

The Study of Innovation Policy in a Brazilian State

J. F. D. de Rezende and M. A. D. de Araújo

Abstract—The present study focuses on issues related to innovation policy alternatives based on the Grant Program for Technological Innovation for Small and Micro Enterprises in Rio Grande do Norte state (Inova). The technological intensity of innovation is considered an important issue for policies and strategies of innovation. This research evaluates several projects financed by the Rio Grande do Norte Research Support Foundation (Fapern). A total of 43 projects were assessed, regarding aspects such as: 1- problem solving; 2 - main changes generated in businesses; 3- meeting planned aims; 4 - results expected; 5- support for economic sustainability; 6 - new business startups; 7- new jobs; 8 - project versus time adequacies; 9 – project difficulties. The innovation program was found to be well evaluated and a number of businesses became more competitive. However, at times the specific financing of a project is not sufficient to consider some businesses innovative. As such, innovation projects need to be related to a new sustainable profile of businesses. Innovations must be linked to businesses strategy. Some enterprises do not use social networks such as Facebook and Twitter. The sponsoring agency recommended innovation support for businesses to develop innovation management status.

Index Terms—Innovation in Brazil, innovation management, innovation policy and management.

I. INTRODUCTION

In emerging economies such as India and Brazil, innovation is becoming a crucial aspect in competitiveness ([1], [2], [3]). The Brazilian Ministry of Science and Technology and government agencies developed programs to support innovativeness among Brazilian companies. The present investigation was conducted between 2010 and 2011 and assessed company projects funded and supported by the Grant Program for Technological Innovation for Small and Micro Enterprises in Rio Grande do Norte state (INOVA/RN), Brazil, operated by the Rio Grande do Norte Research Support Foundation (FAPERN).

Rio Grande do Norte is one of 27 Brazilian federal states. It is located in the Northeast and borders the Atlantic Ocean, as well as Paraíba and Ceará states. It is divided into 167 municipalities and has a total area of 52 796.791 km², accounting for 3.42% of national territory and 0.62% of the Northeast, making it slightly larger than Costa Rica. The state population census in 2010 reported 3,168,027 inhabitants,

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representing the sixteenth most populous state in Brazil.

We evaluated 41 companies and their respective 43 projects approved by the edicts Pape Inova-RN - 004/2008, Pape Inova-RN 007/2008 and Pape Inova-RN - 017/2009.

It is essential to analyze government programs such as Pape Inova-RN in order to identify changes in businesses generated through financing. Understanding these results allows more effective economic public policies to be established. It is necessary defend the need for caution regarding innovation indicators used to evaluate organizational behavior within companies [4]. When assessing the projects, FAPERN should apply a plan to continuously analyze project execution. Describes some elements regarding what must be considered in innovation support policies [5]. The author presents the development and findings of an evaluative case method, conducted for a government department's organizational innovation program, in an Australian state. In Brazil, a culture is developing where entrepreneurs manage innovation projects.

The PAPPE is a program designed to support research projects in developing products and processes, preparing business plans and conducting market research, primarily in technology-based companies, under the responsibility of researchers working for or in cooperation with the program.

The PAPPE is operated by FINEP (Brazilian Organization of Innovation Financing) in partnership with the State Foundation for Research Support. Its purpose is to finance Research and Development activities of innovative products and processes undertaken by researchers working for or in cooperation with technology-based firms.

Operation of this program is based on direct support or startup for entrepreneurs, funding research projects to create new products or processes. The PAPPE INOVA Program provides: 1) researcher grants or scholarship aid; 2) material consumption-related research activities and services; 3) consulting services; 4) equipment and material, when needed.

Public policies of innovation should be interested in assessing the impact of support and grants in increased innovation [6]. Critical perception is essential when dealing with public resources. From this standpoint, the present study sought to make some theoretical contributions to this field.

II. METHODOLOGY

The proposed methodology was developed to evaluate the performance of 43 projects supported by the Grant Program for Technological Innovation for Small and Micro Enterprises in Rio Grande do Norte, referring to INOVA and PAPPE edicts. In this study the innovation project coordinator/manager and the researcher responsible for innovation development in the enterprise were interviewed. Projects were evaluated using the following instruments:

A form to evaluate project implementation;

A self-assessment questionnaire applied to the project coordinator; and

A self-assessment questionnaire applied to the project researcher.

The following Research and Development (R and D) aspects were observed:

- 1 - Solving the problem initially characterized;
- 2 – Main changes generated in businesses;
- 3 - Meeting proposed aims;
- 4 – Achieving planned results;
- 5 - Support for economic sustainability of the business:
 - 5.1 - Acquisition of new customers;
 - 5.2 – Increasing competitiveness;
 - 5.3 - Development of new relationship businesses;
 - 5.4 - Development of new products or services;
 - 5.5 - Patents;
 - 5.6 – Development of Academic articles;
 - 5.7 - Creation of New jobs.
- 6 – Creation of startups;
- 7 - Adequacy of project x time;
- 8 - Difficulties in project operation;
- 9 - Evaluation of Accountability Report;
- 10 - Suggestions.

It is also important to have an idea of the impact of innovations in terms of creating new products/services/organizational framework, as well as operational processes or marketing communication. It is necessary to know how innovations were important to businesses consolidation, and how they contributed to profitability or customer satisfaction. Were these innovations useful in learning more about the customer profile or improving relationships with the client? Were they significant in reducing costs? As to the scope of innovation, was it innovative for the company itself, new to the market or to the world? These are some relevant elementary aspects regarding evaluation of innovation activity.

Some studies [7], [8] continues the effort to build methodologies dealing with innovative behavior.

III. RESULTS

Survey results are related to assessment of the following aspects:

A. Impact of Funding to Solve Organizational Problems Presented in the Project Submitted by Businesses

Problems reported by companies have been minimized through project operation and 95% considered funding highly important.

B. Collaboration for Fostering Business Competitiveness

Contribution towards making the company more competitive was deemed high (67%). From the moment that economic subsidies to businesses allow the development of new products and services, they become better able to attract new customers. Investigate the acquisition of technological capabilities in small firms in developing countries must be considered [9]. From this perspective, it is possible to affirm that businesses need to develop other organizational capabilities.

C. Influence on Attracting New Clients

73% considered it substantially important and 24% partially important for companies to conquer new customers and develop more permanent relationships with them, so as not to depend only on public resources.

D. Development of New Products or Service Support

FAPERN resources collaborated in order to encourage startup businesses to consolidate (86% of answers). It is necessary consider the relevance of having new products and services for innovation and business performance [10]. It is important for FAPERN to assess the survival of innovation over a longer period of time.

E. Influence on Sales

The impact of funding on increases sales of new products and services was perceived as less significant when compared with other aspects. Only 61% considered innovation to improve sales as important, while 34% deemed it highly significant,

F. Assistance for Developing New Business Relationships

Contributed to the development of new relationships. A total of 43% felt this contribution was substantial and 49% deemed it important. Through projects funded by FAPERN, businesses began to interact with innovation agencies, maintaining better density and consistency of economic relationships.

G. Creation of New Jobs

59% felt this contributed significantly. Nevertheless, job creation is not as important as other aspects evaluated. This may explain why most small companies and their activities do not require many employees

H. Improvement of Environmental Sustainability

In general, funded projects showed no significant improvement in environmental indicators, since some projects such as the area of Information and Communication Technologies do not exhibit a substantial polluter process. Research [11] suggest considering a permanent evaluation of the extent to which innovations impact business sustainability. From this point of view, it is recommended that the government agency FAPERN consider how innovations will affect the environment in subsequent edicts.

I. Patents

Only four companies analyzed felt that the impact of funding in generating patents was highly significant, while another five considered it only important. There is not yet a culture of patenting by local companies, emphasizing the importance of specific campaigns in this regard [12].

J. Academic Articles

The impact was smaller compared with other aspects evaluated. Only three companies reported that the study enabled researchers to produce academic articles. The businesses were not strongly related to academic activities, processes and agendas. In IT companies, concerns regarding academic articles are more present when compared to other areas. The interest in academic communication is more relevant in companies with employees holding M. Sc. and Ph. D. degrees.

K. Impact of Seed Money on Business

The following graph shows the main influences on business financing, according to a Likert Scale.

In accordance with the previous graph depicting a Likert scale evaluation from 1-5, the main impact of financing is the possibility of generating new products or services (with an average rating of 4.7). Funding was also perceived as very important for solving problems in projects submitted through Pape Inova edicts, with a rating equivalent to 4.4 (high impact). Funding was also important in empowering companies to be more competitive (4.4).

In relation to funding generating patents (2.8) and scholarly articles (2.7), these were identified as the worst aspects evaluated. With respect to generating patents,

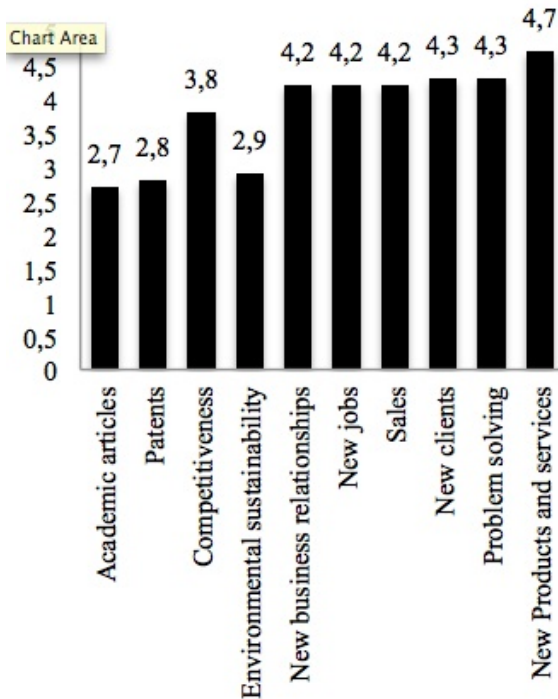


Fig. 1. Major impact on business financing (Likert Scale).

companies were not interested in or prepared to undertake the patenting of innovations developed. One could also consider that some innovations developed did not generate patents, but were only related to improved production processes. Compiling academic articles (2.7) is more interesting to researchers than firms, indicating projects do not necessarily transfer knowledge or data to academic research.

L. General Perception of Businesses Financing

46% of entrepreneurs felt that funding substantially contributed to the company operations and a further 34% believed that funding was important. Thus, it appears that the operation of the business can be considered a success. According another research [13] high-technology innovation projects are generally preferred and less technologically advanced or innovative firms lack adequate support. The spillover effects of technology centers are limited. The problem that most SMEs barely interact with knowledge providers from outside the business sector (e.g., universities) is not reduced by support instruments. Furthermore, they are insufficient in the function of interfaces to innovation-related resources and information from outside the region. There is a lack of proactive consultancy concerning strategic,

organizational, and technological weaknesses, which is necessary because firms are often not aware of such deficiencies.

M. Industries Supported by Public Edicts

Agribusiness (41%), tourism (7.7%), construction (10.3%) and software (23.1%) were the main supported economic industries. In the context of agribusiness there is a wide spectrum of companies, including those producing food and extracting limestone. Much of the funding was allocated to companies in the agribusiness area. This shows that the nature of the Rio Grande do Norte state economy is still based more on assets than knowledge.

N. Nature of the Innovations Funded.

A fundamental aspect for MOT Public Policy makers is to know the nature of projects funded in the context of business promotion. The following table summarizes the areas in which innovations were undertaken.

TABLE I: NATURE OF THE INNOVATIONS FUNDED BY FAPERN

Nature of innovation	Quantity	Percentage
Mechanics	3	6.4%
Web solutions	2	4.3%
Materials	9	19.1%
Information Terminal (ATM)	2	4.3%
Geoprocessing	1	2.1%
Recycling / material reuse	4	8.5%
Automatization	4	8.5%
Software / Information Systems	10	21.3%
Quality and production process	12	25.5%
Total	47	100.0%

- 1) According to the above, we can infer that a quarter of the projects funded (25.5%) are characterized as initiatives aimed at improving the production process and the quality of products and services offered in the market.
- 2) Projects in the field of information and communication technologies (ICTs) also accounted for a high percentage (25.7%), in the form of projects related to systems development (21.3%) and web solutions (4.3%). Adding to that figure automation projects (8.5%), Information Terminals (4.3%) and Geographic Information System (GIS) projects results in a total of 40.4% of funded projects.
- 3) The new materials field (19.1%) involves a variety of innovations, including development of new technologies in ceramics, new techniques and theories of refrigeration, new properties for new materials used in construction and the use of probiotics and bacteria applied to agricultural production and shrimp farming.
- 4) Interestingly, as per the above table, part of the innovations developed were aimed at consolidating programs for reuse and recycling of resources that would traditionally be considered worthless. These innovations represent 8.5% of supported projects. The most interesting aspect of these loans is that innovations aimed at developing processes for recycling generated new sources of revenue for companies. Thus, projects with a strong connotation of environmental sustainability have become important for the economic

sustainability of businesses.

- 5) It is important to note that, although there is a tendency towards promoting projects with environmental sustainability characteristics, 8.5% of funded projects have been directed towards this purpose through motivation by the entrepreneurs themselves.
- 6) The information presented here is a guideline for formulators of MOT public policies. Thus, considering investments in agribusiness activities, it is clear that innovations play an important role in adding value to these activities, so as to provide products that improve production activities, bringing economic sustainability to traditional sectors of the economy.

IV. CONCLUSION

It is important for future projects to consider assessing the following aspects: 1) maintain efforts to balance project management skills undertake projects and negotiate; 2) identify resource dependence of the grant. This is not a positive phenomenon. Companies be aware of different and new funding, particularly market opportunities. Innovation agencies need to pay greater attention to the managerial and entrepreneurial style exhibited by managers/ entrepreneurs; 3) understand how much has been invested and listen to the client. A new product designed without listening to the market is not an innovation. 4) Evaluate the company skills in developing new products and services. Funding for a particular innovation cannot be perceived as something innovative. It is important for innovation to provide the company with the ability to offer other products and services. Only then will business support be a vector for a sustainable innovation. 5) Firms frequently fail to take advantage of electronic tools such as Facebook, Orkut and Twitter to promote their innovations and improvements, as well as the business itself. Meetings or social networks could also be encouraged. 6) It is essential to enquire about the future. What is the future vision of these companies? It is important to identify at what level a technological innovation is linked to the business model and a vector for financial sustainability. Another research [14] observed that organizations should first examine their mission and then define the innovation strategy in order to develop the capacity to innovate.

The innovation agency should: 1) improve communication and announcements with local entrepreneurs; 2) operationalize links with other federal innovation programs; 3) Develop technical and business events that help to build social networks among businesses supported; and 4) sharing guidelines through training to ensure a healthy and satisfying experience when executing the funded projects.

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