council Resolution No. 283, of January 21, 2021. In two years of operation, this program has proven to be fundamental in promoting the integration of the different NITs in the State, fostering innovation and technology transfer [46].

INNOVATION SUPPORT CLUSTERS

With the aim of strengthening the Espírito Santo innovation ecosystem, FAPES launched, in 2022, Call for Proposals 26/2022, a public call for Support for Espírito Santo Innovation Clusters. The idea is to offer support to clusters located in the interior region of the state. Economic clusters are groups of companies that have similar characteristics or carry out similar activities in the same geographic area.

The result of this call was announced in April 2023 and resulted in 24 proposals being selected in eight microregions of Espírito Santo. The expected resource, in the order of R$2.8 million, comes from Funcitec/MCI. This financial support will be made available through an economic subsidy.

"Economic clusters are geographic concentrations of interconnected companies and institutions with similar or complementary capabilities. The purpose of this call for proposals is to encourage the competitiveness of the sectors that make up these clusters, distributed throughout the microregions of Espírito Santo, with the exception of the Metropolitan microregion, in order to make them a state and regional economic reference, through support for startup projects that develop innovative solutions for business and government challenges common to a given microregion." [47]

ELTON MOURA
DIRECTOR OF INNOVATION AT FAPES

PHOTO: FAPES COMMUNICATIONS OFFICE

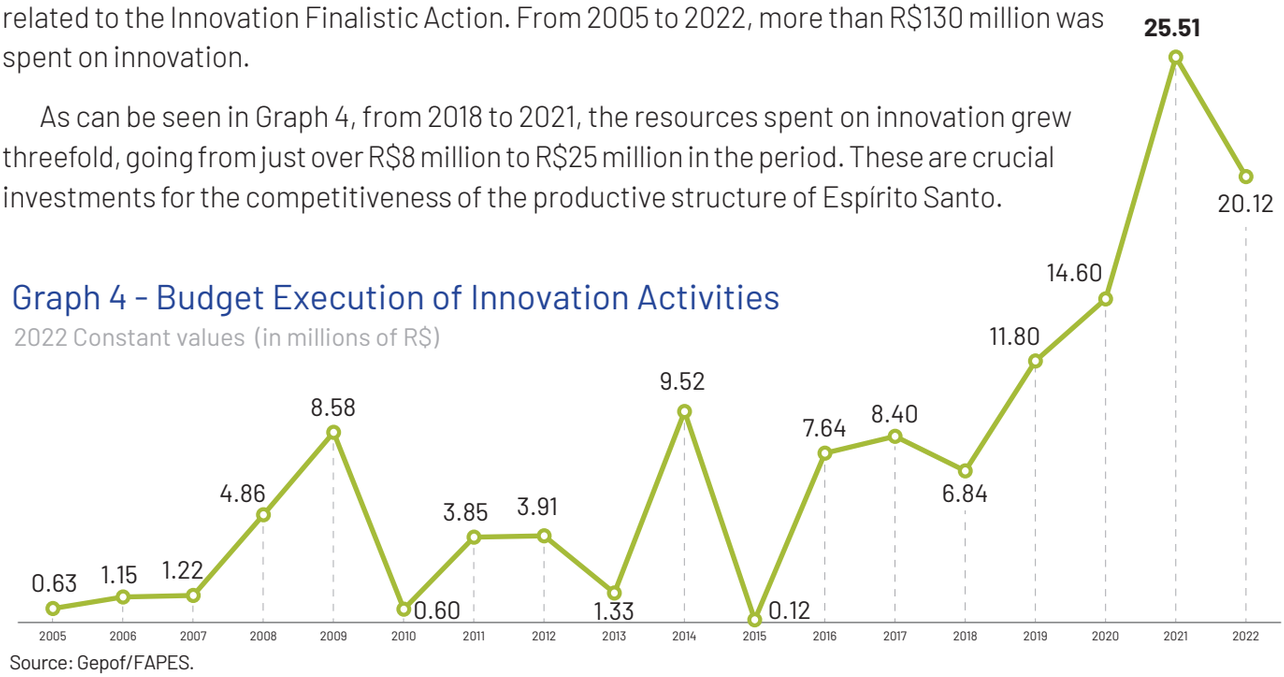
INNOVATION NUMBERS

The information presented in this section demonstrates the growth of FAPES activities related to the Innovation Finalistic Action. From 2005 to 2022, more than R$130 million was spent on innovation.

As can be seen in Graph 4, from 2018 to 2021, the resources spent on innovation grew threefold, going from just over R$8 million to R$25 million in the period. These are crucial investments for the competitiveness of the productive structure of Espírito Santo.

Graph 4 - Budget Execution of Innovation Activities

2022 Constant values (in millions of R$)



Source: Gepof/FAPES.

In light of what has been observed so far, FAPES's journey in promoting innovation in Espírito Santo demonstrates a continuous and growing effort to integrate scientific and technological research into the productive sector. Despite initial challenges, such as low demand for the resources offered, persistence and extension efforts resulted in programs that fostered the creation and strengthening of innovative companies. As explained in this section, FAPES's support facilitated the technological evolution of companies in Espírito Santo and contributed to the sustainable development and competitiveness of the State.

EXTENSION

EXTENSION: UNITING TEACHING, RESEARCH AND SOCIETY

Since its creation, FAPES has supported projects that have an interface with community outreach. However, the most recent restructuring of FAPES, brought about by Complementary Law No. 978, of October 4, 2021, inaugurated not only organizational changes, but also incorporated a new finalistic action into the institution's DNA: extension.

It is present throughout the legislation and goes hand in hand with innovation, in the understanding that both complement each other in promoting scientific and technological development in Espírito Santo.

As will be seen below, the creation of the Innovation Directorate (Dinov) and the Center for Strategic Programs and Extension (Nupex) boosted strategic government and academic extension projects.

Dinov was created based on this new law and, linked to it, Nupex was established, with the purpose of serving the government's strategic extension projects and projects in general. This center is responsible for the Nossa Bolsa Program, the Espírito Santo Open University (UnAC) and the Technological Extension Call, which had its first public call launched in June 2023. Nupex also coordinates the Universal Extension Call, which, by the way, inaugurated FAPES's work with extension activities as of Call 12/2022 – Universal Extension.

The objective of this call is to provide resources for extension projects linked to Higher Education and/or Research Institutions (IES/P). They need to contribute to the reduction of social disparities, providing socioenvironmental or economic development in several microregions of Espírito Santo.

FAPES made R$5 million available, from Funcitec, to financially support the projects contemplated in Universal Extension Call 12/2022. In all, 104 of the 270 proposals submitted were approved [48], but in the end, 103 projects were contracted.

Figure 8 shows the thematic areas to which these projects can be aimed.

FIGURE 8 - THEMATIC AREAS OF ACTION OF THE PROJECTS

Source: Prepared by the author based on data from Call 12/2022 – Universal Extension.

The main results that this Call for Proposals seeks to achieve are to empower local communities, promote public health and stimulate entrepreneurship. "The Universal Extension Call for Proposals stimulates innovation and creativity in addressing social problems, encouraging the search for practical and effective solutions. Through these projects, the people of Espírito Santo benefit from initiatives that promote sustainable development, social inclusion, improved quality of life and strengthening of citizenship"[49].

Head of Nupex, Ana Maria Marques de Oliveira, highlighted the impact of the Universal Extension Call on local communities
PHOTO: FAPES COMMUNICATIONS OFFICE

One of the results of this call for proposals can already be observed in communities of rural producers in the municipality of Santa Leopoldina, in the interior of Espírito Santo. The project is called "Agricultural training plan for the preservation of the genetic and socioeconomic heritage of producers of Ginger from Espírito Santo", coordinated by researcher Ana Paula Candido Gabriel Berilli.

The project aims to provide solutions to farmers in Espírito Santo who face problems in their crops, such as low production and high incidence of diseases, which directly affect the sale of ginger on the foreign market. "The agricultural training plan for ginger farmers aims to strengthen a habit among producers, which is to work on the issue of good management of ginger crops. The ginger chain has been suffering from the incidence of diseases in crops and, to combat this problem, in addition to the genetic improvement program, there is also a very important focus on crop management. We felt the need to provide an update on knowledge, reviving for farmers the importance of simple habits that can make all the difference in the quality of the ginger they harvest."[50].

Producer benefiting from the project during the ginger harvest, in Santa Leopoldina (ES)
PHOTO: MICHELLI POSSMOZER

This project, in addition to contributing to maintaining the state's position in the international market as the largest producer and exporter of ginger in the country [51], should benefit approximately one thousand families throughout the state, who survive from the cultivation and sale of the product.

"This project, funded by FAPES, was of fundamental importance enable us to assist these producers. Our research group has a strong focus on developing applied research projects, but we were already feeling the need to make this research reach those who actually use its results. The Extension Call for Proposals came to collaborate in a very important way to carry out this technology transfer."

ANA PAULA CANDIDO GABRIEL BERILLI
PROJECT COORDINATOR

PHOTO: ÉRIKA LEAL

Among the specific objectives of the Universal Extension Call is to "enable new means and processes of production, innovation and provision of knowledge, allowing for the expansion of access to knowledge and to technological and social development in Espírito Santo" [52]. The transformation of animal waste into cooking gas and organic material in Linhares, in the northern region of the state, is an example of the development of 100% Espírito Santo technology. This is an experimental project by Incaper, entitled "Construction of biodigesters: source of renewable energy and biofertilizers in communities with agroecological experiences in the municipality of Linhares". The project focuses on the construction of rural biodigesters as a source of renewable energy and biofertilizers. According to the project coordinator, rural development extension agent at Incaper Daniel Nascimento Duarte, the proposal for biodigesters was a demand from family farmers to address the problem of improper disposal of animal waste.

Residents gathered at the Sezínio Fernandes de Jesus settlement, in Linhares, on the Agostini family property, where a biodigester was inaugurated

PHOTO: DANIEL NASCIMENTO DUARTE

This project has been developed through Call for Proposals 12/2022 – Universal Extension and there are currently five biodigesters in operation. Three of them are in the Sezínio Fernandes de Jesus settlement, in Linhares, and two in Córrego Jacutinga, District of Farias. All of them produce cooking gas and biofertilizers. The gas is piped directly to the stoves of rural homes and is used for cooking, while the biofertilizers are destined for coffee, pepper crops and vegetable gardens. There is also a sixth biodigester scheduled to be built in 2024. This equipment has attracted the attention of neighboring municipalities, so much so that students from the Família Agrícola School from Rio Bananal have already visited one of the biodigesters, as have farmers from Jaguaré.

Through the Universal Extension Call for Proposals, we at Incaper, in partnership with rural families, Diaconia, an NGO from Pernambuco, the Small Farmers' Movement and IFES, were able to develop five biodigesters for rural areas. This social technology is widely developed in the Northeast, but little known in our region. We learned about the experience and brought it to Linhares, readapted the technology and currently have five biodigesters in the municipality, producing cooking gas and organic material for crops and vegetable gardens. This was made possible because the FAPES funding allowed financial autonomy, in addition to being less bureaucratic. Now, we need to further study the technology, evaluate the organic material generated and the economic and environmental impacts caused by the biodigesters."

DANIEL NASCIMENTO DUARTE
PROJECT COORDINATOR

PHOTO: DANIEL NASCIMENTO DUARTE'S PERSONAL ARCHIVE

Another specific objective of the Universal Extension Call for Proposals is to "stimulate technological extension activities, the development of which involves multi-, inter-, and/or transdisciplinary relationships between academic, research, and business sectors with society" [52]. A project created by researchers from UFES in partnership with the Women's Association for Education and Fight against Cancer (AFECC) located in Vitória (ES), approved in the Call, represents the dialogue between academia and other social sectors.

They developed the physical platform DigiPATH, which functions to accelerate the diagnosis and treatment of cancer patients. This equipment was launched in June 2023. It "digitizes images of tissue samples (biopsies) from glass slides used for analyses and, by making the images available, allows doctors anywhere in the world to view the material and assist in diagnosis" [47]. The platform was purchased with financial support from the HEADSpAcE project, which investigates cases of head and neck cancer in South America and Europe.

The technology was developed by researchers from UFES in partnership with AFECC and is available to any pathologist or public educational and assistance institution interested in the platform. In the first month after its launch, approximately 200 analyses of complex cancer cases were conducted [48].

"The Digital Pathology Platform allows different healthcare professionals and research centers from anywhere in the world to engage, evaluate and collaborate quickly and remotely, achieving greater efficiency and productivity in analyses. Using this technology, more complex cases that require a second opinion for diagnosis can be evaluated by another professional, ensuring a faster and more effective diagnosis."

SANDRA VENTORIN VON ZEIDLER
PROJECT COORDINATOR

PHOTO: SANDRA VENTORIN VON ZEIDLER'S PERSONAL ARCHIVE

Another project funded by FAPES through the Universal Extension Call for Proposals that brings benefits to the people of Espírito Santo is the study developed by UFES, which aims to improve the heart health of women who are in menopause. The research, entitled "Effects of acupuncture treatment on arterial hypertension and markers of oxidative stress on the evolution of cardiovascular diseases in women in menopause", is coordinated by Glaucia Abreu, PhD in Physiological Sciences.

The study received approximately R$50 thousand through the Call for Proposals to be used over the course of a year, and the testing phase began in June 2023. The project will use acupuncture treatment as a potential ally to care for women who have developed cardiovascular diseases during menopause, which can be the result of psychological and organic changes, in addition to ovulation disturbances. The aim of the study is to monitor 80 patients from the Cassiano Antonio Moraes University Hospital (Hucam), divided into ten groups, with each patient having a 20-minute session [53].

"Our goal is to reinforce public health policies for the agents who develop them, showing the need to expand the acupuncture technique at this specific time in life when cardiovascular diseases bring so many problems, including death. FAPES' support has been fundamental in the execution of these projects."

GLAUCIA ABREU
PROJECT COORDINATOR

PHOTO: GLAUCIA ABREU'S PERSONAL ARCHIVE

Among the projects approved in this call for proposals is also the "Social emancipation based on food sovereignty", which consists of actions involving social technologies for community mobilization and organization, developed by residents of Jesus de Nazareth, in Vitória (ES), to stimulate productive backyards in the neighborhood. According to IFES professor Leonardo Bis, who coordinates the project, the idea of this initiative is to distribute the necessary materials and provide technical assistance for the production of family gardens with residents who voluntarily want to participate, training them to carry out the project [54].

Residents of the Jesus de Nazareth neighborhood learned how to produce vegetable gardens in a project supported by FAPES

PHOTO: LEONARDO BIS

In Brazil, the pandemic has led to an increase in hunger and poverty indicators in the country. In this sense, this project aims to build alternatives to enhance the autonomy of healthy food production, as well as enable nutritional reeducation in communities in situations of social vulnerability, such as the Jesus de Nazareth community." [54]

LEONARDO BIS
PROJECT COORDINATOR

PHOTO: LEONARDO BIS/PERSONAL ARCHIVE

The 103 approved projects received a total amount of R$4,961,753.50 and are distributed across 12 higher education institutions: Cetem, Emescam, Esfa, FAACZ, Faesa, ICEPi, IFES, Incaper, Multivix, UFES, Unisales and UVV.

UNIVERSAL EXTENSION CALL FOR PROPOSALS:

103
PROJECTS

INVESTIMENT OF
R$ 4.9
MILLION

The implementation of Complementary Law No. 978 represented a turning point for FAPES, given that the creation of Dinov and Nupex resulted in the institution playing a key role in the execution of strategic projects in the area of extension. The success of the Universal Extension Call reinforces FAPES' commitment to the socioenvironmental and economic development of Espírito Santo, in addition to highlighting the transformative potential of these projects in several communities in Espírito Santo. The experimental projects developed in Santa Leopoldina, Linhares and Vitória are examples of the significant impact that collaboration between academia, the public sector and local communities can bring about.

FAPES' FINALISTIC ACTIONS: SOCIAL IMPACT AND TRANSFORMATION

The projects highlighted here are just a small sample of the universe of actions that FAPES has been developing over the past 20 years in Espírito Santo. As seen throughout this chapter, the projects promoted by the institution play an important role in strengthening the academic community and promoting scientific and technological research and innovation. FAPES' work as a funding agency has brought innovative solutions to problems in several areas and, as a result, has had a direct impact on the population. In the research area, the institution's support for the development of applications that help monitor diseases and the promotion of calls for proposals aimed at women are examples of how FAPES has sought to keep up with new technologies and foster the development of projects based on a policy of gender equality and inclusion.

Although the process of scientific dissemination faces some challenges in the Brazilian reality, as seen in the finalistic action of Dissemination of Knowledge, FAPES has directed actions to disseminate the results of the research and projects it funds. Among these are support for the publication of scientific articles, as well as for the promotion and organization of scientific events and for the popularization of science. Holding these events is important because it is where researchers exchange ideas at national and international levels, which projects the scientific production of Espírito Santo to other states and countries. In this context, it is worth highlighting the importance that the television program "TV é Ciência" had in publicizing research conducted in the state and in raising awareness among the population about the relevance of science in everyday life. It is possible to affirm, then, another fundamental role of FAPES, which is to act in the democratization of science and in the appreciation of the work carried out by researchers. It is not only about attributing value to scientific communication, but also about making the knowledge produced easily accessible to the population.

In the finalistic action of Human Resources Training, FAPES emerges as an institution that values the training of people. Through programs such as PIC Jr, Procap, Profix and Nossa Bolsa, FAPES awakens scientific and technological vocations, in addition to providing opportunities for professional growth to students of different educational levels. As highlighted in this chapter, the partnerships that FAPES seeks to establish with CNPq and Capes in favor of human resources training tend to strengthen the scenario of valuing people, who are the core of public policies for STI, since there is no way to make progress without people. In this sense, the Espírito Santo Research State Funding Agency has been fulfilling its role of acting as an agent encouraging knowledge and skills.

In the finalistic action of Innovation, FAPES identified, in 2006, the need to promote the union between academia and the productive sector in the development of innovative technological projects, with the Technological Partnership call. Since then, there have been many

calls and programs that follow the innovation trail, from the emergence of the idea to the consolidation of the product in the market. Investments in Innovation have already resulted in innovative technologies on the national and international markets, such as the autonomous microbus, the only solution of its kind in the Southern Hemisphere. In this sense, through Innovation calls and programs, FAPES strengthens its role of encouraging and supporting innovation activities that deliver products capable of meeting the demands of the population of Espírito Santo.

Finally, it is possible to consider that Law No. 978, of October 4, 2021, was a milestone in the history of FAPES, because in addition to changing its organizational structure, it incorporated Extension as a fundamental line of action, placing it as a complementary piece of Innovation. In this way, the union between Innovation and Extension promoted the intertwining of teaching, research and society, and has brought visible results in people's lives and in the development of the state through the Universal Extension Call. The project that provided training to ginger producers in Santa Leopoldina and the one that developed rural biodigesters in Linhares are examples of the significant impact of research funded by FAPES in Espírito Santo. From this perspective, all the projects and programs presented in this chapter represent the strengthening of the research and innovation environment in the state, including the people of Espírito Santo in this process, which are the main beneficiary of FAPES' actions.

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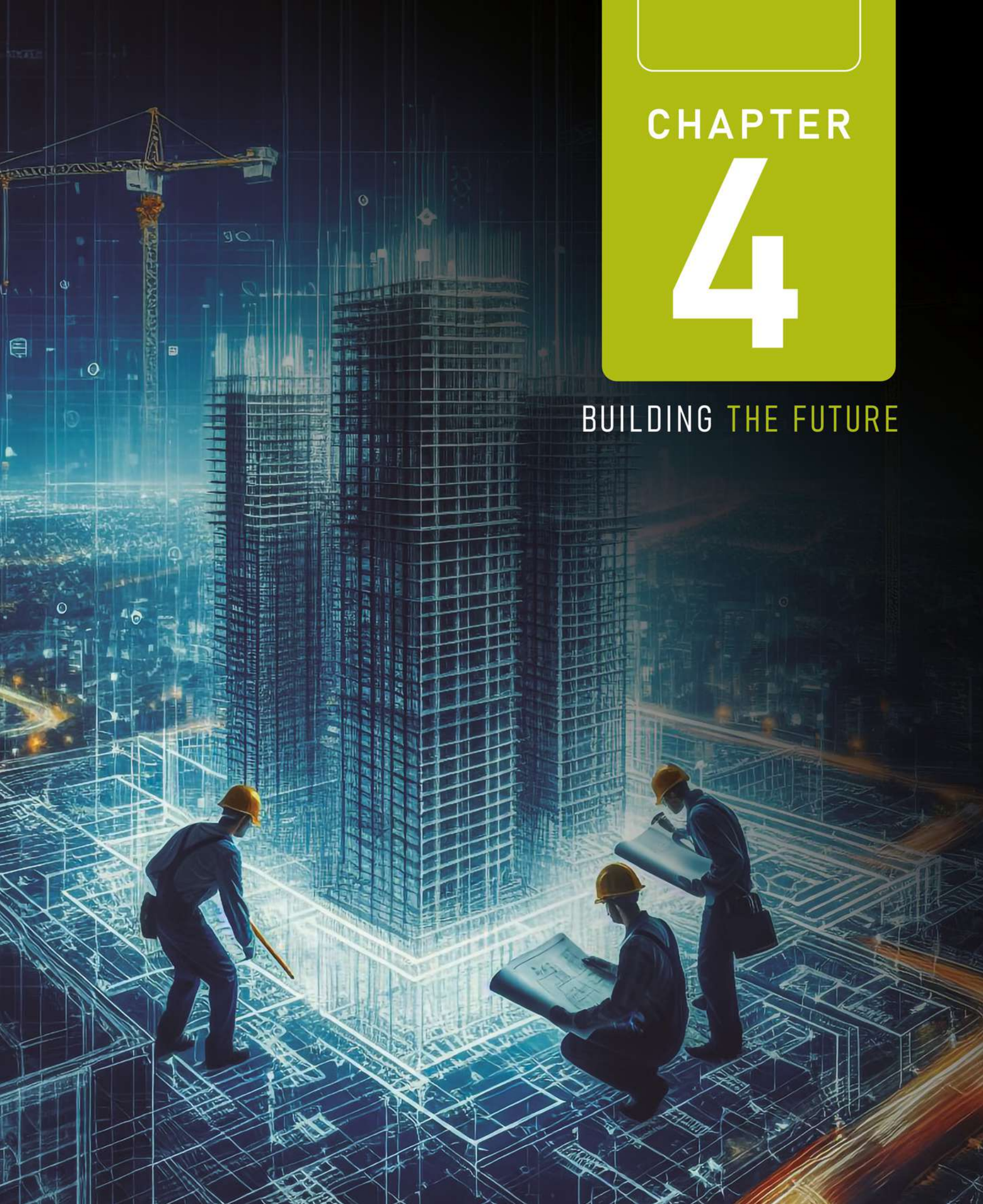


CHAPTER 4

BUILDING THE FUTURE

20 YEARS OF SCIENCE, TECHNOLOGY AND INNOVATION IN ESPÍRITO SANTO

As Fapes completes two decades of existence, its mission to "promote science, technology, innovation and extension, with the objective of integrating different sectors of society in the construction of sustainable development" [1] is reaffirmed.

Throughout this book, light was shed on the multiple actions of Fapes, which demonstrate how the institution works in line with its institutional mission.

In chapter 1, the history of Science, Technology and Innovation (STI) in Espírito Santo was outlined, culminating with the creation of Fapes in 2005, and the recent institutional milestones of STI in Espírito Santo were presented.

Chapter 2 was dedicated to the history and evolution of FAPES. The academic community's struggles to establish the 19th Research State Funding Agency in the country were presented, highlighting the fact that, at the beginning of this century, Espírito Santo was the only state in the Southeast Region that did not have its own Research State Funding Agency (FAP). This alone highlighted the challenges of advancing the state's STI policy.

Despite its relatively late creation compared to most other FAPs in the country, in just 20 years of existence, data show the leading role of FAPES in the national context. In several indicators related to investments in research activities, budget execution and investments in scholarships, FAPES is among the most successful in the country.

In Chapter 3, some highlights for FAPES were presented in its five finalistics actions: Research, Dissemination of Knowledge, Human Resources Training, Innovation and Extension. Given their importance, it is worth reviewing some points of these actions in order to highlight some achievements and challenges with a view to projecting the future of the institution.

In the Research field, Fapes was born covering all areas of knowledge through the launch of the first Public Call, Universal Call for Proposals 01/2005. A traditional call, which was already executed within the scope of CNPq and which, in 2005, was executed in Espírito Santo in an unprecedented way and with resources from Funcitec.

Still on the subject of supporting scientific research activities, since 2011, FAPES has become a key partner of the state secretariats of the Espírito Santo government, by enabling the contracting of research projects to solve local bottlenecks. Important projects have been implemented with solutions for areas such as agriculture, health, education, the environment, among others.

In line with the global challenges of the 2030 Agenda, in 2022, FAPES launched the Women in Science Call for Proposals, which supports research carried out by female scientists from Espírito Santo and contributes to achieving Sustainable Development Goal (SDG) 5 – Gender Equality. FAPES also works with the agendas of the Government of the State of Espírito Santo in the plan to regionalize development, by directing some of its calls for proposals to all ten microregions of Espírito Santo.

In the finalistic action of Scientific Dissemination of Knowledge, chapter 3 highlighted that, in its 20-year history, Fapes has financially supported the organization of 737 events in Espírito Santo and another 729 projects for participation in events, in addition to supporting scientific publications.

In times marked by debates of all kinds on social media, scientific dissemination activities become crucial. In this regard, FAPES' activities stand out as a protagonist in supporting the scientific dissemination of knowledge in the state.

In the field of Human Resources Training, FAPES has emerged with the concern to contribute to the training of professionals at all levels in Espírito Santo. The program that stands out in this action is Nossa Bolsa. As shown in the previous chapter, based on data from Nupex/FAPES, the program has already trained more than 10 thousand students in the most diverse higher education courses at private universities in the state.

Among the institution's outstanding human resources training programs, the following stand out: PIC Junior, aimed at middle and high school students, and Procap, aimed at graduating masters and doctors.

Over the past 20 years, postgraduate programs have become more established in the state, especially in terms of the number of courses offered. Today, the biggest challenge is to improve the quality of all programs in Espírito Santo, in order to achieve a level of excellence in various areas of knowledge. Given the funding activities carried out by FAPES, it is clear that the institution is a key player in this endeavor.

In the field of Innovation, it is clear that the creation of Fapes coincided with the creation of the Brazilian Innovation Law. From the beginning, the institution enabled the execution of the most diverse federal programs in the State, such as the Human Resources in Strategic Areas Program (RHAE), the Economic Subsidy for Innovation (PAPPE and Tecnova) and, more recently, Centelha.

Despite all the efforts made by FAPES and its partnerships with local stakeholders, it was also indicated that our innovation ecosystem needs to become more mature. Regarding its innovation indicators, it is observed that, although Espírito Santo is in an embryonic position in relation to neighboring states, the state has made consistent progress in recent years.

Espírito Santo currently has important mechanisms to stimulate the development of innovative activities. Since 2018, it has had the Funcitec/MCI subaccount – Espírito Santo Mobilization for Innovation –, which has permanent resources from the State Government for this area.

The creation of the Innovation Directorate in 2019 was a landmark act, given that, in practically all the calls launched in this area in the last five years, Espírito Santo obtained a prominent position, especially in the execution of the Centelha Program.

From the business ideation to the scaling phase, FAPES supports startups from Espírito Santo, in addition to stimulating environments that promote innovation in the state. This action has increased expectations about the innovation activities carried out by the agency in Espírito Santo and, therefore, it is expected to increase its results in the coming years.

Finally, Fapes' most recent finalistic action is Extension. Its main objective is to strengthen the work of the Espírito Santo agency, so that science, technology and innovation produced in the state

reach the population. Fapes has already launched two editions of the Universal Extension Call for Proposals and, in view of this, it is assumed that this area will increasingly gain prominence among the actions carried out by the Agency.

It is worth highlighting that all of Fapes' achievements were only possible because the institution has a qualified technical team, which invests in improving the organizational climate and its processes.

In order to monitor the results of the five finalistic actions and assist in directing future actions, Fapes prepared its Strategic Plan, which will allow readers to understand the organization's vision for the future, the main elements of which will be identified below.

STRATEGIC PLANNING

Strategic Planning is an administrative process that provides methodological support to establish the best direction for the organization to follow, acting in an innovative and specialized way [2]

Public and private institutions use different methodologies to develop their strategic plans in order to guide the future of their organizations. Fapes has a Local Office of Processes, Projects and Innovation (ELPI), which, involving the institution's entire team, developed the Strategic Plan, using principles of the Design Thinking Methodology, which is a people-centered approach to innovation.

The justification for using this methodology is that it enables the institution to achieve an innovative organizational culture, which is more agile and efficient in executing processes with greater participation and engagement of the institution's employees [3]. To prepare its Strategic Plan, FAPES initially used the SWOT Matrix to understand the institution's weaknesses and strengths [1]. From there, it was possible to collectively establish its mission, vision and values, as can be seen in Figure 1.

Figure 1- Mission, Vision and Values

MISSION

To promote science, technology, innovation, and extension through partnerships and promoton initiatives aimed at integrating various sectors of society to foster sustainable development in Espírito Santo

VISION

To be a central actor in the construction of an equitable, democratic and competitive society, with knowledge and innovation as the pillars of sustainable development in Espírito Santo.

VALUES

- **Competence** = ability to perform a task or function quickly.
- **Collaboration** = the act of producing or doing something together.
- **Diversity** = recognize, respect and value the richness that arises from the differences between people and groups.
- **Ethics** = set of rules and precepts of a value-based order that guide the behavior of employees.
- **Innovation** = implementation of something new or a significant improvement of something already existing.

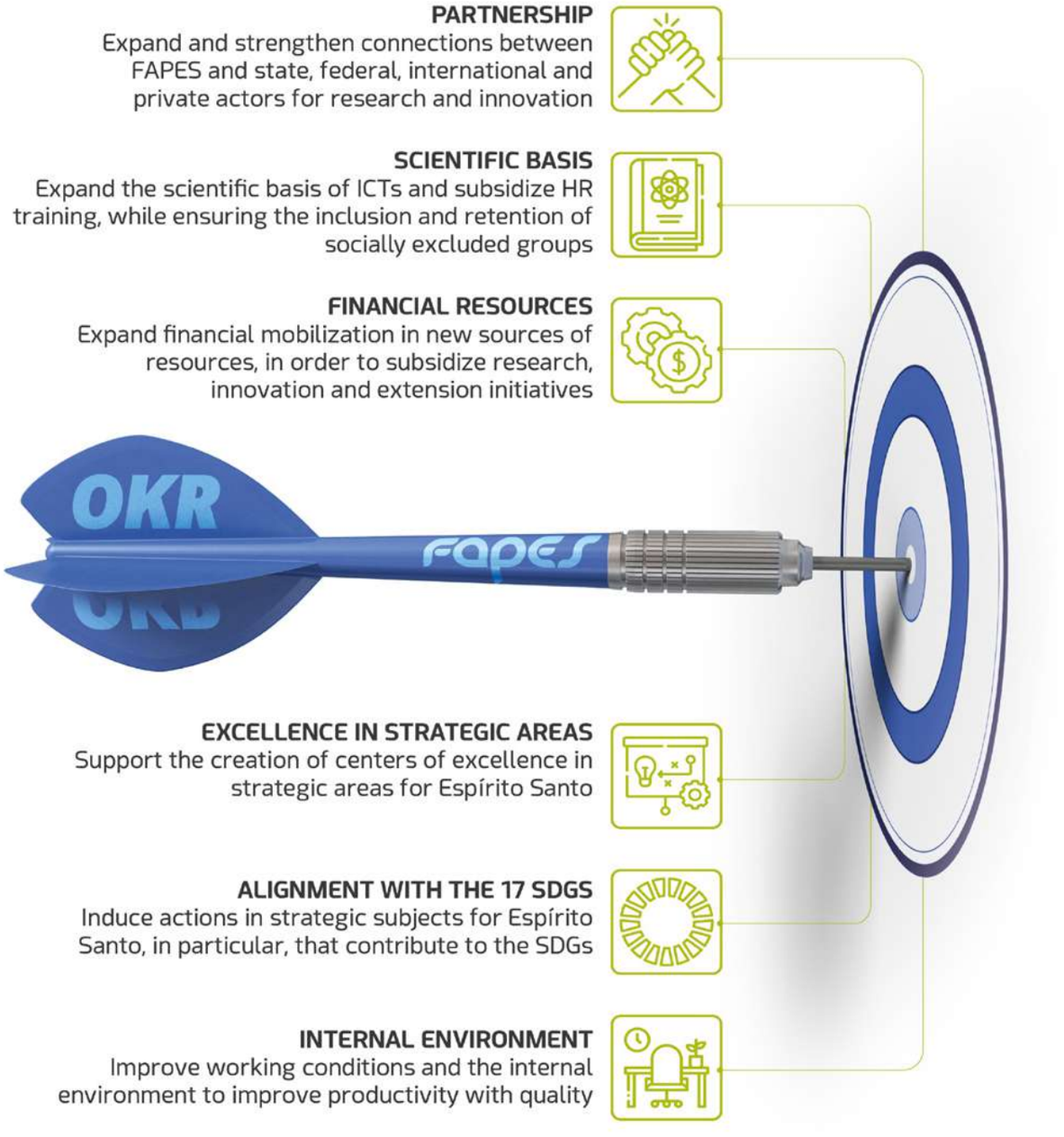
Source: Fapes (2023) [1].

A LOOK INTO THE FUTURE

Looking into the future involves developing strategic objectives aligned with the institutional mission and its values, which, according to Figure 1, are competence, collaboration, diversity, ethics and innovation.

Strategic objectives are related to results that express the organization's vision for the future, which is "to be a central player in the construction of an equitable, democratic and competitive society, with knowledge and innovation as pillars of the sustainable development of Espírito Santo"[1]. It is with this concept that Fapes' Strategic Planning established six Objectives and Key Results (OKRs) as shown in Figure 2.

FIGURE 2 - FAPES OBJECTIVES AND KEY RESULTS



Source: Prepared based on information from the Local Office of Processes, Projects, and Innovation (ELPI/FAPES)

By establishing as a strategic objective "to expand and strengthen connections between Fapes and state, federal, international and private actors for research and innovation" [1], the institution is committed to building bridges that connect innovative researchers and entrepreneurs from Espírito Santo with the country and the world.

As highlighted by the Director of Innovation at FAPES in his opening message to this work, by building bridges, the institution is not only connecting organizations and people, but also creating a globally integrated research and innovation ecosystem. This ecosystem is essential for facing the challenges of the future and transforming our discoveries into concrete solutions that benefit society as a whole [4].

In this scenario, internationalization emerges as a fundamental strategic axis to achieve goals and strengthen Espírito Santo's position in the national and global scenarios. FAPES is committed to directing its actions towards establishing partnerships that enable the internationalization of scientific research and innovation.

Next, with strategic objective 2 – "expand the scientific base of ICTs and subsidize HR training, ensuring at the same time the inclusion and permanence of socially excluded groups" [1] , Fapes will be contributing to the state policy of distributing the benefits of development to all Espírito Santo residents, as established in the Sustainable Regional Development Plan [5].

In this sense, in addition to reviewing legislation to favor the inclusion and permanence of socially excluded groups; attracting and retaining doctors and post-doctorates not yet linked to an ICT for non-academic work, Fapes has as a strategic policy the stimulation of the regionalization of scientific research and innovation [1].

The third strategic objective deals with the resources that Fapes needs to mobilize to achieve its goals, which are related to "expanding financial mobilization in new sources of resources, in order to subsidize research, innovation and extension actions" [1].

The Agency has traditionally been present in the main national Public Calls for the capture of contributions for STI and all the efforts made over the years qualify it to project a vision of the future aimed at seeking increasingly diversified sources, in order to meet its finalistic actions.

Understanding that the future depends on the recognition and ongoing support of strategic areas, Fapes developed its fourth strategic objective, which is to "support the creation of centers of excellence in strategic areas for Espírito Santo" [1].

The world is facing the greatest technology that humanity has created, artificial intelligence [6], and this is a strategic area for the development of the State, together with studies on decarbonization and energy transition, as highlighted by the Governor of the State of Espírito Santo during an interview for the preparation of this book [7]. FAPES has the role of articulating human and financial resources for the development of these areas in the state of Espírito Santo.

In this scenario, attracting high-level experts with international reputations in the strategic areas of Espírito Santo and supporting collaborative laboratories, engaging experts in strategic themes and integrating activities from the public, private and civil society sectors, are results to be achieved by Fapes [1].

In addition to the strategic subjects for Espírito Santo, FAPES, as a global institution, needs to be aware of the SDGs. In view of this, the Agency developed the strategic objective "to encourage actions on strategic subjects for Espírito Santo, in particular, that contribute to the SDGs" [1]. In this sense, FAPES hopes to support strategic themes for local development that contribute to the SDGs.

Fapes is clear that, in order to achieve its strategic objectives, it is necessary to "improve working conditions and the internal environment to improve productivity with quality" [1], which is the institution's sixth strategic objective.

The people of Espírito Santo are eager for FAPES to provide support services for STI activities in an increasingly qualified manner, which will only be possible by strengthening the institution's technical team. In this perspective, the adoption of enabling technologies, the implementation of an individual development plan and internal diversity actions are results that FAPES aims to achieve in order to have a more innovative and productive technical team.

Finally, Fapes is committed to pursuing its strategic objectives with the expectation of being recognized as a "central actor in the construction of an equitable, democratic and competitive society, with knowledge and innovation as pillars of the sustainable development of Espírito Santo" [1].

"We are in an important transition. There are several events, but I would highlight the fact that we are moving towards a knowledge society. So, we need to train people to prepare for these new challenges. And the greatest challenge for Espírito Santo is to qualify people in a way that benefits our entire community and can act as protagonists in recent technological innovation."

RODRIGO VAREJÃO
PRESIDENT OF FAPES

PHOTOS: FAPES COMMUNICATIONS OFFICE

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