

# The cooperation between companies and universities and its reflections in the information society<sup>1</sup>

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## Abstract

It will be discussed in this article, as an introductory character, the cooperation between companies and universities as an instrument for the promotion of technological progress, which is an essential element for the economic and social development of a nation. Thus, there will be discussed aspects related to open innovation, protection of intangible assets arising from the cooperation, technology transfer agreements and licensing of intellectual property rights as a means of integration between Brazilian companies and universities with foreign companies and the consequent increase in international relationships as well as economic and technological development of the involved actors. Brazil occupies a prominent position in the international trade; therefore it denotes the relevance in addressing the integration between companies and universities that are outstanding in creating new technologies and its impact on the information society.

**Keywords:** Companies. Cooperation. Intellectual Property. Technology transfer agreements. Universities.

## Introduction

In the globalization process we face nowadays, the competitiveness of each nation is directly linked to the creation of a strong and harmonious system of Science, Technology and Innovation, thereby allowing cooperative actions and encouraging technology transfer.

The technology transfer between companies and research institutions demonstrates the importance of knowledge for technological advancement and competitiveness of a nation. In recent years, the use of the generated

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knowledge in universities as well as many forms of technology transfer resulting from academic research has been object of thorough analysis and investment in developed countries.

In the Brazilian context, however, the debate needs to move forward. Nevertheless, the Brazilian government base has been offering instruments for strengthening the innovative activities in the country, encouraging interaction projects between public and private sector. The cooperation between companies and universities is still an incipient topic in the current panorama that reveals quality, innovation and internationalization as key pieces for international recognition.

In view of the new international scenario, which emphasizes the globalization process and economic growth, and considering that the industry is an important sector of the Brazilian economy and should be at the center of the development strategy of the country, it is essential to invest in cooperation as well as in technology transfer agreements, since these are strategies to promote solidification of an economy based in the technological innovation as competitive advantage.

Thus, for the Brazilian sustainable growth, it is essential to invest in education linked to innovation, once that stimulating entrepreneurial education is a key factor for the development of a country, and it is from all this that the importance of investment in collaborative networks emerges.

Considering that Brazil occupies a prominent position in international trade in various segments, it is important to address the integration between companies and universities that are outstanding in creating new technologies as well as its impact on the information society.

Therefore, we will address the model of open innovation, the protection of intangible assets arising from public-private cooperation, as well as technology transfer agreements resulting therefrom.

## Strategic model of open innovation

The need for skilled labor has allowed an approach between higher education institutions and companies, showing to be the most appropriate and profitable way for the formation of a new paradigm in Brazil.

Innovation activities, such as research and development of a new product or process can be carried out by the company through its researchers (closed

innovation), as it can also be effective by hiring an Institution of Science and Technology or university (open innovation).

Research and innovation are increasingly moving away from the laboratories of companies and returning to where they first started: the university. Within world economy growth, the generation and dissemination of knowledge also increases, in this sense, universities are seen as natural partners for business and the relation university-industry is growing.<sup>2</sup>

Open innovation refers to the use of external ideas, and letting the ideas and technologies not used previously to be used by other organizations. This requires from each company, when opening their business model, to allow external ideas and technologies to be used as well as making it available for the outside public. Open innovation offers the prospect of lower costs to innovation, shorter time to enter the market and the possibility to share risks with other companies.<sup>3</sup>

It is worth noting the *Plano Brasil Maior* (Brazilian Development Plan)<sup>4</sup> which in its Structuring Guideline 4 brings as an objective the rooting of foreign companies and stimulus for the installation of centers of Research and Development (R & D) in the country. There is thus the importance of interaction between universities and industry as strategy for consolidation of Brazil in the international scenario.

As a public initiative, the *Plano Brasil Maior* seeks to unite the efforts of the Federal Government with private entities, glimpsing the national development in an integrated effort to generate employment and income, leveraging the expertise of companies, academia and society.

The politics of science and technology is considered a strategy to develop and implement policies and solid budgets on science and technology, having the private sector, the state, local governments, scientific and higher education communities as well as other nations working for this purpose.

Over the last fifty years there has been a gradual opening of international trade which has culminated with the establishment of the World Trade Organization (WTO), fact that has been reflected in increased international trade between companies, and therefore the economy of each country.

<sup>2</sup> DEVOL, Ross et al. *Mind to market: A global analysis of university biotechnology transfer and commercialization*. Available at: <[http://www.milkeninstitute.org/pdf/mind2mrkt\\_2006.pdf](http://www.milkeninstitute.org/pdf/mind2mrkt_2006.pdf)>. Accessed: 15 Sept. 2012.

<sup>3</sup> CHESBROUGH, Henry. *Inovação aberta: como criar e lucrar com a tecnologia*. Tradução de Luiz Claudio de Queiroz Faria. Porto Alegre: Bookman, 2012a.

<sup>4</sup> BRASIL. *Plano Brasil Maior 2011-2014*. Inovar para competir. Competir para crescer. Available at: <[http://www.brasilmaior.mdic.gov.br/wp-content/uploads/cartilha\\_brasilmaior.pdf](http://www.brasilmaior.mdic.gov.br/wp-content/uploads/cartilha_brasilmaior.pdf)>. Accessed: 20 Sept. 2012.

According to the Ministry of Development, Industry and Foreign Trade,<sup>5</sup> in 2010, Brazil was among the seven largest economies in the world, ranked on the twentieth position in the world's largest importers and on the twenty-fourth of global exporters.

Currently Brazil has been providing mechanisms for the development of research activities, development and innovation in the country, being highlighted the incentives through funding, as well as cooperation between research institutions and the private sector, thus promoting the transfer of developed technology.

Due to the globalization and the international trade growth we have been facing, states are increasingly exposed to competition. The information society has introduced a new competitive paradigm, since it is not a dispute between only domestic companies, but of a global character, i.e., competition is no longer just internal, it has become global, in view of international developed relations.

Currently, the industrial conglomerates that used to dominate the market face strong competition from new companies that do almost any type of own research and innovate from the discoveries resulting from research of other companies.<sup>6</sup>

The cooperation between the public sector and the private sector in matters of research and technological development does not have a recent history. However, it was in the United States, during the Cold War period, marked by new policy orientations induced by the growth of spending on R & D in the defense sector, that the ancient practice of collaboration between universities and the industrial world gained a new and final impulse.<sup>7</sup>

In the 1960s and 1970s, industrial countries were conducted to further invest in partnerships between R & D institutions and in the productive sector, in order to guide efforts to produce new knowledge for the promotion of local economic development. In the early 1980s, the success of the policy of technology transfer and the high industrial growth in Japan, coupled with strong competition in world markets for technology, led the United States to have from partnerships between institutions and industry a key component of its technology and innovation policy. Thus, in most countries, encouraging science-

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<sup>5</sup> Available at: <[http://www.desenvolvimento.gov.br/arquivos/dwnl\\_1312203713.pdf](http://www.desenvolvimento.gov.br/arquivos/dwnl_1312203713.pdf)>.

<sup>6</sup> CHESBROUGH, Henry. *Modelos de negócios abertos: como prosperar no novo cenário da inovação*. Tradução de Raul Rubenich. Porto Alegre: Bookman, 2012b. p. 3.

<sup>7</sup> GUSMÃO, Regina. Práticas e políticas internacionais de colaboração ciência-indústria. *Revista Brasileira de Inovação*, Campinas, v. 1, n. 2, p. 327-360. jul.-dez. 2002. p. 328.

-industry collaboration now is seen as an important intervention tool, turning into a pillar of the national programs of science and technology.<sup>8</sup>

In recent years, innovation has been established as an important guarantor of growth, competitiveness and differentiated profitability to the companies, which remains essential for maintaining the current globalized world. From the second half of the twentieth century, governments of developed and developing countries had already recognized the importance of the role of science and technology in economic, social and cultural development. From the 1990s, this concern has been stressed in Brazil, when the Brazilian government started emphasizing the need for structuring initiatives to stimulate the incorporation of science, technology and innovation in its development policies.<sup>9</sup>

The triple helix approach developed by Henry Etzkowitz, lies the innovation in a moving and developing context, where new relationships are established among the three institutional spheres (helixes): university, industry and government. For the author, the interaction among university, industry and government is the key to innovation and growth in a knowledge-based economy.<sup>10</sup>

The theory of the triple helix is characterized as an evolutionary model of the concept of Public-Private Partnerships (PPP). The PPP model is based on joint activities between the government and the private sector. The triple helix adds the university as an actor in this process to strengthen the growth of knowledge and innovation in projects of social interest.

The scope of technical progress requires cooperation practices of the so-called triple helix actors to contribute in the generation, maintenance and dissemination of information, since innovations are essential to maintaining and increasing the competitiveness of companies. They stem from the efficient operation of networks and from the national innovation system.<sup>11</sup>

The use of knowledge produced in universities represents a rich source of information and training for the development of new technology, since technology transfer between universities and the productive sector consists of an

<sup>8</sup> GUSMÃO, 2002, p. 329.

<sup>9</sup> LOTUFO, Roberto de Alencar. A institucionalização de Núcleos de Inovação Tecnológica e a experiência da Inova Unicamp. In: SANTOS, Marli Elizabeth Ritter dos; TOLEDO, Patricia Tavares Magalhães de; LOTUFO, Roberto de Alencar (Org.). *Transferência de Tecnologia: estratégias para a estruturação e gestão de Núcleos de Inovação Tecnológica*. Campinas: Komedi, 2009. p. 41-74.

<sup>10</sup> ETZKOWITZ, Henry. *Hélice tríplice: universidade-indústria-governo: inovação em movimento*. Porto Alegre: EdPUCRS, 2009.

<sup>11</sup> ABDALLA, Marcio Moutinho et al. *Hélice tríplice no Brasil: um ensaio teórico acerca dos benefícios da entrada da universidade nas parcerias estatais*. Available at: <[http://www.fsma.edu.br/cadernos/Artigos/Cadernos\\_3\\_artigo\\_3.pdf](http://www.fsma.edu.br/cadernos/Artigos/Cadernos_3_artigo_3.pdf)>. Accessed: 10 May 2012.

alternative and complementary way to achieve a higher technological level for Brazilian companies.<sup>12</sup>

While companies benefit from reduced investment in training, procurement of intellectual labor and equipment, universities in turn, form human material and much more qualified laboratories.<sup>13</sup>

The United States is a great example of successful practices of cooperation between the public and private sector. The University of California in Berkeley is maintained, for example, by 10% of the value coming from students' tuition, and the remainder comes from partnerships with the private sector. The budget of the university in 2008 was \$ 19 billion, and from these, only \$ 1.7 billion was derived from students' tuition.<sup>14</sup>

Paradoxically, in Brazil it appears that private universities are maintained almost exclusively from the students' tuition, becoming a bottleneck to be resolved in order not to impair the social mission performed by the institutions.

The competitive global market, as well as the quick access to information and new markets, results in an accelerated competition among companies, and for them to keep their participation and have competitive advantage, it becomes essential to have investments in innovation from them. The open innovation has proved to be an advantageous and efficient model for those which are involved. However, to ensure exclusivity and ownership of products or processes resulting from innovation is critical to protect them through intellectual property rights.

## Protection of intellectual property rights resulting from cooperation

The cooperation model between educational and research institutions with business communities proves to be very efficient, reflecting a significant increase in the protection of intangible assets shared by the involved subjects in the innovation process, bringing benefits to both participants.

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<sup>12</sup> GARNICA, Leonardo Augusto; TORKOMIAN, Ana Lúcia Vitale. *Gestão de tecnologia em universidades: uma análise do patenteamento e dos fatores de dificuldade e de apoio à transferência de tecnologia no estado de São Paulo*. Available at: <<http://www.milkeninstitute.org/publications/view/289>>. Accessed 10 August 2012.

<sup>13</sup> BONVENTTI, Rodolfo C. Parcerias para decolar. *Ensino Superior*, São Paulo, a. 14, n. 158, p. 22-25. nov. 2011.

<sup>14</sup> ROMANINI, Bruno. Independência e cooperação. *Ensino Superior*, São Paulo, a. 10, n. 129, p. 18. jun. 2009.

The intellectual property right has assumed great importance in the international debate in recent years. The transformations in which the world economy has been undergoing impose new challenges all the time; among them we have the global competition, which increasingly requires strategies to conquer new spaces.

A strategy of analysis and reflection on intellectual property should start by questioning what are the gaps in the current knowledge, what are the possible areas of policy that should be explored and finally, what are the priority areas of action.<sup>15</sup>

When the effective protection of intellectual property is considered as part of the infrastructure of a nation, it contributes to the technical change, diffusion of knowledge, expansion of human resources, technology sponsoring, industrial growth and economic development.<sup>16</sup>

Intellectual property should not be placed solely on business optics. Into the formulation of policies and negotiating strategies, an integrated society view should prevail, including search mechanisms and practices that ensure internal coherence and internationally in order to stimulate international cooperation, stimulating scientific and technological development.<sup>17</sup>

Currently, under the intellectual property rights, there are many intangible property that can be the object of protection. Brazil is a signatory and has incorporated into its legal systems the main international treaties that deal with the matter. The legislation has undergone numerous changes, especially after Brazil's participation in the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) and ratification of the establishing agreement of World Trade Organization (WTO), which included, Annex 1C to the Agreement on Aspects of Intellectual Property Rights (the TRIPS Agreement) in 1994, which extended the protection of intangible property that can be protected by intellectual property rights.

The competition in the current capitalist economy is mainly characterized as an evolutionary process and therefore dynamic and innovations emerge constantly from search for new profitable opportunities for companies in their competitive interaction.<sup>18</sup> Thus, it is evident the importance of legal protection of intangible assets.

<sup>15</sup> ROFFE, Pedro. *América Latina y la nueva arquitectura internacional de la propiedad intelectual*. Buenos Aires: La Ley, 2007. p. 141.

<sup>16</sup> SCHERWOOD, Robert M. *Propriedade intelectual e desenvolvimento econômico*. São Paulo: Universidade de São Paulo, 1992.

<sup>17</sup> ROFFE, 2007, p. 143.

<sup>18</sup> POSSAS, Mario L. Concorrência schumpeteriana. In: KUPFER, David; HASENCLEVER, Lia (Org.). *Economia industrial: fundamentos teóricos e práticos no Brasil*. Rio de Janeiro: Campus, 2002.



Fonseca expresses<sup>19</sup> “competition means freedom to compete fairly and honestly, not admitting artificial entanglements to the entry of new companies into the market or the growth of business activity”.

The fierce competition among companies that aim to maintain and win new markets, pushes forwards the growth of scientific and technological development, which generates significant economic benefits for the whole society, and since it propels innovation, it creates new products as well as new processes or improvements that can bring productivity gains.

For companies, the partnership with research centers, besides reducing risk and sharing costs, allows access to new competencies, brings the possibility of absorbing knowledge and recent discoveries, as well as the accomplishment of exploratory research in new areas, other than those on its main actuation.<sup>20</sup>

The Agricultural and agro-industrial processes as the new products and services protected by intellectual property rights, are some of the strategic elements for agribusiness competition, generating employment and wealth to Brazil.<sup>21</sup>

After all, technology plays a fundamental role in the economy, as one of the factors of production, whose set contains essential elements to the manufacturing of goods that will satisfy the needs and desires of society.<sup>22</sup>

Innovation is one of the main strategies linked to the competitive advantages of companies seeking to maintain and highlight the markets where they operate, through new products or processes. Through innovation, the economic development is maximized and the growth of companies is boosted, thus allowing competition in the increasingly fierce and widespread markets.

Currently, those hitherto informal relationships among researchers, academics and industry that predominated in the recent past are now gradually taking the form of initiatives or well-structured programs, including custom research, training programs and internships of researchers in industry, researching projects in collaboration with the private sector on public funding.<sup>23</sup>

Thus, compared to the new model derived from the information society, it becomes necessary to formalize the established cooperation between actors

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<sup>19</sup> FONSECA, José Júlio Borges da. *Direito antitruste e regime das concentrações empresariais*. São Paulo: Atlas, 1997. p. 29.

<sup>20</sup> GUSMÃO, 2002, p. 330.

<sup>21</sup> PIMENTEL, Luiz Otávio. Introdução à propriedade intelectual e inovação no agronegócio. In: BRASIL. Ministério da Agricultura, Pecuária e Abastecimento. *Curso de propriedade intelectual & inovação no agronegócio*. 2. ed. rev. e atual. Brasília: Mapa, 2010. Organização de Luiz Otávio Pimentel.

<sup>22</sup> PIMENTEL, Luiz Otávio. *Direito industrial: as funções do direito de patentes*. Porto Alegre: Síntese, 1999.

<sup>23</sup> GUSMÃO, 2002, p. 332-335.



of the collaboration network through technology transfer agreements, besides protecting the resulting intangible assets.

## Technology transfer agreements

The technology transfer agreements are necessary instruments to regulate the integration between universities and companies having as object an intangible asset protected by intellectual property rights.

Contracts for research and development aim to achieve results for technological innovation, such as to the improvement of a production process, such as the reduction of time to prepare a product as well as for creating innovative products.

Through the partnership agreement, the companies have the opportunity to establish cooperation with universities to conduct either scientific or technology research, using their laboratories, infrastructure, as well as their researchers, thus avoiding high investing values to build the necessary infrastructure in the company.

After the implementation of research and development, which typically involves high investment, the company or partners are able to achieve breakthrough results by creating a new product or a new process. From this, there is the possibility to opt for maintaining the secrecy, taking risks that third parties also research the same issues, and develop the same or similar products, or protect them adequately through the industrial property rights.

However, before conducting surveys is essential to search the databases of patents, that is to say, an anteriority search, avoiding effort and expense in research that are already available in the prior art. Even if the development of innovative products or processes is not a company policy, either for financial reasons or market circumstances, they may use up what is on the market.

Before checking for the existence of such technology, the interested part which cannot copy it has the option to negotiate it with the owner, through transfer agreements and technology licensing.

To serve this market, in the international scope, many states have cutting-edge technology and technology transfer policy, especially in major universities and research centers, investing thousands of dollars in research and having their names highlighted in the international scenario.

Thus, considering that the international relations have been intensified, enabling cooperative action and trade settlement, it raises the importance of

maintaining technology transfer agreements between Brazilian or foreign companies and institutions, thereby encouraging commercial exchange.

The American universities have expanded significantly the commercialization of technologies developed on their campuses in recent years, as well as generating new business from U.S. universities.<sup>24</sup>

In the United States, it has already been 30 years since the Bayh-Dole Act was enacted, a legislation that stimulated the process of partnerships between public research institutions and industry and accelerated the creation of technology transfer offices.

Historically, the United States was the country which most took on the formal protection of intellectual property rights, the Bayh-Dole Act allows participants of financed research from federal funds to deposit patent applications and grant operating licenses to third parties. Still, the modification of the U.S. patent law led to the creation, within universities and research institutes, of new intermediate agencies to formalize the interactions with the private sector.<sup>25</sup>

The international experience shows that there are now various collaborating modes between the public and the private sector, associated with a wide range of institutional arrangements that have been created to facilitate this cooperation, making it possible to confirm that these devices play a real leverage effect on research efforts and on innovation, besides very important indirect effects (for example, the network improvement and the flow of tacit knowledge), susceptible to promote broader and lasting collaborations.<sup>26</sup>

Universities and companies are capable to intensify their interactions and cooperation activities. The Government is responsible for establishing the rules and incentives that should be granted to companies and research institutions. Thus, political action is considered to be of extremely importance and indispensable for the proper performance of cooperation between universities and companies as well as their impact on the innovation process.

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<sup>24</sup> GORGULHO, Guilherme. *Universidades dos EUA ampliaram transferência de tecnologias em 2010*: volume de licenciamentos para start-ups cresceu 14% em relação ao ano anterior, aponta AUTM. Available at: <<http://www.revistaensinosuperior.gr.unicamp.br/noticia.php?id=55>>. Accessed: 20 Oct. 2012.

<sup>25</sup> GUSMÃO, 2002, p. 339.

<sup>26</sup> GUSMÃO, 2002, p. 331.

## Final considerations

In face of the current globalization process and the intense maintained international relations, which stimulate the competitiveness of each nation, the development of cooperative actions and technology transfer for innovation becomes essential to the conquest and maintenance of fierce international market.

Universities and research centers are increasingly better prepared to attend this growing demand. It is extremely advantageous to the private sector to maintain strong links with research centers, which have highly specialized labor, equipped laboratories as well as groups of researchers skilled in several areas.

Thus, for Brazil and Brazilian companies succeed in this segment and incorporate in their structures new standards that emerge from the Information Society, which is focused on innovation, it becomes necessary the acceleration of the creation of supportive environments, that is to say collaborative networks, which will help enabling a greater cooperation establishment, which allows innovation, resulting in agreements of technology transfer and licensing of intellectual property rights.

## A cooperação entre empresas e universidades e seus reflexos na sociedade da informação

### Resumo

Será discutido neste artigo, em caráter introdutório, a cooperação entre empresas e universidades como instrumento para a promoção do progresso tecnológico, que é um elemento essencial para o desenvolvimento econômico e social de uma nação. Assim, serão explorados aspectos relacionados à inovação aberta, proteção de ativos intangíveis decorrentes da cooperação, aos acordos de transferência de tecnologia e ao licenciamento de direitos de propriedade intelectual como meio de integração entre empresas e universidades brasileiras com empresas estrangeiras, devido ao aumento das relações internacionais bem como do desenvolvimento econômico e tecnológico dos atores envolvidos. O Brasil ocupa uma posição de destaque no comércio internacional; portanto, denota a relevância de abordar a integração entre empresas e universidades que se destacam na criação de novas tecnologias e seu impacto sobre a sociedade da informação.

*Palavras-chave:* Empresas. Cooperação. Propriedade intelectual. Acordos de transferência de tecnologia. Universidades.

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