# ANALYSIS OF THE RIO DE JANEIRO STATE INCUBATOR NETWORK (ReINC): CHARACTERISTICS AND INFLUENCE ON THE ORGANIZATION AND SUSTAINABILITY OF INCUBATORS

MARIZA ALMEIDA, ELAINE BORIN, CARLOS MARIO ÁLVAREZ, BRANCA TERRA and THADDEUS BLANCHETTI

## SUMMARY

The emergence of incubators in Brazil occurred from the bottom-up in the context of the down-fall of the military government and the restoration of civil society in the 1980s. To develop its activities the incubators in 1987 organized a civil association called ANPROTEC. This national association encouraged the setting up of regional/state incubator networks, to bring together local incubators, exchange experience and seek support at the regional level. This paper presents the initial results of a study that is in course, the aim of which is to assess how the regional incubator network in the state of Rio de Janeiro, known as ReINC, has contributed to sustainability, based on theoretical concepts of social networks and social capital.

he emergence of incu-bators in Brazil took place during the down -fall of the military government and the restoration of civil society in the 1980s, which saw a broad redefining of public policies, including scientific and technological policies. Due to the absence of a centralized project, the concept of incubators has been applied with great flexibility to different actors, in bottom-up initiatives by universities, municipal governments, business groups, regional associations and state governments, as well as top-down (the federal government). Incubation was already growing in Brazil by the time it began to receive effective federal government support. Only in August 1998,

when there were already 60 incubators functioning, did the federal government, through the Ministry of Science and Technology (Ministério da Ciência e Tecnologia; MCT), create the National Enterprise Incubator Support (Programa Nacional de Incubadoras; PNI). Since the mid-1990s, most Brazilian incubators have formed national associations, with many of these embracing various different kinds of incubators: technological, traditional, mixed, private, cooperative and social. The first association was established in the network of the Associação Nacional de Entidades Promotoras de Empreendimentos Inovadores (ANPROTEC; National Advanced Technology Enterprise Promoter Entity), which welcomes all types of incubators. There are two other incubator networks that embrace the cooperative and social incubators, the University Network of Technological Incubators of Popular Cooperatives (ITCPs) and *Unitrabalho*. Today, there are 18 regional/state networks. The creation of local and national networks is an organizational innovation that brings together individual incubators (Anprotec, 2004).

The objective of these networks is to promote and stimulate regional development, through joint initiatives for the exchange of knowledge. They also aim to spread an entrepreneurial culture and create new incubators, as well as acting to raise funds (promotion), not only to ensure

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the viability of the network, but also focused on increasing the contributions received by the incubators.

These networks follow the general guidance of ANPROTEC and participate in the formulation of the entity's Annual Action Plan (Anprotec, 2002). It was in this local network context that the *Rede de Incubadoras, Parques Tecnológicos e Pólos do Rio de Janeiro* (Rio de Janeiro State Network of Incubators, Technology Parks and Hubs; ReINC), the object of this study, appeared, with the task of stimulating the exchange of knowledge between incubators, clusters and technology parks and supporting their development.

The objective of this research project is to analyze the Re-INC, it's characteristics and influence on the organization and sustainability of incubators in Rio de Janeiro state, based on theoretical concepts of social networks and social capital.

This paper is a work in progress. The study takes as its starting point the concept of incubator sustainability used by ANPROTEC: from an economic point of view, sustainability means the financial return on a project that enables it to function effectively over an unlimited period of time, even after the initial financial support ends. Hence, one can visualize the relations between incubators that launch joint projects to raise funds and develop activities in order to ensure their sustainability, based on theoretical concepts of social networks and social capital.

# **Theoretical Milestone**

The movement for the creation and development of incubators in Brazil has been cited internationally, in the works of Lalkaka and Bishop (1996), Etzkowitz (2002, 2003), Feldman (2002), Scaramuzzi (2002), Almeida (2004) and Etzkowitz, Mello and Almeida (2005).

Because of the peculiar characteristics of incubators in Brazil, which are the result of local initiatives without a strong government program to define the parameters for their growth, the leadership of this process has always been under the aegis of ANPROTEC. This institution intermediates with national entities on behalf of the incubators, as well as liaising with local associations. ANPROTEC and the regional networks of business incubators operate in mutual support, exchanging experience in the building of partnerships, (Almeida, 2004).

One of the knowledge gaps in the development of incubators in Brazil is its form of organization as a network, where the nodes can be considered the incubators and the links are the relations between them, with proactive players, the government, universities and other organizations providing support. The sources of support are of two basic kinds. The first provides specific resources for maintaining the incubator, as well as providing services to the incubated companies. The second is for the purpose of developing the incubated companies. Since in this study the sustainability of incubators operating in a network is analyzed, only the former type is being considered.

This analysis is based on theoretical concepts of social network theory and social capital. The main elements of these theoretical concepts, as well as the interrelationship between them, are presented. Social network theory has been used for research in various fields of knowledge that seek to understand how the relations between individuals are organized into a structure, such as a network, and what is its impact on society.

One of the main studies on the analysis of social networks and their importance to understanding the interactions between micro and macro levels was made by Granovetter (1973), who considers interpersonal networks to be a fundamental element in this connection. His analysis covers existing social links, classifying them as strong (defined as those in which the individuals rack up most of the time, emotional intensity and exchanges; such as friendships) and weak (those in which the investment is smaller or negligible, such as with mere acquaintances).

One of the first aspects to be studied, according to Hanneman (2001), is how participants are linked to or inserted within the network. This involves analyzing the existing relations between the network participants and outside institutions supporting the incubators and the enterprises (universities, institutions disseminating entrepreneurism, public bodies promoting science and technology and those working in favor of a supportive economy, at the federal, state and local levels, business institutions, institutions supporting the enterprises, and third sector organizations),

for the purpose of comprehending the social capital that has been accumulated by these groups while seeking to resolve problems in relation to the needs of the incubators they serve.

Interest in the study of social networks is also derived from increased studies in the fields of economics and sociology into the importance of social capital (Coleman, 1990; Ostrom, 1990; Putnam, 2000). Social capital forms part of the structure of interpersonal relations and facilitates their functioning. So, it is a factor in social relations that makes it possible to construct a network (Coleman, 1990). According to Atria and Siles (2003), social capital may be understood as "...a specific ability, on the part of a group, to mobilize resources". This viewpoint facilitates the analysis of the question raised in this study: to comprehend the mobilization of incubators in networks, as they seek scarce resources from supporting institutions to ensure their sustainability and development.

## Methodology

The analytical methodology of this research provides for a review of articles already published about incubator networks in Brazil and of documents relating to ReINC, as well as interviews.

The research is conducted in two phases. The first phase addresses the motivations and objectives for creating ReINC and the institutions that provided support for this proposal. This information was obtained through interviews with representatives of the founders of the incubator network. In the second phase, data were collected by means if interviews with representatives of the incubators that are members of ReINC, so as to identify the projects developed in relation to securing financial resources through the efforts of ReINC. The data obtained in the questionnaires were transformed into matrices and the UCINET software was used to consolidate them in graphics representing the relations developed within the network.

# **Results and Discussion**

ReINC is composed of 24 incubators of different sizes, years in existence and goals (Table I), totaling 130 incubated firms and 103 graduated or associated firms (www.redetec. org.br/redeseprogramas/redestematicas/ reinc/default.aspx, cons. 01/01/2011).

# At the time ReINC was

founded, there were only five incubators in the state of Rio de Janeiro. Interviews conducted with the founders of ReINC show a convergence of views regarding the motivation for establishing the network. One of the most important aspects mentioned is the possibility of obtaining financial support from the various institutions related to the area of R&D and local and regional economic development. Thus, Re-INC is presented as a network that provides access and identifies opportunities in relation to various resources.

In addition to the possibility of obtaining various resources, ReINC was also seen in the period of its creation as a way of strengthening the representation and interaction of incubators with the national network and incubators in the state of Minas Gerais, which formed the first statewide incubator network.

It is noteworthy that, according to the interviewees, the incubator movement in the period grew at high annual rates, encouraging the national network and regional decentralization. Therefore, ReINC was also considered to offer the possibility of increased power and influence with the national incubator movement, government, and regional institutions.

While the incubators in the country were not created in a context of a strong government project, the majority of them were developed at the same time, and the methods and experiences of other countries were adapted to local needs.

The regional network (ReINC) was seen as a governance mechanism, whereby incubators and institutions could enjoy a coherent supported system, a collaborative network for the dissemination of information and exchanging of knowledge among the incubator managers.

ReINC was also a mechanism for encouraging innovation and promoting entrepreneurship and local development through the enterprises created. This is the third aspect of this network: the production and dissemination of knowledge.

The interviews show that ReINC was an important element in the dissemination of the proposal to create a larger number of incubators in the state, leading to the permanent extension of the network through the addition of new incubators.

While one finds in Re-INC key aspects of social capital such as links of trust, solidarity and reci-

## TABLE I LIST OF INCUBATORS LINKED TO REINC

Incubator	Year first bid launched	Туре
COPPE/UFRJ (Incubadora da COPPE/UFRJ)	1993	Technological
IEBTec (Incubadora de Empresas de Base Tecnológica do Instituto Politécnico da UERJ)	1994	Technological
ITCP (Incubadora Tecnológica de Cooperativas Populares COPPE-UFRJ)	1995	Cooperative
BIO-RIO (Incubadora e Pólo Tecnológico da Fundação BIO-RIO)	1996	Technological
PUC-Rio (Incubadora Tecnológica Gênesis)*	1997	Technological
IETEC (Incubadora de Empresas de Teleinformática do CEFET/RJ)	1997	Technological
INEAGRO (Incubadora de Empresas de Base Tecnológica em Agronegócios UFRRJ)	1998	Technological
INITIA (Incubadora de Empresas de Base Tecnológica da UFF - IEBTUFF)	1999	Technological
INT (Incubadora do INT)	1999	Technological
Iniciativa Jovem (Programa Iniciativa Jovem)	2001	Mixed
PUC-Rio (Incubadora Cultural Gênesis)*	2002	Cultural
INMETRO (Incubadora de Empresas do Inmetro)	2002	Technological
Incubadora TEC-CAMPOS (Incubadora de Empresas Tec-Campos)	2002	Technological
Incubadora da Universidade Católica de Petrópolis	2002	ND
Incubadora Afrodescendente	2003	Technological
Incubadora de Empresas da Universidade Veiga de Almeida	2004	Mixed
PUC-Rio (Incubadora Social Gênesis)*	2004	Social
Incubadora de Macaé	2004	Cooperatives
SENAC Rio (Incubadora de Empresas de Base Tecnológica)	2005	Technological
Incubadora LNCC (Incubadora de Empresas de Base Tecnológica do LNCC)	2005	Technological
IETEX (Incubadora de Empresas de Base Tecnológica do Exército)	2006	Technological
Incubadora de Design UERJ	2006	Mixed
Phoenix (Incubadora de Empresas Phoenix/UERJ)	2006	Technological
IEBTST- UERJ (Incubadora IEBTST- UERJ Resende)	2007	Technological

\* The three incubators PUC-Rio (technological, social and cultural) are part of the Genesis Institute.

procity, there are points of tension between the incubators, particularly in relation to the expected performance of the network as a possible means of access to financial resources. Until year 2000, there was the view that it was necessary to increase the number of incubators, and various institutions channeled resources into setting up new incubators. But from then on, the priority of these same institutions became the provision of resources for implementing activities to support business incubation.

It can be seen from the data in Table I that fifteen of a total of 24 incubators have been created since 2000. The lack of outside resources for the maintenance of these younger incubators and the little domestic support in the institutions to which they are connected (generally public universities that also passed through a period of scarcity of resources) generated for the first time, in 2005/2006, an internal debate on the election of coordinators, which until then took place by consensus. The proposed alignment of interests became possible due to the election of coordinators chosen by the smaller incubators.

One of the characteristics of Brazilian incubators is that they have no budget allocated by universities or by any other institution. Their financial sustainability depends on the approval of proposals contained in specific tenders and carrying out projects for third parties, in addition to financial contributions from incubated businesses, in return for services provided. This means that a considerable portion of the incuba-

TABLE II					
CALLS TO	TENDER	IN	SUPPORT	OF	<b>INCUBATORS</b>

Year	Name	Responsible institution	Characteristics
2006	MCT/ FINEP/Ação Transversal Public Call to Tender – PNI 09/2006	FINEP	Called for the submitting of proposals from networks with at least four incubators.
2007	Call to Tender under the program "Support for Incubators of Technology- Based Companies in the State of Rio de Janeiro - 2008"	FAPERJ	Proposals from individual incubators or incubator networks.
2008	Call to Tender in support of Business Incubators 06/2008	SEBRAE-RJ	Proposals from individual incubators or incubator networks.

#### TABLE III INCUBATORS AND FINANCIAL SUPPORT PROJECTS

Year	Name	Participating Incubators
		Approval was given to three projects by incubators in the state of Rio de Janeiro.
2006	MCT/ FINEP/Ação transversal public call to tender - PNI 09/2006	Project 1: Executive incubator: Instituto Gênesis PUC-Rio. Participating incubators: Initia/UFF Phoenix/UERJ Incubadora da Universidade Veiga de Almeida Project 2: Executive incubator: Coppe/UFRJ Incubator Participating incubators: IETEX Incubadora LNCC Incubadora de Empresas do INMETRO Incubadora de Empresas do INMETRO Incubadora do INT Project 3: Executive incubator: BIO-RIO Foundation Incubator and Technological Hub Participating incubators: ORIGEM IETEC SENAC-Rio – Incubadora de Empresas de Base Tec- nológica
2007	Call to tender under the program "Support for Incubators of Technology-Based Companies in the State of Rio de Janeiro - 2008"	<ul> <li>11 projects were approved: <ul> <li>INITIA/UFF</li> <li>Instituto Gênesis PUC-Rio</li> <li>IETEC/CEFET/RJ</li> <li>PHOENIX /UERJ</li> <li>Incubadoras LNCC</li> <li>IETEX</li> <li>Incubadora de Empresas do Inmetro</li> <li>Incubadora do INT</li> <li>TEC-CAMPOS</li> <li>INEAGRO</li> <li>UERJ incubator network, with the participation of three incubators: Origem/UERJ</li> <li>Incubadora de Design/UERJ</li> <li>IEBTST/UERJ</li> </ul></li></ul>
2008	Call to tender in support of business incubators 06/2008	Approval was given to one proposal from the state of Rio de Janeiro         Executive incubator: Instituto Gênesis da PUC-Rio         Participating incubators:         INITIA/UFF         PHOENIX/UERJ         Incubadora da Universidade Veiga de Almeida

Sources: www.faperj.br/interna.phtml?obj\_id=6861 www.finep.gov.br/fundos\_setoriais/acao\_transversal/resultados/Resultado\_Final\_PNI\_09\_2006.pdf http://publique.genesis.puc-rio.br/assessoriadeimprensa/cgi/cgilua.exe/sys/start.htm?from%5 Finfo%5Findex=21&sid=3&infoid=177 (All consulted on 12/10/2010).

tor managements' time is spent preparing and negotiating project proposals. If, on one hand, this adds to the entrepreneurial activities of the incubator management, on the other hand it means considerable efforts are expended on activities that are not the prime function of the incubator, which is to select and oversee the incubated businesses.

Interviews carried out with incubator management during the second phase of the study made it possible to identify the projects developed since 2006, when the incubators began operating in a network to obtain the resources that would ensure their sustainability.

Three projects were identified, the details of which are shown in Table II. The proposals approved by incubators in the state of Rio de Janeiro in each of the corresponding tenders are shown in Table III.

The MCT/FINEP/Ação Transversal - PNI 09/2006 public call to tender, requiring incubators to participate in networks, with each proposal coordinated by an incubator called the anchor, and supported by three other incubators, generated considerable discussion and not a little concern at ReINC, due to the fact that the incubators would be participating in subnetworks and this could reduce the bargaining power and weaken the network itself, as expressed in an interview by the ReINC Coordinator, Kátia Aguiar, and the Representative of the Rio de Janeiro Technology Network, Paula Gonzaga. Nevertheless, these sub-networks have invigorated the exchange of experience among the management of the incubators, in an effort to develop joint projects. Another factor is that the anchor incubators have greater experience, having been around longer and having achieved success both in incubating enterprises and in managing the incubator itself, to be shared with the other incubators in the sub-network during the implementation of the project.

The ability to carry out joint projects can also strengthen ReINC by diminishing the competition between the incubators over resources. This was demonstrated on the occasion of the issuing by Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro (*Rio de Janeiro State Foundation of Support for Research*; FAPERJ) of the call to tender under the program "Support for Incubators of Technology-Based Companies in the State of Rio de Janeiro - 2008", whereby the board of the institution listened to the management of some of the incubators while drawing up the call to tender, in an effort to cover as many incubators as possible. One of the decisions taken during the meetings of ReINC was that each incubator would limit its proposal to a maximum of (US\$ 179,877), so that all incubators could be covered within the amount of the resources available under the call to tender.

The decision by three of the four incubators of the Rio de Janeiro State University (UERJ) to organize themselves in a network was positive for that institution, as, with the exception of the "Incubadora IEBTec", located in Nova Friburgo and created in 1994, they were all set up 2006 and 2007. Since the year 2000, when there were already 135 incubators in Brazil, the emphasis of the leading institutions that provide financial support, such as Financiadora de Estudos e Projetos (Studies and Projects Financing; FINEP) and Serviço Brasileiro de Apoio às Micro e Pequenas Empresas (Brazilian Micro and Small Business Support Service; SEBRAE), had been to provide backing for activities aimed at strengthening incubators that were already consolidated, and creating new market opportunities for companies that had already been incubated. There had not been any funding, under the calls to tender that had been issued, for the development of existing incubators that were not yet consolidated. Created under adverse conditions, these incubators had also encountered difficulty in obtaining funding from their own universities, due to the internal competition for scarce resources. Their participation in the project meant that they were building and developing within a context that offered them poor conditions to compete individually in a call to tender or to carry out the project. That they could proceed to develop their credibility through joint action, within the university context, was another positive factor.

The network established by the incubators Instituto Gênesis, Phoenix, Initia and Veiga de Almeida for the purpose of participating in the FINEP call to tender had further repercussions, with them also participating together in the Sebrae national call to tender, the activities under which led to greater discussion of topics such as entrepreneurism and innovation amongst the university students in formal lectures.

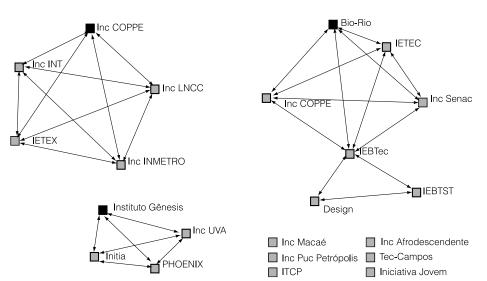


Figure 1. Incubator networks.

Based on the data on project participation obtained in the interviews, it was possible to draw up matrices and utilize the UCINET software to analyze the ReINC configuration in the light of the objective of the study, to analyze the sustainability of the incubators through their joint activities.

Figure 1 shows the network structure. For the sake of simplification, the incubators that have both individual projects and participate in sub-network projects have been represented only once.

Four sub-networks were created, in accordance with the funding projects that were secured. There were also three incubators that did not participate in any joint project. Despite not being included in the proposal submitted to FINEP, when the project was to be carried out, one of the incubators, Ineagro, joined the subnetwork and shared in the resources obtained, as revealed in the interview referred to above.

The capital accumulated in ReINC over the years suffered the risk of fragmentation, due to internal disputes over power and access to financial resources. This led the network to a reflection that resulted in the submission of proposals to the backers and the restoration of internal democracy and links of trust and cooperation.

# Conclusion

The structure of the network is considered an appropriate way to regulate the practice of inter-

organizational alliances, such as collaborative activities. In the interviews, it was found that the main types of projects developed by the network over the years have revealed both a concern over network maintenance and organization (such as strengthening of ties of trust) and cooperation aimed at strengthening the social capital.

One of the characteristics of the Brazilian incubator movement is the development supported by the creation of networks. Collaboration has stood out as an important value that strengthens the network and contributes to the development and sustainability of the incubators and of the network itself.

As has been shown, there are a multitude of networks, at different levels, with one inserted within another. Within the national network, Anprotec, there are eighteen state/regional networks, including the ReINC, in which are inserted the networks of incubator projects. These networks complement one another, thereby contributing to the sustainability of the incubators.

The social capital that has been accumulated over the years by the various networks permits disagreements to be resolved and difficulties to be overcome without compromising the networks' existence.

Relations between the incubators, which form the nodes in the networks, and with the supporting institutions share a common objective; providing support to the incubated enterprises. Interaction with outside bodies, whether performed by the network coordinators or by the incubators themselves, helps to define aspects of calls to tender that are to be issued. Internal agreements, meanwhile, facilitate access to resources by the majority of the incubators, thereby reducing internal competition and increasing the network's social capital.

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# ANÁLISIS DE LA RED DE INCUBADORAS DEL ESTADO DE RÍO DE JANEIRO (ReINC): CARACTERÍSTICAS E INFLUENCIA EN LA ORGANIZACIÓN Y SOSTENIBILIDAD DE INCUBADORAS

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## RESUMEN

El surgimiento de incubadoras de empresas en Brasil nació de manera bottom-up en el contexto de la caída del gobierno militar y la renovación de la sociedad civil en la década de 1980. Para desarrollar sus actividades las incubadoras de empresas crearon en 1987 una asociación nacional llamada AN-PROTEC. Esta asociación nacional estimuló la creación de incubadoras regionales y estatales orientadas a satisfacer las incubadoras locales para intercambiar experiencias y buscar el apoyo de las fuentes de recursos regionales. Este artículo presenta los primeros resultados de un estudio en curso con el objetivo de examinar la forma en que la red regional de incubadoras en el estado de Río de Janeiro, llamada ReINC, contribuye a la sostenibilidad de las políticas basadas en los conceptos teóricos de red social y capital social.

## ANALISE DA REDE DAS INCUBADORAS DO ESTADO DO RIO DE JANEIRO (ReINC): CARACTERÍSTICAS E INFLUENZA NA ORGANIZAÇÃO A SUSTENTABILIDADE DAS INCUBADORAS

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## RESUMO

O surgimento de incubadoras no Brasil nasceu de forma bottom-up em um contexto de colapso do governo militar e da renovação da sociedade civil, na década de 1980. Para desenvolver suas atividades as incubadoras criaram em 1987 uma associação nacional chamada ANPROTEC. Esta associação nacional estimulou a criação de redes regionais/estaduais de incubadoras visando to reunir as incubadoras locais para trocar experiência e buscar apoio a junto às fonte de recursos regionais. Este artigo apresenta os primeiros resultados de uma pesquisa em andamento cujo objetivo é analisar como a rede regional de incubadoras do Estado do Rio de Janeiro denominada ReINC, contribui para a sustentabilidade das mesmas baseado nos conceitos teóricos de rede social e de capital social.