

System of Innovation: Comparing Savings of Brazil and South Africa

Glessiane de O. Almeida, Sérgio Murilo C. Messias, Iracema M. de Aragão Gomes

Abstract—This article discusses issues related to the System of Innovation: Comparing economies of Brazil and South Africa. Having as this study aimed at comparing the Innovation System of the countries mentioned. Then briefly describe the process of Venture Capital and present the industry innovation in Brazil and South Africa. The methodological approach described in this article is descriptive and the approach is qualitative, taking as a basis secondary data relating to research articles. The main results are related to the different forms of financing of Venture Capital used by countries compared, in addition to the training and economic policy. And finally, it was highlighted the importance of implementation of policy reforms for the Brazil and Africa in the innovation process.

Keywords—Innovation, Venture Capital, Economy, National Innovation System (NIS), BRICS.

I. INTRODUCTION

THIS article write about knowledge and innovation are items considered, currently, as sources for the technological progress, the latter being crucial for the sustained economic growth in the longer term. In the case of a country, two concepts are interconnected in the chain of economic progress: innovation and absorption. The innovation is related to the marketing and development of technologies or products that have not yet been tested. The absorption is the means by which technology is concentrated and propagated from another country. The ability of an economy to search for and develop new technologies increases your ability to understand and apply the existing technical knowledge; however, the absorption of technology inspires new ideas and innovations [10].

The expenditures in Research and Development (R&D) are important in the innovation process. The financial systems adopted by each country aims to make these innovations and the achievement of financial transactions, the competition in the markets, risk analysis criteria and funding for the deployment. However, the procedure of financial analysis of the innovation process traditional is characterized by long periods of maturation and uncertainties, extremely difficult. On this basis, countries considered emerging, as in the case of Brazil and South Africa, need to obtain the cooperation of the government to implement political reforms and thus obtain the economic growth desired.

The Venture Capital (VC) is a differential financing, which

G. O. A. and S. M. C. M. are master students in PPGPI the University Federal Sergipe, 49100, Brazil (e-mail: gleissi_psi@yahoo.com.br, sergiovc.vc@bol.com.br).

I. M. A. G. is teacher in PPGPI the University Federal Sergipe, 49100, Brazil (Phone: +55 79 9134 1541; e-mail: aragao.ufs@gmail.com).

is not required by guarantee [2]. In this way, the VC is a method of the high risk to get high return in the future, providing the initial capital for the start-up companies of basis in innovation.

In this context, the aim of the present study was to compare the Innovation System in Brazil and South Africa. It also intends to describe a brief comment on the process of Venture Capital and present the industry innovation in Brazil and South Africa. The research is based on qualitative and descriptive.

II. VENTURE CAPITAL

Historically, even if it appears to be a new term, Venture Capital (VC) is already evidence of the application of this form of financing. The history of capitalist merchant Marco Crasso, in Rome, points out that after the conquest of new territories, he funded the construction of roads, buildings and foundations, and after they are ready received part of the profits of these ventures characterizing the new form of Venture Capital [1]. The VC has been of the importance for the economy of several countries. The Americans were that benefit in your business by VC.

From this perspective, the risk capital is an alternative for small and medium-sized businesses that have focused on the development of innovative products and services, and who has no financial resources or access to bank credit for the development of such technologies. As regards investment in risk capital, points out that the differential of this type of investment is the management support and technological relations and exchanges of experience to which you have access through the investor and possible alliances [4].

A range of innovative companies, for example, Adobe, Intel and Lucent started programs of risk capital to the promotion of greater innovation and, above all, motivate employees to take risks and become entrepreneurs that use the VC in an environment with significant changes [2].

Companies that receive the support of venture capital pass through stages of developments. To start receiving the seed capital performed in stage pre-operational, for the development of a product, market testing or patent registration. Then performs the initial structure, in general in the first year of its operation, when still does not sell its products/services commercially. And finally the phase of expansion of the company already sells its products on the market [6].

The main participants that encompass the activity of VC are: firstly, the entrepreneurs, who need investments. Second, the investors, who wish to achieve profitability. Third, the

investment banks, which require companies to sell, and finally, the venture capitalists, who need money and create a market advantage for the three previous actors [2]. The venture capitalists are looking for competitive advantage, growth potential, exit strategy viable, among other resources.

Therefore, it can be noticed that for the company, the VC is a long-term financing, in which no guarantees are required characterizing an excellent investment. However, in relation to the investor before the financing of VC is carried out a process of careful analysis of the company, to reduce the risk. The Table I shows the advantages and disadvantages to VC to the investor and entrepreneur.

A. Industry Innovation in Brazil and Venture Capital

Since over the last decade, Brazil has presented a growth in technological innovation. However, the progress in innovation in the country is news, for the most part, dependent on government support. The National System of Innovation (SNI) covers the infrastructure, the political decision, universities and laboratories of the government, such as tax laws and intellectual property, among others [10].

TABLE I
ADVANTAGES AND DISADVANTAGES OF VENTURE CAPITAL

| | Advantages | Disadvantages |
|--------------|---|---|
| Investor | <ul style="list-style-type: none"> - Largest gains due to the intangibility of the business; - Possibility of diversification of investments; - Dilution of risk | <ul style="list-style-type: none"> - Difficult visualization of the real value of the business and its prospect of gain; - Possible losses by analyzes performed poorly or measurable risks inadequately; - High cost to launch actions (divestment) |
| Entrepreneur | <ul style="list-style-type: none"> - Experience; - Development of skills; - Investment in strategy, research or specific projects; - Responsible for own future | <ul style="list-style-type: none"> - Difficult to visualize on the part of the investor and its prospect of gain; - Relevant Decisions on the company should be shared with the investor (decisions limited) |

The most of the institution of government in Brazil, promotes the creation and promotion of innovation. The Ministry of Science and Technology (MCTI) is the institution responsible for setting the policy of innovation and technology, having as a strategy the funding for the universities and research institutes federal, for example, the Brazilian Agricultural Research Corporation (EMBRAPA), National Bank of Economic and Social Development (BNDES), Petrobras and Eletrobras. Already the Agency of Financier of Studies and Projects (FINEP) acts as source of innovation projects and research oriented by MCTI [10].

The government plan 'Brasil Maior' and the Fund 'Verde-Amarelo' are examples of initiatives taken by Dilma Rouseff (the government since 2008). This plan has as objective the increase of competitiveness national and international, innovation and growth of RP&D activities with regional significance or inserted in local productive arrangements, and measurable contribution to the crowding and technological dynamism of productive chains acting in partnership with universities or research institutes in the country. The Fund

'Verde-Amarelo' aims intensify cooperation between universities, research centers and the productive sector, contributing to the significant increase in the investment in Science e Technology activities in Brazil.

But, ambiguous relationship between growths in innovation has been presenting a macroeconomic reality in Brazil. Fig. 1 [7] shows the non-alignment related to growth in the Gross Domestic Product (GDP) of Brazil with the other countries in the BRICS.

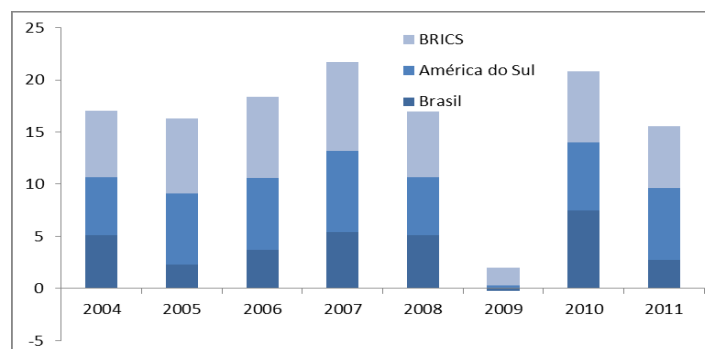


Fig. 1 Growth in the Gross Domestic Product (GDP)

In a comparative study conducted by [7] it is clear that the rate of economic growth in Brazil is lower than the other countries in the BRICS, in the period between 2004 and 2011, with the exception of 2010. These numbers indicate that the low GDP is related to maintenance of the Basic Interest Rate (SELIC) defined by the Brazilian government. With a view, the comparison with the bloc countries BRICS, Brazil, mainly in the area of technological innovation has enormous economic challenges and infrastructure to be achieved.

B. Industry Innovation of South Africa and Risk Capital

Recently integrated the BRICS, a group formed by the major emerging economies, south Africa presents a panorama ambiguous, on the one hand, the advancement and scientific knowledge, technology and innovation, and the other, the history of struggle and racial segregation reflects deeply on the development of the country and are the causes of this division of panorama.

South Africa is faced with the challenge of maintaining and expanding the modernization of areas of technological base developed during the apartheid and, at the same time, extinguishes the gap in the educational system inherited during the period of racial segregation. The various changes in the first ten years after the apartheid aimed to adapt the National System of Innovation (SNI) the reality of the country.

The Ministry of Science and Technology, Trade and Industry, and Higher Education and Training are at a level of equality in the structure of the SNI South African, followed by institutions of international cooperation, Advisory Council on National Innovation National Advisory council on innovation (NACI) and the National Foundation for Research National Research foundation (NRF). The council and the foundation are organizations created respectively with the objective to

provide guidelines on the role of science, technology and innovation in the promotion of national objectives, and to stimulate the creation of knowledge and the improvement of all fields of Science, Technology and Innovation, including traditional knowledge [5].

Unlike most developing countries, South Africa has the participation of the private sector above the expected in relation to the government on the issue of financing innovation. This has helped large companies to remain to the world technology frontier [8]. Recent data indicate that the private sector has invested 14.3 billion dollars, contributing approximately 500 million with venture capital in transactions that involve the life sciences (41 %) and in the IT industry (27%). Being that these contributions comes from resources of the local private sector, credit lines government and foreign capital [5].

In relation to government funds, the sector accounts for 35% of all investments of the number of transactions. The systems of government funding included in these investments are: the Corporation for the Development of Industry (CDI), the Innovation Fund, Cape Biotech, LifeLab, BioPad and PlantBi, all being instruments of the Department of Science and Technology now oriented and organised by the Agency of Technological Innovation - AIT [10].

The challenge encountered by companies in South Africa involved in the financing of risk capital is related to the regulation of exchange. To minimize the exchange related to investment in risk capital the small market of South Africa; investors tend to invest their projects abroad in normal market conditions.

III. METHODOLOGICAL PROCEDURES

The present work is part of the descriptive and qualitative approach. Given the objective, presented in the introductory section, to compare the System of Innovation in Brazil and South Africa, with emphasis on two specific phases, the description of a brief comment on the process of Venture Capital/Risk Capital and industry innovation in Brazil and South Africa of risk capital. Therefore, in order to organize such information, was chosen the comparative method. The first step of the literature search was performed in the collection of data in search of academic articles in databases, from the web portal. From the analysis of this initial group of literature, were located new references of interest that resulted in items reviewed and analyzed as described.

IV. ANALYSIS OF RESULT

Brazil and South Africa are countries with historical social and similar political, were European colonies; maintained enslaver schemes; owners of large quantities of minerals and vast biodiversity; present technologies for synthetic fuels (Petrobras for the Brazil and SASOL of South Africa). Other similarities include the extreme inequality of income and the internal regional disparities and both are in debt to the United States. However, maintains standards of leadership in their respective economic groups, Brazil in Mercosur and of the

economic bloc formed by the southern Africa countries - SADC [3].

Initially, the acronym BRIC was launched in 2001, by Jim O'Neill, economist linked to Bank Goldman Sachs, originally formed by Brazil, Russia, India and China (the factory of the world). However, in Beijing in 2011, China and Russia have invited South Africa to join the club BRIC, with the objective of attracting investors to the possible changes in the global economy, making it BRIC'S'. Each one with their economic reasons, political or strategic. The five emerging countries have in common the fact that their economies depend in large part on the industrialised countries [9].

However, the difference between the two countries is the forms of investment and financing of VC used by each country and issues geographics and economic. Brazil has approximately a territorial area of 8,515,767 km², much larger than the South Africa, with 1,221,037 km².

In spite of all the encouragement of the National Innovation System (SNI) of Brazil and the government invested in programs and lines of credit of the Science & Technology has inefficiency of public institutions and complex bureaucracy hindering the development of innovation in the country [10].

South Africa, for its time, in spite of its historical difficulties, encompasses forms of foreign funding, government, and the largest percentage of Venture Capital comes from a private company. However, due to the high exchange rate, investors risk their projects in the international market. On the other hand, the slowdown in relation to innovation of South Africa is directly related to their lack of ability, the inequality in access to quality education, which is compounded by the failure of the system technical education, which is a legacy of the apartheid system. In addition, the costs of labor in South Africa are estimated between 35% and 40% higher than in Brazil [5].

Another relevant factor is related to competition from imports oriental. Large companies were instructed to increase the scale of products, but with lower costs. Since then, many companies have been forced to change their operations to the outside. Tax Incentives could be used in South Africa to transform this framework. The example of Brazil, South Africa could increase the deduction of income tax of spending on Research and Development (R&D) in value of purchases [10].

Finally, openness to trade, a judicial system in operation, proper infrastructure, a tax system and regulatory fair, are necessary for the development of Science and Technology, both for Brazil and South Africa.

V.CONCLUSIONS

Both countries have the potential to become world economies of great importance in the fields of science, technology and innovation. Brazil and Africa have in their geographic territories natural potential envied by the rest of the countries. It can be noticed that the limitations of each country are structural and governmental, but can be modified from the creation of an environment of more favorable policies.

In relation to trading economy of countries, a way to expand the innovation in this sector, it would be through the modification of restrictions on the import and export adequacy in subsidy program to reduce the cost required for export, mainly to small businesses. In the case of Brazil and South Africa, the raw material represents the majority of its exports. However, the large multinationals influence on prices making these products vulnerable to changes in the world market.

The investment with lower interest rates and the strengthening of the connection between university and company is another important factor for the economic growth of the country, because it aims at a greater involvement of the private sector by ensuring that the research is oriented to the market.

However, it is necessary to implement some policy reforms for the Brazil and South Africa will be able to development on their products, services and processes of innovation. These policy reforms would be the instrument necessary for the long-term development in the two countries. Therefore, it can be noticed that a satisfactory environment investment encourages both local business and multinational companies to remain in the country providing the activities of R & D.

REFERENCES

- [1] Caetano, P. A. *Capital De Risco*. Conjecturaatual: Lisboa, 2013.
- [2] Faurya, T. P., Carvalho, M. M. Corporate Venture Capital: Geração E Acompanhamento De Oportunidades De Investimento em empresas inovadoras. (S.L). *Revistaprodução*, V. 23, N. 4, P.735-750, Out-Dez.2013b.
- [3] Kahn, M. J. The Brics And South Africa As The Gateway To Africa. *Journal South African: Johannesburg*, V. 111, N. 7, July 2011.
- [4] Magalhaes, J. M.; Daudt, C. G.; Phonlor, P. R. Vantagens proporcionadas às pequenas E Médias empresas por meio Da Uniãoemredes De Cooperação No Contexto Do Venture Capital, Curitiba. *Revista De Administração contemporânea*, V. 13, N. 4, Dec. 2009.
- [5] Mendonça Pedro Luiz Carneiro De; Weid Carolina Von Der; Rosas Gustavo. Inovação Para O Desenvolvimento: Osdesafios Da África Do Sul Entre Os Brics E A África. In: Ministério Das Relações Exteriores. *Mundoafora: Políticas De Incentivo À Inovação*. Brasília: Ministério Das Relaçõesexteriores, Mre, 2013.
- [6] Meirelles, J. L. F.; Júnior, T. P.; Rebelatto, D. A. N. Venture Capital E Private Equity No Brasil: Alternativa De Financiamento Para Empresas De Base Tecnológica. *Revistagestão Da Produção*, V. 15, N. 1, Jan.-Abr. 2008
- [7] Neduziak, L. C. R. Uma Comparação Do Baixo crescimento economic brasileiro em relação aos países Do Brics. Curitiba: *Conjuntura Global*, Vol.2, N.4, Out./Dez., 2013.
- [8] Portmann, D.; Mlambo, C. Private Equity And Venture Capital In South Africa: A Comparison Of Project Financing Decisions. *Journal Economy And Management*, Pretoria, V. 16, N. 3, 2013.
- [9] Thorstensen Vera, Ramos Daniel, Müller Carolina, Nogueira Thiago. Osbricscomoatoresnaorganização Mundial Do Comércio. In: Thorstensen V.; Oliveira, I. T. M. (Org). *Os Brics Na Omc: Políticascomerciaiscomparadas De Brasil, Rússia, Índia E África Do Sul*. Brasília: Instituto De Pesquisaeconômicaaplicada, Ipea, 2012.
- [10] Tuomi, Krista.; Neto, Castro, Lopo. Innovation And Venture Capital Policy In Brazil And South Africa. *Journal Of Technology Management & Innovation*. Santiago, V. 8, N. 2, May. 2013.

Glessiane de O. Almeida. Undergraduate Psychology. Ms. Student of Master in Intellectual Propriety at Federal University of the Sergipe, Brazil.

SérgioMurilo C. Messias. Undergraduate in Physical Education Education. Mr. Student of Master in Intellectual Propriety at Federal University of the Sergipe, Brazil

Iracema M. de Aragão Gomes. Dr. Teacher of Master in Intellectual Propriety at Federal University of the Sergipe, Brazil. Has an MBA from the University of São Paulo (1998) and PhD in Business Administration from the University of São Paulo (2005). He is currently assistant professor at the Federal University of Sergipe in undergraduate administration, master's and doctorate in science intellectual property. Coordinates the postgraduate degree in public administration. Conducts research in the area of entrepreneurship (business incubators, technology parks and business plan) and intellectual property.

- Franca, M. C. L. ; Iracema ; Russo, S. L. ; Machado, G. J. C. . Factors Conditioning Failure Of Micro And Small Businesses Of The Information Technology And Communication (Ict): Study Of Multiple Cases, Aracaju (Se), Brazil. *Business Management Dynamics*, V. 3, P. 40-50, 2014.
- Aragão, I.M.A.; Barreto, I.D.C. ; Russo, S. L. . Analysis Of Program Prime Of Brazil. *World Academy Of Science, Engineering And Technology (Online)*, V. 1, P. 123-125, 2013.
- Russo, S. L.2013russo, S. L. ; Martins, F.A. ; Santana, J. R. ; Aragão . The Interaction University-Business As A Factor Of Local Development: A Study Of Oil And Gas Sector Of Sergipe. *African Journal Of Business Management JCR*, V. 7, P. 1660-1666, 2013.
- Santos, A. G.2013santos, A. G. ; Silva, A. S. R. ; Aragão ; Russo, S. L. . The Potential Entrepreneur Of Management Students At The Federal University Of Sergipe, Brazil. *Australian Journal Of Basic And Applied Sciences*, V. 1, P. 35-42, 2013.
- Gomes, I.M.A.2013gomes, I.M.A. ; Barreto, I.D.C. ; Paixão, A.E.A. ; Russo, S.L. . Análise Da Seleção De Projetos Do Programa Primeira Empresa Inovadora (Prime) No Centro Incubador Do Estado De Sergipe/Brasil (Cise). *Geintec - Gestão, Inovação E Tecnologias*, V. 3, P. 083-093, 2013.
- Russo, S. L.2013russo, S. L. ; Iracema ; Santana, L. V. ; Fabris, J. P. . Employment Of Arima Models For Prediction Of Sugar Cane In Sergipe, Brazil. *Australian Journal Of Basic And Applied Sciences*, V. 7, P. 139-147, 2013.
- Pedro Fabris, Jonas2012pedro Fabris, Jonas ; Iracema ; José Couri Machado, Glaucio . Evolução Da Proteção Dos Produtos Tradicionais. *Geintec - Gestão, Inovação E Tecnologias*, V. 2, P. 387-395, 2012.
- Gomes, Iracema Machado De Aragão ; Silva, Jonathan Santos . Incubadoras De Empresascomomecanismo De Estímulo À Inovação. In: Russo, Suzana Leitão; Silva, Gabriel Francisco. (Org.). *Capacite: Oscaminhos Para Ainovaçãotecnológica*. 1ed.São Crist[Ovãõ: Editora Ufs, 2014, V. 1, P. 09-32.