

Technological innovation in biobusinesses: an analysis of the public investments in the state of Amazonas

Inovação tecnológica no bionegócio: uma análise dos investimentos públicos do estado do Amazonas

Kleber Abreu Sousa¹
Weimar Freire da Rocha²
Mariana Ribeiro de Matos³
Andréia de Carvalho Silva⁴
Debora de Oliveira Sousa⁵

Resumo

O estudo realiza um esforço de revisão bibliográfica e discute de forma crítica as iniciativas do governo amazonense na promoção da inovação para a promoção de investimentos em inovação. A pesquisa mapeia os principais setores econômicos beneficiados com recursos públicos para a promoção de inovação. Os resultados da pesquisa permitem concluir que a preocupação com os interesses e preocupações das empresas regionais têm sido considerados - principalmente tecnologia da informação, fitocosméticos, e companhias alimentares – pois elas têm concorrido nos leilões públicos, nos programas de subsídios econômicos e também têm estimulado a emergência de novas companhias nos setores selecionados, promovendo a expansão tecnológica e adicionando valor aos produtos regionais.

Palavras-chave: Inovação. Investimentos públicos. Expansão tecnológica. Amazonas.

Abstract

With this work, we pretend to present, after a bibliographic review effort, a critical thinking about the initiatives of the government of the State of Amazonas in the promotion of the investments in innovation. The research maps the main economic sectors which are being benefited from the application of the public resources for promoting innovation. The results of this study allow concluding that the preoccupation and the interest of the regional companies - mainly the information technology, phytocosmetics, phytotherapy, and food companies - in running for public bids, like economic subsidy programs, may stimulate the appearing of new companies in the referred sectors and even promote the technological expansion and adding value to regional products.

Key-words: innovation; public investments; technological expansion. Amazonas.

¹ Realiza estágio pós-doutoral na Universidade Estadual do Oeste do Paraná - UNIOESTE, possui doutorado em Biotecnologia, na área de Gestão da Inovação pela Universidade Federal do Amazonas, mestrado em Engenharia de Produção também pela Universidade Federal do Amazonas, especialização em Engenharia de produção pela Universidade da Amazônia, MBA executivo em Gestão de organizações pela Universidade Federal do Amazonas e graduação em Administração de Empresas. E-mail: kleberabreu@uft.edu.br

² Doutor em Engenharia de Produção. Bolsista produtividade pela Fundação Araucária. Professor da Universidade Estadual do Oeste do Paraná. E-mail: wrochajr2000@yahoo.com.br

³ Economista, Mestranda no PPGCUL - Programa de Pós Graduação em Cultura e Território da Fundação Universidade Federal do Tocantins . mariana.ribeiro.matos@gmail.com

⁴ Historiadora, mestranda em Estudos de Cultura e Território da Universidade Federal do Tocantins-UFT. E-mail: andrea.c@mail.uft.br

⁵ Pedagoga, mestre em Administração. UFT - Universidade Federal do Tocantins. E-mail: deb.sec@gmail.com

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INTRODUCTION

According to Benchimol (2000), the State of Amazonas occupies today the position of environmental *commodities* provider. In other words, continues to sell its raw natural resources and buying high added value products, entering a cyclical market dynamic that only benefits the foreign capital, which puts Amazonas in a position of “environmental commodities” exporter. Therefore, is necessary to effectively overturn its economic development pattern by articulating a scientific and technological knowledge, transforming its natural resources in productive and financial assets, rooted by sustainable production industrial structures. In the regional context, is perceived that the companies which, in its essence, use resources from the Amazonas biodiversity still are few, small companies, with familiar administration and focused in the regional market. Revenues are obtained from few products, the research level is still low and basically focused in adapting, for the region, products launched overseas. In that perspective, is assumed that the development of innovative products is not relevant for these organizations and the strategy of launching new products follows the international market tendencies. In other words, even with a huge natural resources potential in the region, still there is no regional development centre based in biobusinesses in Amazon Rainforest.

Is in this context that appears the need of insertion of technological innovation in the agenda of Amazonas companies with the purpose of adding value to the regional products and making them even more attractive from the marketing point of view. From there is expected to stimulate the development of an alternative or complementary support model to the Free Zone model, based in the economic exploitation of biodiversity, by means of the use of advanced technical-scientific bases. As the group of companies that use biodiversity resources is mostly composed by new organizations and, therefore, do not have high resources for investment in technological innovation, the role of the state, in this case, is essential as promoter and financer agent of innovation. From the need of knowing more the regional biobusinesses, and considering the huge importance of public investments in innovation, the expectation is that the results of this study may contribute for the formatting of incentive

mechanisms for innovation in biobusinesses in the State of Amazonas and also that may serve as base for the formulation of public policies of the state, trying to strengthen the businesses that intensively use Amazonas biodiversity resources. The results of this research may also contribute to an action proposal from the Amazonas Science, Technology and Innovation State Department - SECTI and for the Research Support Foundation of the State of Amazonas - FAPEAM.

METHODOLOGY

With the objective of giving a scientific and methodological direction to the study, in this topic is described the approach, the research method and the research instrument used. The definition of the research approach is essential for the legitimacy of the research, considering the adequacy to the reviewed concepts, the adequacy to the research objectives, the validity and the reliability. This study used the ***bibliographic research and document research***:

Bibliographic research - characterized by the intense search of information in literary works, related to the innovation and biodiversity field; and ***Document research*** - characterized by the analysis of original documents, which did not yet receive adequate analytical treatment. The document research was made with the promotion, inspection and support agencies to micro and small-sized companies of Amazonas (Amazonas Planning Department – SEPLAN; Amazonas Science, Technology and Innovation Department – SECTI; Amazonas State Commercial Board – JUCEA; Amazonas State Industries Federation – FIEAM; Research Support Foundation of the State of Amazonas – FAPEAM and Brazilian Support Service to Micro and Small-sized Companies – SEBRAE/AM). Regarding its form, this research is classified as qualitative, which according to Gomes and Araújo (2005), is the most indicated research when approaching subjects related to the organization management. Qualitative research justifies its election as it qualifies a given reality, in the case of this study, the reality of innovation investments in the State of Amazonas, as well as the most demanding sectors, to explain a certain phenomenon. The research also fits as exploratory, because according to Marconi and Lakatos (2001), the exploratory research is adequate when is pretended to research until which point the research variables can be measured, and in case of an affirmative answer, how can be possible to perform such measurement. In other words, by means of this type of research is

expected to familiarize more with an unexplored subject and in the end to create previously inexistent hypothesis.

AMAZONAS BIODIVERSITY AND ITS RELATION WITH THE FREE ZONE MODEL

The study of the aspects related to Amazonas biodiversity is important from the conceptual point of view, because presents a dimension of the capillarity of the available and required inputs for the appearing of new biobusinesses. The biodiversity concept includes all biological life in the planet, in its different levels - genes, species and ecosystems - as well as its reproduction capacity. (MIGUEL, 2007)

According to Becker (2007), the Amazon Rainforest has huge natural resources: one third of the tropical forests, approximately 20% of the fresh water and the largest biodiversity territorial concentration of the planet, besides of valuable mineral resources. Consequently, it shelters the most rich and heterogeneous ecosystem of the world. According to the author, the market of products which uses Amazonas biodiversity resources showed enviable vitality by means of a growth of the differentiated rates in the last two decades of the 20th century. According to the author, the estimative suggests a natural richness without comparison in the planet. According to Matias and Pimentel (2005, p,120) *apud* Becker (2007) the Amazonas forest has a series of peculiarities that distinguishes it from the other regions:

- *Approximately 60 thousand species of angiosperms, also noting the existence of many others to be object of prospecting;*
- *300 species of cataloged mammals;*
- *Two thousand species of prospected and known fish; and*
- *Tens of millions of microorganism species.*

That natural richness, however, is not present when the analysis is made under the economical dimension. For example, performance indicators of the Manaus Industrial Centre (PIM) collected by the Manaus Free Zone Superintendence (Suframa, 2013) show that, in 2012, the participation of the main activity sectors in the total billing of the Centre is as follows: electronic products represent 35.39% of the PIM billing; two wheeler sector with 18.58%; computer goods are approximately 11.5%; and the chemical sector, which reaches 13.07%. Contrasting with the reality of those four main segments, the indicators of Suframa point out that the sub-sectors of drinks and food products were responsible for 0.91% and 0.19% of the total billing, respectively.

Based in the mentioned data, can be inferred that even with all the natural richness that the region has, when is analyzed the participation of the economic segments related to biodiversity in the billing of the industrial centre is observed that in the current model which supports the local economy, those segments do not have a representative participation. Benchimol (2000) even considers that model as eunuch exactly for not using the natural resources of the region.

According to Vieira (2002), when is examined the Amazonas region development process, is perceived that the traditional model used is strongly based in the exploration of its natural resources in predatory molds, like agribusiness, mining and wood industry. The products of the region are extracted raw and return to the state in form of manufactured products with high added value.

For Abrantes (2002), considering the collective interest - of politicians, leaders, businesspersons and researchers - in the increase of the rational use of local inputs in the state economy, the greater comprehension of the dynamics of this reality becomes an important support point for the formulation of public incentive policies to larger added value products, in which innovation has been considered a key factor.

According to a study developed by the Amazon Biotechnology Work Group, composed by prestigious educational and research institutions of the region, is estimated that the market for products that intensively use natural resources of the Amazon Rainforest, moves US\$ 958.47 billions per year, in which Brazil, despite its privileged biological diversity, has embarrassingly shy participation. The same study projects that the State of Amazon could, in 10 years, be participating of this market with a share of US\$ 20.8 billions, of which will be added in the region US\$ 11.1 billions that will generate 357,422 jobs and will represent a collection of US\$ 652.9 millions in direct and indirect state taxes.

In the generation, development and maintenance of technological base businesses with the utilization of natural inputs, innovation is an essential factor, because only through its application the organizations can differentiate and stay competitive. The innovation process demands application of new knowledge resulting in new products, processes or services that widen the complexity of the operational process and give flexibility as an essential requirement of it and of its management.

Today the Free Zone model of Manaus, which gives support to the local economy, does not value the natural resources of the state and is characterized as

eminently importer of its inputs. Besides that, little is known about the retention or reinvestment of the profits deriving from the industrial activities that are strongly encouraged by the existent model, which privileges a small part of society that concentrates these resources.

For the State of Amazonas, the strengthening of an economy based in the potential of the Amazonas biodiversity can be an alternative and/or complementary way to the Free Zone model which can bring a better distribution of resources for the region and in theory would bring a better exploitation of the potential that the Amazon Rainforest has.

BIOBUSINESSES: An endogenous alternative for the development of the amazon rainforest

The interest and the conscience of the economical, scientific and technological importance for the biodiversity inputs in the State of Amazonas are not new. It is known that the economic history of the state was already firmly related to the exploration of its natural resources. According to Benchimol (2000), during the rubber boom, the State raised a revenue equivalent to US\$ 89.5 millions. Together with rubber, almost other 200 kinds of forest extraction, for example Brazil nut, rosewood oil, copaiba oil, helped the economy of the State to match, and sometimes to exceed, the most thriving economies of Brazil. Considering the concept of bioeconomy, which always was more related to the products originating from modern biotechnology, is necessary to construct a broader concept for the business universe which use Amazonas biodiversity, to also include the products/services in its most rustic forms or conceived from more traditional techniques. Particularly in the reality of the Amazonas region, if all local economic activities that use resources originating from the Amazonas biodiversity were framed in the usual concept of biobusinesses – always directly related to the advances of modern biotechnology– very few companies would be found, making the study at least insufficient to meet the local reality.

For Frickman and Vasconcellos (2010), the world market of Amazon bioproducts is in expansion, representing an attractive investment segment for Brazil, which as one of the three largest Latin-American economies, has developed political, economic and environmental arrangements for the sustainable exploration of this potential. However, most of the currently commercialized bioproducts in the Brazilian

Amazon Rainforest has low technological density like *in natura* fruits, or just dried and peeled fruits, vegetable oil (without purification). Even with low added technology, Amazon bioproducts are exported, mainly as *commodities*. The very marketing of the natural referential of the Amazon Rainforest is a value addition factor.

Products with an average level of pre-processing are dried, milled, crushed, or transformed in pulps, extracts or vegetable and/or essential oils, sometimes purified. Others are directly transformed in products like soaps and shampoos. Few can be transformed in a finished product with all the required registers for its free commercialization in the national and international markets.

The difficulties of the producers/traders are so many to conduct the production that sometimes they need to negotiate with the historic middlemen existent until today in the Amazon Rainforest. The middlemen are intermediary agents of the production chain that during many years were the only ones to guarantee the conduction of the extraction production to the exporter businessmen. That's why is verified the preference of the extractors for the commercialization with those agents, which also offer 'alternatives' like the required advance payment for the harvesting and are less demanding regarding quality criteria. To inhibit the simple transference of low added value local products and inputs to other parts of Brazil and the world is required the scientific and technologic improvement to add value and guarantee a better final quality to products.

For Araújo Filho (2010), biobusinesses are activities with "economic purposes", developed by companies, which have as main characteristic the intensive use– and, therefore, significant dependence – of biodiversity inputs. In that discussion, he proposes a table for the characterization of the different types of biobusinesses, according to the degree of technology used in the processing of these products:

Table 1: Characterization of the different types of Biobusinesses

Typology of Biobusinesses	Characteristics
Group I	Use of <i>in natura</i> biodiversity or submitted to simple processing, centered in mechanical characteristics (cut, polish, sand, paint, dry, etc.); includes activities with economic use of the “cultural” value of biodiversity. Are examples of biobusinesses classifiable in this Group the commercialization of fresh fruits and fish, leaves, roots, shells, flowers, artifacts with aesthetic or decorative emphasis, fashion, tourism.
Group II	Products that use processes based in established knowledge, with disseminated domain (extraction, concentration, filtration, distillation, separation, etc.), which may demand the use of good practices (in the stages of harvesting, handling or conservation, for example). In this Group are included products like drinks, concentrated, sweets, pulps, powders.
Group III	Encompasses more complex chemical and/or biological processes, which demand for specialized knowledge implies an increase of technical risk; the development of the product demands tests or essays. Encompasses raw materials and products of perfumery, cosmetics, phytotherapics and phytocosmetics, bioenergy, reproduction of plants, industrialized food.
Group IV	The classification in this Group is ensured by the use of processes associated to modern biotechnology, which are based in molecular biology and genetic engineering (even that other characteristics of biobusiness classified here may be described in the other Groups). Genetically modified organisms, industrialized microorganisms and functional foods are examples of products of this Group.

Source: Araújo Filho (2010)

For Juma (2001), bio-businesses are systems that incorporate the sustainable use of natural resources, acknowledging the rights of traditional communities. Frickman and Vasconcellos (2010) defend that biobusinesses are driven by the base of the productive chains of most bioproducts which begins in the Sustainable Development Reserves (RDS), Sustainable Extraction Reserves (Resex), National Forests, Indigenous Lands and Sustainable Agrarian Reform Units.

The development of this market, in sustainable bases, with scientific and technological support induces social inclusion of Amazonas populations, valuing its knowledge and inserting the population in a traditionally practiced economic activity cycle, with technological improvements able of adding value to bioproducts. The associated scientific researches support social and environmental sustainability strategies, ensuring the conservation of those systems.

According to Cassiolato (2004) and Roman (1983), one of the main competitiveness differentials of an economic sector, in this case the biobusinesses, is the degree of articulation between the innovation system and the business community. In the State of Amazonas reality, it would be the approximation degree between the sectors that intensively use Amazon biodiversity resources and the local innovation system that is constituted by the following institutions: SECTI, FAPEAM, UEA and CETAM. For characterizing a sector constituted by companies of diverse economic segments that use forest resources in the manufacturing of its products, Lasmar (2008) uses the word phyto-industry. According to the author, the word was extracted from the research proposal document, called “Development of two phytotherapeutic products and one phytocosmetics product, from natural species”.

Particularly in the State of Amazonas, innovation in organizations that has in its essence the use of biodiversity resources, still seems to happen very timidly. Many efforts have been done to encourage the innovative process inside these companies, mainly driven by the state government, however, the results are still not very representative.

TECHNOLOGICAL INNOVATION IN BIOBUSINESSES

Understanding the concept of technological innovation is essential to make a deeper analysis about the need of inserting it in the agenda of local companies, as well as to understand the need of public funding that materializes it.

According to the innovation law appearing in Article 17 of law nº 11,196 of November 21st, 2004, “Is considered technological innovation the conception of new product or manufacture process, as well as the adding of new functionalities or characteristics to the product or process that implies incremental improvements and effective quality or productivity increase, resulting in more competitiveness in the market.”

According to the Oslo Manual (OCDE, 2005, p,55), innovation “is the implementation of a new or significantly improved product (good or service), or a process, or a new organizational method in the business practices, in the organization of the work place or in the external relations”. According to the manual, there are four basic innovation types: product, process, marketing and organizational.

The great difference between the technological innovation concept proposed by the innovation law and the concept defended by the Oslo manual is that the first considers, in its essence, the conception and introduction of a new product/process in the market that necessarily provides competitive advantage for the organization, in other words, a product that is attractive from the marketing point of view.

Despite the wide diversity of concepts for innovation, we opted for using the one considered the most widely disseminated, proposed by the Oslo Manual. Inside that perspective is highlighted that the product and process innovations are the two exclusively discussed types in that research, considering its direct relation with the technological dimension of innovation.

A product innovation is characterized by the introduction of a new or significantly improved good or service regarding its characteristics or expected uses. Are included in this type of innovation: new products in the market, significant improvements in technical specifications, components and materials, incorporated softwares, facilities of use and other functional characteristics (OCDE, 2005).

Is considered process innovation the implementation of a new or significantly improved production or distribution method. Are included among process innovations: introduction of new or substantially improved equipments required for the productive process, implementation of computer aided design for product development, implementation of information technologies and implantation of new distribution channel (OCDE, 2005).

According to Tidd (2005), before the huge and fast changes that globally occur today, technological innovation became a vital requirement for all organizations, whether they are small, medium or large sized and belonging to any segment. Many companies that produced goods or offered quality services perished in the past due to the lack of innovation perceived by its consumers. According to Viotti (2003), science, technology and innovation are key elements for growth, competitiveness and development of companies, industries, regions and countries, and are essential in the determination of the development style of regions.

Slow and progressive changes that occurred some time ago were substituted by fast and discontinued changes, making the market totally global and innovative. Technological innovation in the vision of Reis (2004) is the main agent of changes in today's world, considering that through innovation many countries and organizations obtain competitive advantages and subsequently, a larger growth and sustainable

development. Technological innovation generates the new force of modern companies. Through constant innovations the organizations keep loyal its already existent customers and capture new customers seeking higher profitability. The need of being competitive and of staying alive and active and still placing and staying ahead of competitors took the organizations to a constant search for innovation.

Constant technological innovation does not require just new technologies launched in the market, the so-called *high-tech*, Kline (2006). Small changes in the functioning of a product, in its *design*, or even changes in the form of performing a process or of providing a service, are also considered technological innovations. To take place a technological innovation, Reis (2004) considers that must take place the creation of a new product, process or service, or even, changes in already existent products, processes and services in the market. Inside this context, is purpose of this research to examine the public investments scenario in innovation, as well as the most demanding sectors of those investments.

RESULTS AND DISCUSSIONS

This work axis has as objective to portray the main actions of the State of Amazonas in the incentive to innovation, and the adhesion of the studied segments companies to those initiatives. These actions are represented by programs, projects and by the appearing of institutions developed by the government, with the main objective of encouraging the innovation in Amazon businesses, thus strengthening the regional economy trying to create an alternative development economic model according to what was discussed in the previous topic. Other point that will be discussed in this topic is the adhesion and the interest of the companies of two sectors in particular, for PAPPE Subsidy and Integration Programs, which today represent the largest state initiative in the support to business innovation.

It is known that the market does not regulate alone the movements of economy, but is the State which seeks the efficiency and equity, two essential concepts for the promotion of growth and economic development. The competitive positioning of a nation, its states and municipalities, in this case – the State of Amazonas, is, to a great extent, a reflex of the competitiveness of its industry. That competitiveness is determined, increasingly, by capacity of generation of richness through innovation and technological development, by products and services that revolutionize consumer

markets and by the positive influence that generate in other sectors of the economy. In general lines, productive efficiency would be associated to the production optimization issue, of the use and assignment of resources and of the development of the productive capacity in the scope of the technological development.

One of the intervention means of the economy used by the State in its 3 spheres, is the incentive to industry, by creating conditions and encouraging the development of the creation capacity of new technologies through innovation. Is understood here as basic premise that the function of the State is create an innovation ecosystem and deliver it to the companies.

The State of Amazonas, mostly in the period from 2000 to 2014, advanced a lot towards the efforts for the creation of a regional innovation ecosystem. However, is even perceived that those efforts were not enough to give the robustness that a new economic development system for the Amazon requires. Below will be presented table 2 that reveals the chronology of the mobilization efforts of the actors of the State of Amazonas for the development of Science, Technology and Innovation - S,T&I:

Table 2 - Chronology of the mobilization efforts of the actors of the State of Amazonas for the development of S,T&I

Period	Event	Institutions	Action
1984	1 st Meeting of Science and Technology Entities of the State of Amazonas	Seplan and Codeama	Discussion about the issues related to Science and Technology for the Amazonas.
1987	Education, Science and Technology Strategic Plan (Peect)	Suframa (Fucapi)	Strengthening of the education, science and technology areas with emphasis in the Free Zone of Manaus.
1990	Molecular Ecology Brazilian Program for Sustainable use of the Amazon Rainforest Biodiversity (PROBEM)	Scientific Community, private sector, Federal Government and region governments	-Creation of CBA and of the national network of laboratories for bio-prospecting; -Formation and attraction of human resources; -Creation of the Amazon Rainforest Bioindustry Centre.
1991	Law of Informatics	ZFM Industries/ Academia/ Governments	Incentive to the increase of R&D expenses.
1996-1999	S&T Multiannual Plan (14 Funds)	Governmental Agencies CAPDA	Science and Technology Sector Funds (Amazon Rainforest ST).
2001	2 nd Science, Technology and Innovation National Conference (CNCTI) – Belém/PA	IPAAM, SUFRAMA, SEDEC/IDAM, FUCAPI, FMT, UTAM, UEA; UFAM, INPA, EMBRAPA, CEFET, FAM, FIEAM, SEBRAE.	- Preparatory Meetings. - Important Milestone: first collective expression of the main actors in S&T of AM, about the issues. -Elaboration of the S&T&I document for AM.
2002	Creation of FAPEAM	State Government (SEDEC)	Support to research activities, programs and projects related to innovation in the companies and the incentive to the approach of the academic and productive sectors.
2003	Creation of SECTI	State Government	Natural Interlocutor of the local scientific community with the state and federal governments, implying the insertion of the state – and the visibility of its activities and demands – in the S&T national scenario.
2006	Enactment of the Technological Innovation Law - AM	State Government	Promotion to innovation and to scientific and technological research in the productive environment.
2006	Creation of NEPI	FUCAPI	Deepen the comprehension of the local reality by means of scientific research and subsidize the formulation of public interest policies in S,T&I.
2007/2008	ARARA Project	SUFRAMA	Articulation Capacity in the regional scenario and its better insertion in the S,T&I area.
2010	ANIS Project - Analysis of National Innovation Systems	SECT/FAPEAM, SUFRAMA, CIEAM, SEBRAE, FUCAPI/N EPI (Coordination)	Analysis of the National Innovation Systems based in indicators

Source: Araújo Filho (2010), adapted by the author

Among the effort chronology appearing in the previous table, two factors emerge as the most important milestones for the advances of S,T&I in Amazonas. They were: the creation of the Research Support Foundation of the State of Amazonas – FAPEAM, and the creation of the Science, Technology and Innovation State Department – SECTI.

SECTI was created in 2003 understanding science, technology and innovation as parts of a system that must be articulated to allow the production of knowledge, the transformation of knowledge in solutions and the transformation of solutions in benefits for society. In its genesis, the proposal of the department was promoting participation and interaction spaces between the agents of the science, technology and innovation state system, the society and the world, stimulating the production of knowledge, innovation and entrepreneurship in the whole State of Amazonas.

The work of SECTI had a transversal character to the diverse departments, seeking to work together in the solution of common problems, and had as main partner the Research Support Foundation of the State of Amazonas – FAPEAM as its main unit for the implementation of the Science, Technology and Innovation State Policy.

FAPEAM was created by Law nº 2,743, of July 10th, 2002, with the exclusive objective of supporting the basic and applied scientific research and to experimental technologic development, in the State of Amazonas, in the exact and earth sciences areas, engineering, biological sciences, health sciences, agricultural sciences and human and social sciences, with the objective of increasing the stock of scientific and technological knowledge, as well as its application, in the interest of the economic and social development of the State. Since its foundation, FAPEAM already leaded many public bids and also encouraged the beginning of the formation of the local innovation system, business incubators and technological parks, in other words, innovation habitat in general.

In the last years the concern with the technological thickening of companies and the role of the state as encourager of this movement was highlighted in the government discussion agenda, despite of still not being the ideal, as referred in the beginning of the text. The strengthening of these discussions reflected, mostly, in the expressive expansion of public resources assigned to the promotion and funding of business innovation activities. When is observed the number of innovation incentive programs

in the State of Amazonas, compared to previous years, can be affirmed that in fact, in the last 10 years there was a change in scale and in range of governmental support to innovation in the state. Table 03 reveals the main programs and actions launched by the state, trying to encourage innovation activities:

Table 03 – Direct innovation support programs managed by FAPEAM

Programs	Period	Objective	Invested Resources
PUBLIC BID N. 011/2012 PRO-INCUBATOR'S PROGRAM	2012	Pro-Incubators public bid had as higher objective to encourage the maintenance of already existent incubators and promote the implementation of new incubators, by means of the improvement of its internal processes and management method of the exchange of principles and knowledge.	R\$ 1,700,000.00 (one million and seven hundred thousand reais)
PUBLIC BID N. 016/2011 CREATIVE BUSINESSES	2011	Creative Businesses public bid had as main objective to select innovative businesses plans for exposition to investors and other potential encouragers of its strengthening, aiming to facilitate the transfer of entrepreneur capital to enterprises that combine profitability, innovation and positive impacts to regional development.	-----
FUCAPI/FAPEAM/ SECTI AGREEMENT 1st EDITION OF THE AMAZON RAINFOREST BUSINESSES PLAN COMPETITION	2012	The objective of the business plan competition is selling a good idea. Selling a business possibility. Good competitions allow that teams personally expose their ideas and increase the possibility of interest of investors in providing resources in the potential business.	R\$ 201,623.10 (two hundred and one thousand, six hundred and twenty-three reais and ten cents)
PUBLIC BID N. 003/2011 PAPPE INTEGRATION	2011	PAPPE Integration – aims for financial support, in the form of economic subsidy, to costing of research, development and/or innovation activities (R,D&I) made by micro-companies and small-sized companies (MEEPPs). Its higher objective is to encourage the expansion and the thickening of innovation activities in the Brazilian business universe	R\$ 6,000,000.00 (six million reais)
PUBLIC BID N./2009 PAPPE SUBSIDY	2008	Pappe Subsidy Finep Amazonas has the objective of promoting the development of technological innovation projects with non-refundable resources, aiming to the increase of innovation culture and competitiveness of MPEs based in the State of Amazonas.	R\$ 6,000,000.00 (six million reais)
PUBLIC BID N. 008/2008 PAPPE SUBSIDY FINEP AMAZONAS		PAPPE Subsidy had as objective to promote the development of technological innovation projects with non-refundable resources, aiming to the increase of innovation culture and competitiveness of MPEs based in the State of Amazonas.	R\$ 6,000,000.00 (six million reais)
PUBLIC BID 007/2004 PAPPE SUBSIDY	2004	PAPPE Subsidy had as objective to promote the development of technological innovation projects with non-refundable resources, aiming to the increase of innovation culture and competitiveness of MPEs based in the State of Amazonas.	R\$ 3,853,743.00 (three million, eight hundred and fifty-three thousand, seven hundred and forty-three reais).

Source: Own elaboration

Programs/projects by FAPEAM presented in the previous table, have differentiated scopes, however converge in the same objective: create a structural environment that allows technological development in the state. It is worth highlighting that were only mentioned direct support programs to innovation in the State.

Today subsidy and integration Papped public bids emerge as the main incentive mechanisms for innovation because they fund non-refundable resources for the development of innovative products/processes. Those public bids have a growing demand and represent an advance for the State of Amazonas considering that similar public bids have been practiced for years in some states, mostly in the states of the south and southeast regions.

Pro-incubators public bid had the purpose of funding proposals aiming to promote the structuring of new incubators and the development of company incubators aiming to expand the number and quality of innovative enterprises in the State of Amazonas. The public bid also aimed to strengthen community based businesses in the interior, with support of incubators and focus in the productive chains of municipalities.

In turn, creative businesses and business plan public bids had the objective of selecting business plans for exposition to investors and other potential encouragers, aiming to allow the transfer of entrepreneur capital to enterprises that combine profitability and positive impacts to regional development. Inside this context is then perceived that according to the previously described in the text, public bids have different natures, but, its objective is always the same. Create an innovation ecosystem in the State of Amazonas.

According to FAPEAM Activities Report (2010), the experiences developed in the foundation, focused in micro and small-sized companies which, in its essence, use biodiversity resources, show their potential regarding the development of new production processes and new products.

In the scope of the state government, since 2004 had been established a group of actions leaded by diverse local institutions, which despite of still been pulverized and somewhat disconnected, have promoted actions focused in the development of innovation in the Amazonas. Those incentives are operationalized by means of forums, events, programs and mainly by means of public bids.

An important support mechanism for innovation in the Amazonas are economic

subsidy public bids, which despite of originating in the federal government, had the support of state agencies by means of the operationalization and financial contribution of part of the resources. In these public bids, companies of diverse segments can submit its proposals. Despite of not being targeted entirely for the companies that intensively use biodiversity resources, is observed that the largest demand of the projects emerged from food and drink, biotechnology, and phytocosmetics and phytotherapics companies, as will be demonstrated below.

When are evaluated the demands for support to innovation in these segments, here measured by the demand to Pappé public bids launched in 2004 and 2008, and Pappé Integration, launched in 2011, is perceived that food & drink, TI and phytotherapics & phytocosmetics segments are the ones that demand more resources and the ones that send more project proposals to the public bid.

According to FAPEAM Activities Report (2010), and the survey made of the business demands expressed by means of the submission of projects to Pappé integration 2011, the experiences developed in the Research Support Foundation of the State of Amazonas, focused to the food & drink and phytotherapics & phytocosmetics segment demonstrate the potential of micro and small-sized companies of these sectors regarding innovation. Those conclusions are shown in table 04 and 05, as follows:

Table 04 - Economic Sector, number of projects and amounts executed by the PAPPE Program (2004) and PAPPE Subsidy (2008)

Economic Sector	Nº. of Projects	Amounts (R\$)	%
Phytotherapics and cosmetics	11	1,695,328.13	20,80%
Informatics and software	8	1,148,649.66	14,01%
Foods and drinks	7	1,266,364.54	15,5 %
Leather artifacts, wicker straw	5	603,968.99	7,4%
fishing and pisciculture	4	609,561.00	7,47%
Wood and Furniture	3	518,611.00	6,36%
Energy	3	371,916.50	4,56%
Services of essays, tests and analysis	3	424,382.82	5,20%
Pottery ceramic Centre	2	356,840.23	4,37%
Ecological Tourism	2	332,018.00	4,07%
(Civil/Naval) Construction	2	239,506.44	2,93%
Plastic Industry	2	295,786.23	3,62%
Brazil Nut	1	154,665.00	1,89%
Fruit pulps, extracts and concentrates	1	135,618.12	1,66%
TOTAL	54	8,153,217.66	100%

Source: Own Elaboration

In 2008 FINEP/FAPEAM launched 2 public bids of PAPPE SUBSIDY offering R\$ 6 millions, with demand of R\$ 19.3 millions, from which 37 proposals were financed, considering that 4 proposals with merit were not financed for limitation of resources.

Table 5 - Economic Sector, financial amount and quantity of proposals of the most demanding segments, submitted to PAPPE Integration public bid (2011).

Economic Sector	Financial Amount (R\$ 10 ³)	Quantity of proposals	%
Food and drink	2,391.2	15	25%
Phytocosmetics and Phytotherapics	1,342, 5	8	17,7%
Information Technology	1,265.4	8	17,7%
Wood and non-wood products	1,146.4	7	15,55%
Biotechnology	786.9	6	13,33%
Naval Centre	196.1	1	2,22%

Source: Own Elaboration

In 2011, was launched Pappe Integration public bid. According to the Project Analysis Department of FAPEAM – DEAP (2012), the gross demand for this public bid was 123 projects totalizing R\$ 29.4 millions, with average amount requested of R\$ 238.7 thousand per proposal, representing 79.5% of the maximum allowed amount – equivalent to R\$ 300 thousand - per proposal. Were qualified 101 proposals, from which 48 obtained merit, demanding the total of R\$ 12.5 million. Specifically of the food and drink segment were submitted 15 proposals with an average amount of R\$ 160 thousand per proposal. Considering the provision of R\$ 6.7 millions in the scope of the partnership, were contracted 26 projects, considering that 22 remained without funding. Table 5 makes a comparison between the demanding economic sectors, the requested amount per segment and the quantity of submitted proposals by the 6 sectors that most sent proposals to the referred public bid, obeying the ascending order of proposals.

In short, from the information provided in the two tables (4 and 5), can be concluded that in the Pappe Researcher (2004) and Pappe Subsidy (2008) public bids, and in the Pappe Integration (2011) public bid, food & drink and phytotherapics & phytocosmetics sectors are the more demanding. That fact suggests that the referred segments have interest in the development of new products/processes.

CONCLUSIONS

When are evaluated the demands for innovation support in the sectors shown in the table, here measured by the demand of Pappé subsidy and integration public bids, which today emerge as the main innovation incentive mechanisms, is perceived that the phytotherapies and phytocosmetics sectors, followed by the TI and food sectors are the ones that more resources demand and the ones that more send project proposals to the referred public bids.

Regarding the origin of the resources used in innovation, a point that draws attention is the low participation of banks in the funding of innovation and, in contrast, the strong importance of FAPEAM as innovation funding agent in the State of Amazonas and the extraordinary capillarity of its work. In this context, is recommended the negotiation and articulation with regional banks, seeking a specific funding line for financing innovation in the region. Innovation funding in regional banks must be encouraged by the state, due to, mainly, its essential role in the increase of productivity and competitiveness of companies and in creation of richness for the State of Amazonas. The number of regional companies that turn to banks with the intention of innovating is not significant, while in stronger economies, that practice is common. Regional banks need to be encouraged to contribute for the increase of innovative activities in the state, systematically enabling specific funding lines for innovation, seeking to finance investment projects associated to the formation of capabilities and innovative environments, aiming that the companies achieve a better competitive position.

The new movement of the state government in support of business innovation, represented basically by the actions of FAPEAM and SECTI, dared in several fronts: by establishing direct subsidy programs to companies for the development of innovation projects; by subsidizing the contracting of researchers by companies and by facilitating the cooperation between them and public research institutions. However, those incentive mechanisms must be aligned to innovation support policies in the state, which still seem diffuse.

The challenges still are huge and involve from promotion to the innovation process in the regional systems to the consolidation of the management of researched sectors, going through the harmonization of public policies and funding all creation phases and consolidation of emerging companies. Those challenges will be conquered

with the contribution of (public and private) partnerships, public will and prioritization of regional entrepreneurship.

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