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TECHNOLOGY TRANSFER FROM THE UFMG TO A PRIVATE COMPANY: PROCESS AND RESULTS

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ABSTRACT

Economic growth and technological development are closely related. In this article, the process of technology transfer developed by the UFMG (a new sole cushioning system for a footwear industry in Nova Serrana city, in Minas Gerais State) is analyzed, using a case study. The data were collected from UFMG document research and through semi-structured interviews with the principal stakeholders. The process of technology transfer from the university to Crômic was a great learning process for both institutions. It led to a better relationship between the UFMG and the productive sector, opening up opportunities for new agreements and products. The study identified some aspects that need to be improved, such as simplification of procedures, bureaucracy reduction and regulation of the Brazilian Innovation Law within the departments of the university. The case study shows how much better cooperation between university and industry can contribute to the innovation process and improve competitiveness and the development of our country in these times of economic crisis.

Keywords: Innovation; University and Industry; Brazilian Innovation Law; Technology Transfer.

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TRANSFERÊNCIA DE TECNOLOGIA NA UNIVERSIDADE UFMG PARA UMA EMPRESA PARTICULAR: PROCESSO E RESULTADOS

RESUMO

Há uma estreita relação entre crescimento econômico e desenvolvimento tecnológico. Neste artigo, analisa-se o processo de transferência de tecnologia desenvolvida na Universidade Federal de Minas Gerais (UFMG) – um novo sistema de amortecimento para solados – para uma empresa de calçados *Crômic* de Nova Serrana (MG), usando-se o método de estudo de caso. Os dados foram obtidos por meio de pesquisa documental realizada na UFMG e de entrevistas semiestruturadas realizadas com os principais agentes envolvidos no processo. O processo de transferência de tecnologia da UFMG para a *Crômic* foi um grande aprendizado para as instituições envolvidas. Esse processo permitiu um maior diálogo da universidade com o setor produtivo, além de abrir espaço para novos convênios e novos produtos. O estudo identificou também aspectos que precisam ser aprimorados: (1) simplificação dos procedimentos; e (2) redução da burocracia e a necessidade de regulamentação da Lei de Inovação no âmbito da UFMG. O caso estudado demonstrou o quanto o aumento do processo de cooperação entre universidade e empresa pode contribuir para a inovação, competitividade e desenvolvimento nacional, especialmente em períodos de grave crise econômica.

Palavras-chave: Inovação; Cooperação Universidade-Empresa; Tecnologia; Transferência de Tecnologia.

INTRODUCTION

The trinomial of science, technology and innovation (ST&I) plays an important role in defining the development model of countries and regions and the evaluation of public policies for nations and sectors. ST&I affect economic growth, increased competitiveness and the improvement of financial and economic conditions in the productive sector. ST&I also influence regional human development indicators and people's quality of life (VIOTTI, 2003).

For innovation to occur, articulated and planned interaction between various agents is necessary. The National System of Science, Technology and Innovation is made up of a large network of institutions and partners. Knowledge transfer from universities to the productive sector is essential to the development process because there is a close relationship between scientific and technological advances and the stage of development of a country (PHILIPPI, MACCARI, CIRANI, 2015). Mastering science and technology is a determining factor in the level of development of a society. In developed and emerging countries, a university is viewed as one of the most important sources of theoretical and applied knowledge. It also plays a fundamental role in training human resources in all fields. In addition to its production of new technologies, a university is also encouraged to transfer these technologies to companies so that they can be turned into products and placed on the market.

In fact, PHILIPPI, MACCARI, CIRANI (2015) studied a start up in a case study, showing how the university can contribute more effectively to society, since the basic research that remains within the "university walls" is "the basis" for the company's successful innovations. Innovations have significantly resulted in the development of new business with the potential for even greater contributions in the future.

This article reports a concrete experience of the creation of a new technology developed by the Federal University of Minas Gerais (UFMG) and its transfer to a private company that implemented it in its production line to produce an innovative product for the market. The article looks at the various stages of this process and the role played by various institutions. One of the contributions of the article is that it encourages greater integration between universities and the productive sector as an alternative for a country to improve its socio-economic indicators and, consequently, achieve higher levels of development.

In addition to this introduction, the article contains four other sections. The second part looks at some of the theoretical considerations regarding the National Innovation System and the role of the various actors involved in the generation of science, technology and innovation, fundamental factors in the promotion of development. In the third part, the methodological procedures that guide the study are presented, along with the criteria used in the data collection and the choice of the sources of information. The fourth part is dedicated to describing the new technology in question and its transfer to the productive sector. It tells of the initial contacts between the company and the UFMG, the agreement they made, the creation of the new technology, the profile of the footwear company and the technology transfer, together with an evaluation of the results of this partnership. In the fifth and final part, some conclusions are presented, along with recommendations for knowledge transfer and suggestions for public policies on knowledge transfer between universities and companies.

Innovation process: interaction between the state, universities and the private sector

The literature on innovation is wide-ranging and extensive. It was summarized by Oliveira (2012). In this article, the fundamentals for analyzing the proposed problem are mentioned. The National Innovation System can be understood as a network of public and private institutions and mechanisms that, in a dialogical process, produce, develop and disseminate technological innovations in a country. This system includes universities, different levels of government, funding and regulatory agencies, financial systems, intellectual property laws, companies and their research laboratories, business associations, research institutes and the network of federal technical schools.

The first graphic model suggested to represent National Innovation Systems was created by

Argentinean theoreticians Jorge Sábato and Natálio Botana, in the form of a triangle known as "Sábato's Triangle". Every institution of the National Innovation System is represented in one of its vertices. The upper vertex is occupied by the government, which is linked on the one hand to the productive sector and on the other to the scientific and technological infrastructure available in the country. Criticisms of Sábato and Botana's model include the recommended rigid nature of interactions between the sectors described in the model (SBRAGIA *et al.*, 2006).

In 1996, in keeping with the development of the concept of National Innovation Systems, a theoretical and methodological approach of a triple helix was proposed by Etzkowitz and Leydesdorff (1998) and Wolffenbuttel (2001), which became a theory for a model. This model is shown in Figure 1, and has been continuously used to describe this process in many countries.

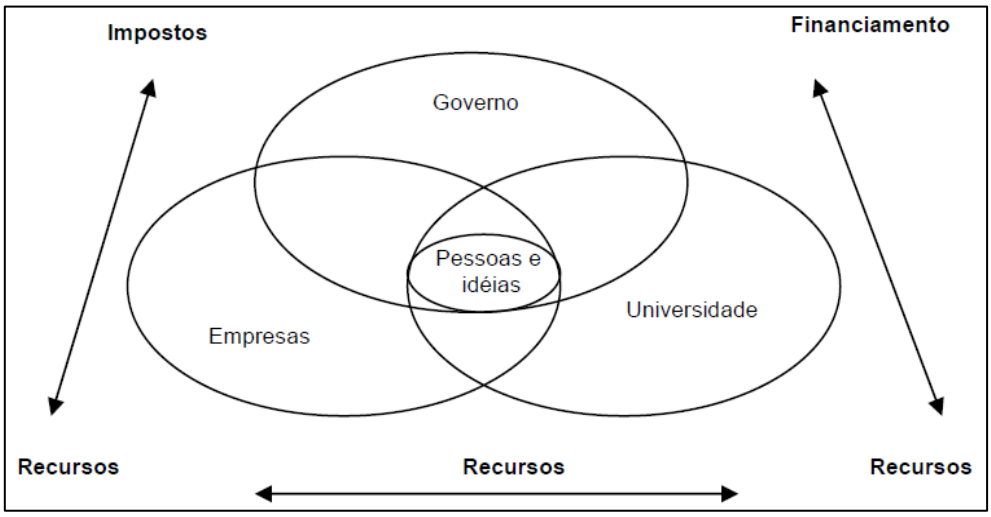

FIGURE 1 - Phase 3 – Triple Helix Model
Source: SBRAGIA *et al.*, 2006, p. 21

In this model, each helix represents an independent sphere of the innovation system. However, each sphere interacts with the others through flows of knowledge between them. Furthermore, each institution can perform functions that were once specific to the other two. Thus, universities can act like entrepreneurs, registering patents and creating technology-based companies (STOROPOLI, BINDER & MACCARI, 2013). In turn, companies can share knowledge with each other to institute training programs with levels of excellence for their employees (SBRAGIA *et al.*, 2006, p. 20-21).

In Brazil, according to Terra (2001, p. 8), "the government acted as the great driving force for interaction between companies and universities, in keeping with Sábato's Triangle". Recently, the government, through its drafting of public policies, has encouraged universities to take on a more proactive role in the technological, economic and social development of the country. Viotti (2003) described four models to understand the nature of the production, diffusion and use of ST&I: the linear, the chain link, the systemic and technological learning.

The first model, characterized as the linear model, describes the innovation process as a "compartmentalized and sequential phenomenon, in which research acts as a kind of catalyst of the chain reaction that leads to [...] innovation" (VIOTTI, 2003, p. XXIII). In this prototype, the entire process happens in specific and successive stages. In the initial stage, scientific knowledge is generated. From this knowledge, applied research is conducted, followed by experimental development that may or may not lead to the invention to be incorporated into production. Later, when sold, it can be transformed

into an innovation. In this model, the company is only a user of the technology (VIOTTI, 2003).

In the second model, known as the chain link model, "the innovation is the results of an interaction between market opportunities and the companies' knowledge and training base" (VIOTTI, 2003, p. XXIV). This model "involves numerous sub-processes that do not have a clearly defined sequence or progression, and its results are highly uncertain (...) and the company is not merely a purchaser of the technology, as the research is done with the intention of solving specific problems" (VIOTTI, 2003, p. 59).

In the third model, labeled as systemic, the innovation process occurs through the interaction and interface between "public or private institutions that include, in addition to companies and research and teaching centers, normative and cultural institutions and the economic environment" (VIOTTI, 2003, p.XXIV). For this model, it is assumed that there is synergy between all the agents and joint synchronized actions.

In the case of the fourth and last model, the technological learning model, greater emphasis is placed on "the technological learning process in place of innovation" (VIOTTI, 2003, p. XXIV). The technological learning of different actors is a requirement for innovation. This is more adequate for countries considered latecomers in terms of industrialization. According to Viotti (2003), Brazil should be included in this category.

An examination of the four models shows that for innovation to occur, planned and articulated interaction by a number of agents and factors is necessary. The National System of Science, Technology and Innovation is formed by a network of relationships and exchanges between institutions, including companies and their Research and Development (R&D) laboratories, government agencies, educational system, universities, research institutes and the financial system. The latter is responsible for generating, implementing and disseminating innovations in the country.

Methodological Procedures

The approach used for this article was qualitative research. To conduct the study, semi-structured interviews were held and documents were consulted. Most of the primary data were obtained through individual, semi-structured interviews, based on scripts applied to analyze the agents involved in the transfer of technology from the UFMG to the footwear company Crômic.

Fifteen interviews were conducted with representatives of the various institutions involved in the projects. These included researchers, managers, employees, scholarship holders and representatives of the legal department of the UFMG, who drafted the agreement and contract between the institutions, and the board of directors of Crômic. These interviewees were chosen in accordance with the representativeness criterion, considering the protagonists responsible for the negotiation, creation and implementation of the new technology at the UFMG, and the managers of the business. The interviews took place between October 2011 and March 2012. The footwear company, located in Nova Serrana in Minas Gerais State, was visited for the researchers to view how the production process using the new licensed technology had been implemented at the company.

This afforded an opportunity to view the physical installations, the machinery and the production of sports shoes, in addition to the organizational structure of the company.

Finally, a salesperson in Belo Horizonte and several users of Crômic footwear were interviewed to gauge the quality and other characteristics of the product. The users were interviewed in June 2012 by telephone.

The salesperson was interviewed in person at around the same time. The aim of these interviews was to measure the degree of acceptance of the brand on the market and the level of satisfaction on the part of customers and users. Content analysis was used to examine the information obtained from these interviews. This technique is recommended when qualitative data are observed, in accordance with Collis and Hussey (2005).

Another important stage of collecting information was the document research. First, the documents in the archives of the Coordination of Technological Transfer and Innovation (CTIT) of the UFMG were consulted, followed by the Technical Cooperation Agreement between the UFMG and *Crômic Indústria e Comércio de Calçados Ltda* regarding the "Development of a New Sports Shoe" project and its additional terms. The RETEC-AMITEC-*Crômic* Proposal, nº RETMG 2007/005, Technology Transfer Contract nº 03/2008, signed by the UFMG and Crômic Indústria e Comércio de Calçados Ltda were also consulted, as were the reports on intellectual property of the UFMG, presented to the Ministry of Science, Technology and innovation, for 2006-2012, drafted by the CTIT/UFMG.

During the consultation of these documents, important information was collected on the communication between the company and the university, their negotiations, the terms of the agreement and the production and transfer of the new technology. This was complemented by the consultation of magazines, bulletins and information published by the Federation of Industries of Minas Gerais State (FIEMG) and the UFMG, articles from widely circulated newspapers in Minas Gerais, company reports and websites with information pertinent to the research object.

Finally, the information was triangulated to describe and evaluate the technology transfer process systemically and in detail for each stage of the process.

Evaluation of the Technology Transfer Process

When explaining the process, it was fundamental to describe how the company arrived at the UFMG, how the terms of the agreement were negotiated, how the new technology was developed and how it was transferred to the private company. An evaluation of the process and the results were then jointly evaluated.

Contact between Company and University

The Director of Crômic affirmed that he frequently attended internal seminars and external missions organized by the FIEMG. Whenever possible, he attended presentations on partnerships between university and company. This gave him the idea of launching a new product with added technology. For this purpose, he needed to form a partnership with a university.

The entrepreneur sought help from the FIEMG and spoke to the director of the Euvaldo Lodi Institute (IEL). She sought the Coordination of the CTIT of the UFMG. At the first meeting, she spoke of the specific requirements of the entrepreneur in the footwear sector, who was interested in manufacturing a new sports shoe with a new form of cushioning that did not yet exist on the market.

In the next step of the process, she arranged a meeting between the entrepreneur and the innovation team of the UFMG to put forward the entrepreneur's idea and requirements. After several negotiations, a Technical Cooperation Agreement was signed between Crômic and the UFMG on 13 August 2007. The agreement was brokered by the Foundation for Development and Research (Fundep), an agency of the UFMG with a mixed character, established to facilitate the implementation of agreements with the private sector, bypassing the bureaucracy inherent to a public federal university, which at the time put constraints on this type of cooperation. An agreement was signed for "cooperation between the parties" that aimed to implement the project named "Development of a new sports shoe", a shoe made for walking, with a sole that adapted to the weight of the person wearing it. The shoe would be made for adult men and women.

This entire process, from the company seeking a partner, via IEL/FIEMG, to the knowledge transfer from the UFMG to Crômic, is summarized in graph form in Figure 2.

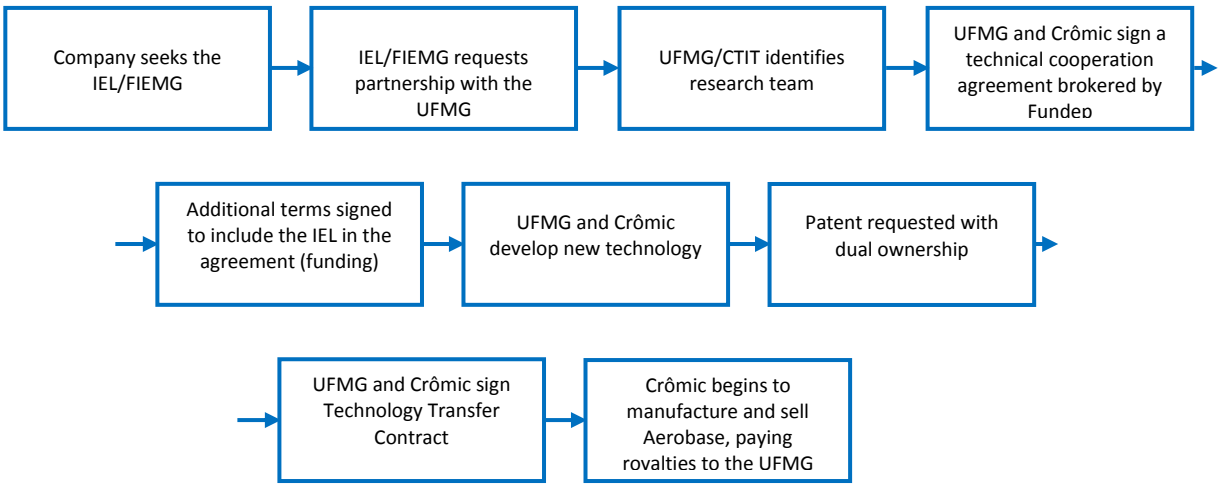

FIGURE 2 – Stages of the technology transfer process from the UFMG to Crômic
Source: OLIVEIRA, 2012, p. 148.

This graphic representation suggests that the process was similar to the linear model proposed by Viotti (2003). The innovation process began with the needs of an entrepreneur, who sought the FIEMG, which brokered a deal with the UFMG. The negotiations underwent several phases before the contract was signed and the invention created.

Creation of New Technology and Cost of the Project

Developed by the UFMG, the new technology is relatively simple. In consists of a "shoe sole cushioning system". It is based on geometric and physical principles, with an arched flexible structure that, when applied to shoe soles, produces a better distribution of impact forces when walking, providing greater comfort and ergonomics for the user during physical activities.

The new technology was developed at the laboratories of the Engineering School and School of Physical Education, Physiotherapy and Occupational Therapy of the UFMG. The team that created the new technology was made up of professors and researchers from the School of Physiotherapy and School of Engineering in the fields of Mechanics and Production, with the collaboration of undergraduate and post-graduate students. The innovation of the technology lies in the geometry of the sole, inspired by a cat's paw, as a natural mechanism for better absorption and distribution of the impact when it jumps.

The project was supported by the Minas Gerais Technology Network (RETEC) and the Program to Support Better Technological Innovation (AMITEC). The cost of the project was set at R$45,000, with R$30,000 financed by the AMITEC/RETEC and the remainder by the entrepreneur.

In addition to the financial resources invested in the project for the development of the new sole, the company invested approximately US$200,000 in the manufacture of the aluminum molds for the sole, in purchasing EVA injector machinery from China and a UV oven on the domestic market to produce the new sports shoe.

Crômic was responsible for the expenses required for the development, industrialization, production and commercialization of the technology and expenses for protecting and maintaining the intellectual property rights of the technology in Brazil and overseas. The company was also responsible for the registration of the contract at the National Intellectual Property Institute (INPI), as stipulated in the fourth clause of the contract.

Characteristics of the Agreement

The agreement also stipulated exclusive knowledge transfer to Crômic and the registration of

intellectual property rights at the National Intellectual Property Institute (INPI).

On 15 January 2008, the UFMG formally applied for national intellectual property rights in the form of a patent from the INPI, registered as number PI0800552-4 A2, in co-authorship with Crômic. On 01 October 2008, Technology Transfer Contract nº 03/2008 was signed, and the UFMG transferred manufacturing rights on an industrial scale and the rights to commercialize the new product to Crômic for a period of ten years, which could be extended for another period pending agreement by both parties.

Regarding the ownership of the developed technology, both the Agreement and the Licensing Contract stipulated joint equal ownership by the UFMG and Crômic, each with a 50% share. Concerning the use of the industrial designs by Crômic, no payment would have to be made to the UFMG. Crômic has exclusive rights to use the technology for commercial purposes nationwide.

Crômic was made responsible for the expenses required for the development, industrialization, production and commercialization of the technology, expenses to protect and maintain intellectual property rights over it in Brazil and overseas and registering the contract at the INPI, as stipulated by Clause 4 of the Contract.

Clause 5 stipulates that Crômic was responsible for compliance with the laws and regulations pertaining to environmental protection, which includes public health, urban planning and environmental management.

According to Clause 6, Crômic agreed to pay the UFMG 1.5% of gross revenues earned from the commercialization of products derived from the technology in the form of royalties. Should the company develop an innovation without the collaboration of the UFMG, the share of royalties paid would be 0.75% of the gross revenue from sales.

In its tenth clause, the Contract states that "any creation of modification that leads to innovation of the technology, whether necessary or not for the implement in question, such as software or any other related technology, this will be formally communicated to the UFMG", and co-ownership of 50% for each of the parties will be maintained.

The UFMG was not impeded from continuing the development of research related to the technology by Item 16.6 of the sixteenth clause of the contract. According to Item 16.7 of this clause, "if a patent is granted for the technology by the authorities, the parties will establish in a specific contract the conditions for exploiting this knowledge".

Industrial Production

With the contract signed, the UFMG transferred the technology to the partner company to produce new sneakers on an industrial and commercial scale. Crômic is a medium-sized company that was founded in October 1993. It is located in the municipality of Nova Serrana, in the Midwestern region of Minas Gerais State. Its environmental license was granted on 21 August 2008, and it was the first footwear industry in Minas Gerais State to be certified by the NBR ISO 9002.

The factory currently produces approximately 1200 pairs of shoes every day. In July 2012, when the study was conducted, it employed 174 workers. In addition to these direct jobs, Crômic has created other jobs in the region, with the outsourcing of the stitching and sewing of shoes. The partners also own another company, Líder Injetados, in Nova Serrana, which employs 35 people to manufacture soles. Of this total production, 25% is earmarked for Crômic and the rest supplies the market of Nova Serrana.

The product portfolio of the company is made up of sneakers and casual shoes, in six lines of models: women's, aeroflex (lighter and more flexible, in nylon), adventure (more casual), casual shoes, children's and aerobase (the line that uses the technology developed in partnership with the UFMG). Furthermore, the company's mix includes sport socks, manufactured in the town of Juiz de Fora, with a monthly production of 2,000 dozens, representing 5% of the company's turnover.

Crômic's products are sold nationwide, but there is a greater concentration in Minas Gerais, Santa Catarina and São Paulo states, respectively. The company's major customers consume 10% of

production, which is equal to 25% of its volume of sales.

Evaluation of the Results

The description of this case of knowledge transfer is similar to what is found in the Brazilian and international literature (ALVIN, 1998; WAHAB et al, 2009). It highlights the importance of a close partnership between company and university to improve the technology used in industry. The introduction of an innovation means economic and social development in accordance with the various models of the National System of Science, Technology and Innovation described above.

The results of the partnership were positive for both the UFMG and Crômic. There was a wide variety of results, beginning with the creation of a new product, a sports shoe called Aerobase, the result of an organized set of knowledge used in its conception and creation and an industrial plant to produce it on a commercial scale.

Another important result was the learning gained through this cooperation between university and company. The production process at Crômic had to be adapted in order to manufacture Aerobase. Some new stages were included in the process because the sole was made using EVA foam and the company had to learn this technique, as it did not possess the know-how to work with this material. The result of the partnership altered the production process by using EVA. Later, Crômic helped to establish an outsourcing company in Lagoa da Prata, located 75 Km from Nova Serrana, which became the manufacturer of EVA. Thus, Crômic was able to purchase the material from this new supplier at a much lower cost.

An analysis of the impact of the new production process showed a reduction in the cost of production in the cutting phase. The amount saved is shared equally between the company and its employees, with 50% for each party. This incentive encourages employees to make an effort to economize in the other phases of production.

The technology transfer process also created new jobs and income in the region. In December 2011, Aerobase accounted for 10% of the production at Crômic and 15% pf its total turnover. The new technology added value to the product and resulted in higher revenues for the company. Another gain was in the number of jobs. In January of 2012, the company employed 145 people. By February of the next year, this number had risen to 170.

When Aerobase was launched in March 2009, Crômic had projected an increase of 10% in its production, estimated at forty thousand pairs per year. However, this forecast was surpassed. In 2010, the company reached the peak of its production, with an increase of 20%, producing 52,000 pairs of shoes per year.

One of the greatest advantages of the partnership for the company was the renewal of its portfolio with innovative products. This improved its competitiveness on the market and provided greater chances for survival.

For the UFMG, the experience meant a great opportunity for learning in several respects. There was a substantial improvement in streamlining the process of integration with the productive sector through the drafting of a model for a technology license contract by the Federal Attorney, the fruit of the success of this concrete case. The university trained its undergraduate and post-graduate students to work on cooperation processes with companies, to develop new technologies and apply for patents. The project was a good opportunity to train the team of researchers in a new field of study, by developing knowledge in the research and production of a new type of shoe.

From an academic viewpoint, the implementation of the agreement enabled the writing of a Master's Degree dissertation in the field of production engineering (design). It served as the inspiration for doctoral research in the field of footwear and opened up opportunities for new products, such as Aerobase 2.0, Crômic's running shoes, which were launched in July 2012.

From a technological viewpoint, the researchers at the UFMG created a machine for testing insoles, another technological achievement. The agreement

included the development of an insole for Aerobase 2.0 and a machine for online tests at the factory.

The UFMG improved its practices in establishing partnerships with companies to develop, negotiate and license specific technologies required by these companies, as the institution perfected its procedures for making new agreements and registering new patents. The agreement helped to create a model contract and the formation of new teams of researchers that are vital for stimulating broader innovations and our development.

The partnership was a small project. It did not result in a large volume of production or income. It was interesting because of its qualitative and educational aspects. Its success provided the university with greater visibility and a good learning experience as an institute working on research and innovation. For the company, it provided a closer relationship with a teaching and research institutions, with higher growth rates and a better position on the market. The region gained more jobs and income, which stimulated its economy in general. Consumers gained a new and more comfortable quality product.

This successful experience shows that integration between company and university is a feasible project, not only for large companies, but also for medium-sized and small ones, which account for 98% of our production. Finally, this type of partnership is an important factor for our continuing development and increasing competitiveness.

Final Considerations

The importance of the National Innovation system for technological advances lies not only in the union of organizations and institutions, but also mainly in the resulting effectiveness of collaborative and interactive work of the components of this set. Universities are key elements in this institutional arrangement, as they have considerable potential, when used well, to contribute to the development of national scientific and technological capacity.

The results of scientific research are expected to promote economic development based on knowledge. Therefore, the transfer of technologies created by universities to the business sector is fundamental for the growth in competitiveness of companies, regions and countries, as it is evident that there is a close relationship between economic growth and technological development.

The case of the UFMG and Crômic is a good example of cooperation between university and company. The university provided researchers, knowledge and infrastructure for the development of a new technology for a medium-sized company in the footwear sector. This created jobs, income and greater comfort for consumers of the product.

The case described shows that the process of developing and transferring technology is a collaborative model similar to the Triple Helix Model developed by Leydesdorff and Etzkowitz (1998). Stronger connections were encouraged between the agents (university, company and government) in an effort to integrate and optimize financial resources, skills and knowledge, and the university was encouraged to participate in the technological development of industry.

The partnership in question is similar to the linear innovation model proposed by Viotti (2003). Despite the efforts of the agents (university, company and governments), there is a compartmentalized and sequential process. In this process, the demand originated from the company, which was forwarded to the university with the FIEMG as mediator. As it is a more limited project, there was little feedback, few interactions, and simultaneous influences of the elements that are fundamental for more complex innovation processes, involving all the government organizations, universities and productive system, as is the case of large projects that occur in several countries.

The article enables a rebuilding of the main stages that consolidated a successful partnership between a university and a company. The reports of the contacts, negotiations and demarches between the interested parties and protagonists at the institutions in question, allow an understanding of how the partnership was formed and how it can be applied to others in the future. The article describes the steps and stages that need to be faced if a new

entrepreneur wishes to form a partnership with the UFMG or another university.

An analysis of the cooperation in question shows some aspects that require improvement. It is important for the legal department of the UFMG (and this is a valid point for other universities) to be restructured, creating exclusive skills for handling partnerships between the public and private sector for the development and transfer of knowledge. This would enable shorter deadlines for analyzing the process. Long analysis processes discourage many partnerships.

Another aspect that ought to be highlighted is the regulatory framework, which is a critical factor in exclusive technological licensing. The Innovation Law requires public bidding by many interested parties in order to obtain the best offer. In our judgement, this has to be reassessed, as a company may have a strategic interest in the technology or simply be in a competitive context. Business secrecy has to be preserved until the product is launched. Furthermore, as bidding is always oriented by the lowest price, this could lead to selling the technology to a buyer that is not the most skilled or competent to reproduce the new product on an industrial scale.

There is also a need to regulate technology transfer, as the legal framework in this respect is, at best, inadequate. In the Innovation Law, this matter is addressed by only one clause. The Innovation Law needs to be regulated in the environment of the UFMG, as the researchers feel insecure about undertaking research requested by the private sector without the limits of their actions being defined, as well as the use of the infrastructure of the laboratories and equipment of the institution.

In the process in question, the government and its funding agencies were only involved in financing the partnership. It is important to expand government involvement beyond funding the development and transfer of the technology. It is also important to include the development of the product, especially for small and medium-sized industries.

The partner company described here, for example, experienced difficulties in the later stages of the manufacturing process, and in publicizing and marketing the new product, which are fundamental phases for consolidating the partnership. When it comes to facing these difficulties, the partnership between university and company alone is not sufficient to leverage the technological and economic growth of national industry.

To finalize, it is important to highlight the need to simplify collaboration between companies and universities by adapting the legislation and providing incentives for partnerships to make the process more dynamic. It is necessary to clarify the limits and possibilities of these partnerships to ensure a positive, healthy and beneficial relationship between companies and universities. Due to the need to implement development in all dimensions, it is no longer possible to justify reluctance to establish partnerships with the claim that this type of interaction will lead to the distortion of the mission and culture of the university. On the contrary, the university, as a source of training qualified workers and producer of knowledge, is a fundamental institution for innovation and the development of the country where it is located and maintained.

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