

# ENTREPRENEURS ARE

# GREAT

## BRITAIN



**Brazil Report 2014**

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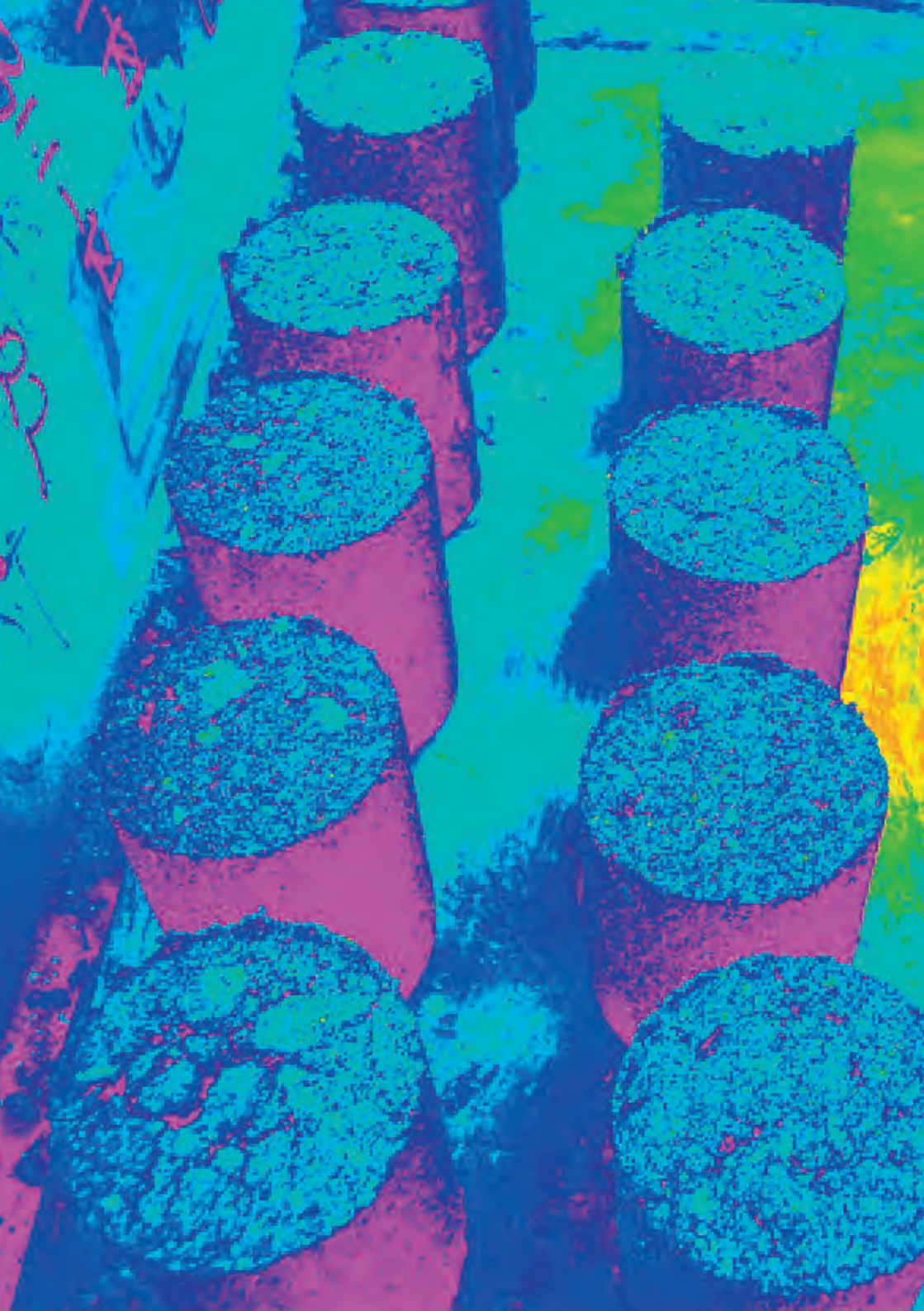
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 UNIVERSITY OF  
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## About the projects and the partners

The project aim was to create a strong partnership between the two key innovation clusters, Cambridge Enterprise and Inova Unicamp, in order to strengthen links and exchange best practices. It has been a fruitful partnership on technology transfer over the past three years. The project has been triggered by the Science and Innovation Network in Brazil and is jointly managed by Inova Unicamp and Cambridge Enterprise.

## Science and Innovation Network (SIN)

**The Science and Innovation Network (SIN)** consists of 90 staff, based in 28 countries and 47 cities around the world. SIN officers engage with the local science and innovation community in support of UK policy overseas. They create strategic relationships to harness the value of science and innovation discoveries and investments overseas, leading to mutual UK and host-country benefits.

SIN teams develop country-specific action plans and work to the following global objectives:

- to influence science and innovation policies of governments, industry and academia to benefit the UK;
- to improve UK policy based on international experience and emerging opportunities and challenges;
- to stimulate strategic science collaborations to benefit the UK and deliver wider policy goals; and
- to harness international technology partnerships and investment to grow UK innovation capability.

In Brazil, SIN has three officers: the director based in Brasília, the deputy director and an assistant based in São Paulo.



# Cambridge Enterprise Limited, University of Cambridge



Universities play an increasingly important role in the building of bridges between countries. One of the ways in which they do it is by promoting a widely shared innovation agenda. Governments understand that university research achieves real and meaningful impact, both societal and economic. The University of Cambridge, with funding provided by the UK's Foreign & Commonwealth Office, has set out to establish exemplary, strategic and long-term relationships with Unicamp and other Brazilian universities. What follows is an insight into what we have achieved over the last three years.

**Shirley Jamieson - Head of Marketing  
Cambridge Enterprise Limited, University of Cambridge**

**Cambridge Enterprise Limited** is responsible for commercialising the University of Cambridge's research. It has been highly successful in bringing Cambridge research to a wider world and is ranked as one of the top technology transfer offices (TTOs) in the world.

Cambridge Enterprise is made up of three business units: Consultancy Services, Technology Transfer and Seed Funds. The Consultancy Services unit supports Cambridge University staff and research groups who wish to provide expert knowledge and advice to public and private sector organisations. The Technology Transfer unit enables licensing of Cambridge research to new and existing companies, which commonly leads to financial and societal benefits. As company formation is often the result of technology licensing, the Cambridge Enterprise Seed Funds unit provides early stage capital, advice, planning and mentoring to these young companies.

The impact of Cambridge research can be measured in many different ways: from the number of patents filed and licences signed; to the number of lives saved by ideas developed by the University's academics; to the very successful cluster that has grown around the University and is home to 13 \$1 billion companies, of which two are \$10 billion companies.

Over the last financial year, Cambridge Enterprise achieved an operating income of £8.9 million, of which £7.3 million was returned to the University, its academics and departments. Over 1,200 researchers were supported by Cambridge Enterprise. Cambridge Enterprise portfolio companies have raised over £1.2 billion follow-on funding since 1995, and have a 97.4% survival rate beyond five years.

In 2013, Cambridge Innovation Capital was launched, and the University now provides or can facilitate access to funding at all levels of support, from proof of concept to venture capital.

# Inova Unicamp Innovation Agency, Unicamp

*The enjoyable environment of the University*



*Students having classes at Ciclo Básico  
(Ciclo Básico is the name of one of the most traditional  
buildings of the University; it's also known as the  
"heart" of Unicamp)*



*The University's Institute of Chemistry*



The projects proved to be the seed for a broader partnership that brings together two universities committed to contributing to the socioeconomic development of their surroundings. Unicamp values its very prestigious partnership with the University of Cambridge. We trust that – as our partner does in the UK – we can increasingly contribute to raising our country to a new level in the knowledge economy. We hope that our experience, described in this report, will also inspire our national partners.

**Professor Milton Mori – Executive Director  
Inova Unicamp**

**Inova Unicamp Innovation Agency** is responsible for managing and commercialising the intellectual property of the University of Campinas (Unicamp). The Agency supports the prospection and establishment of research contracts in collaboration with industry and, as Unicamp's Business Incubator (Incamp), stimulates entrepreneurship within many initiatives. Additionally, Inova is responsible for the Unicamp Science and Technology Park. Despite being a new initiative, the Park is consolidating swiftly: Lenovo, the major PC manufacturer in the world, opened its first R&D centre in Brazil in the Park, with an assigned investment of US\$ 100 million.

Although the commercialisation of intellectual property by universities in Brazil is at an early stage, Unicamp is one of most successful Brazilian universities in commercialising technology, with over 50 active licences. Chemical and pharmaceutical companies represent the highest proportion of licences signed.

Great results have also been achieved in entrepreneurship. Some 39 companies have graduated from Incamp since it was set up. In addition, over 250 spin-out companies have been founded by former students, professors or employees of Unicamp. Such companies make up the association known as Unicamp Ventures.

Inova Unicamp is deeply engaged in educating the academic community and partner companies in intellectual property and technology transfer. Lectures, events and courses are the main activities aimed at increasing the awareness of students, researchers, professors and professionals. As the demand for training in these areas of expertise is high, Inova has initiated an Intellectual Property Specialisation Course at Unicamp. In 2014, this course is being offered by the Chemical Engineering School as one of Unicamp's Extension School courses. The course is staffed by instructors with international experience in the area.

# Inova Unicamp and Cambridge Enterprise:

The first collaboration between the two university commercialisation offices – Inova Unicamp, in Brazil, and Cambridge Enterprise, in the UK – began in 2011, when the Department of Business, Innovation and Skills of the UK (BIS-UK), supported by the British Consulate in São Paulo, searched for a university in Brazil that was interested in partnering on science and innovation.

Inova Unicamp and Cambridge Enterprise have worked together on two projects:

- The **Global Partnership Project** aimed to promote innovation and new business creation in Brazil, with Inova acting as an exemplar for commercialising research and exploring research collaboration opportunities between the two universities. This project was financed by BIS-UK and managed by the British Consulate in São Paulo (November 2011-March 2014).
- **Intellectual Property Commercialisation** investigated barriers to intellectual property commercialisation in Brazil and programmes to stimulate commercialisation and innovation. This project was financed by the United Kingdom's Foreign & Commonwealth Office's Prosperity Fund and managed by the British Embassy in Brasília (October 2012-March 2014).

Both projects have promoted and strengthened the interaction between Unicamp and the University of Cambridge. Over the three years of partnership, initiatives have focused on stimulating intellectual property commercialisation in Brazil. These activities have evolved and impacted not only the Inova Unicamp innovation agency, but also the whole of Unicamp – and indeed the work of other Brazilian universities.



Unicamp

## An overview of accomplished and implemented activities

Unicamp has implemented new programmes that influence technology transfer and industry-sponsored research. Inspired by programmes established at the University of Cambridge, Unicamp's programmes have targeted professors interested in collaboration with industry.

Other universities were invited to participate in training activities offered in Brazil, hosted at Inova and provided by Cambridge Enterprise and its collaborators. The training focused on technology transfer and creating entrepreneurial skills for professors and students of Brazilian research universities. Creating spin-out companies is recognised as one of the important ways of transferring research created at universities to generate new industries and employment.



Cambridge Enterprise



Students at library of the Faculdade de Ciências Aplicadas's (School of Applied Sciences)

The two projects have already fulfilled their first objective of offering knowledge and the exchange of experience in order to consolidate the participation of Brazilian research universities in the support of the knowledge-based economy in the country. The second objective will be the longer-term relationship that will grow and deepen the innovation network between Brazil and the Cambridge Cluster.



Cambridge Enterprise

## Activities and their outcome

Considering the huge number of patents generated by Unicamp, the main focus of both projects was to widen and deepen the understanding of commercialisation activities that could be introduced in Brazil and Inova Unicamp. The training of Inova Unicamp staff was the first initiative.

The University of Cambridge has had a technology transfer function since the early 1970s. It was during this period that the famous Cambridge Cluster emerged as one of the world's most successful high technology clusters, supporting new company creation on a regular basis. Cambridge Enterprise, the University's commercialisation office, was established as a limited company in December 2006. It has over 50 staff providing a commercialisation service to the University's academic community and with a very stable employment record Cambridge Enterprise has built up considerable expertise. As a result it was able to bring new perspectives and methods to the technology transfer process of Inova Unicamp.

The training of Inova staff was promoted in two ways:

- **Visits from University of Cambridge personnel to Inova** – professionals from Cambridge Enterprise spent time with the Inova staff to understand how Inova Unicamp operates. This enabled them to provide specific knowledge and advice,

for instance, emphasising the importance of networking and marketing the inventions. They also analysed some of Inova Unicamp's technology profiles and provided advice on the best routes to commercialisation. The recommendations have benefited not only those involved in the daily activities of the Office of Technology Transfer, but also professors, researchers, students, entrepreneurs and companies that access Inova Unicamp.

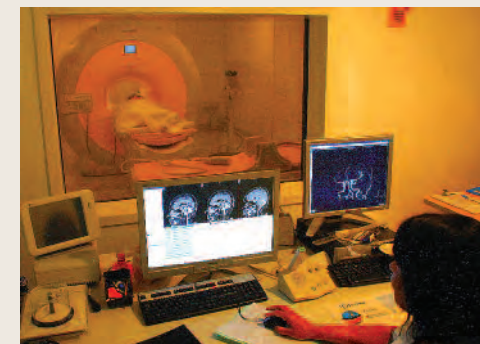
- **Visits of Inova staff to the University of Cambridge** – eight Inova technology transfer staff took part in Cambridge Enterprise's International Outreach Programme between 2011 and 2013. Participants acquired an overview of Cambridge Enterprise's structure and organisation, which led to the identification of major areas of focus for improvement at Inova.

Through these initiatives the Inova Unicamp staff gained a deeper understanding of a number of other areas connected with developing a commercialisation ecosystem. This included the management and growth of science parks and incubators that exist in the Cambridge Cluster; how Cambridge Enterprise interacts with the University of Cambridge research community; and how the Marketing Department supports Cambridge Enterprise's three business units of Technology Transfer, Consultancy Services and Seed Funds.

## Training Inova Unicamp technology transfer staff

Some of the key learning points included: using meeting times efficiently; exploring different pathways for an efficient analysis of technologies; how to add value to inventions through the use of patents and proof-of-concept funds; how to negotiate and close the greatest number of the best possible deals; and ways of approaching a new disclosure.

This interaction has impacted Inova Unicamp's comprehension of its role as an innovation conductor throughout its activities.



*A Unicamp professional working with neurosciences*

*“The whole exchange with Cambridge Enterprise professionals has been of great value for Inova Unicamp and for myself. Among all interactions I had the opportunity to learn different ways to tackle invention disclosures. One of the most important lessons was how to identify and ask critical questions that enabled me and the rest of the team to assess a given disclosure more properly. We have also been introduced to new tools and also learned about the importance of using other very well-known tools. It is not easy to point out everything that I and Inova Unicamp have learned through the interaction between Cambridge Enterprise and Inova Unicamp. But I’m confident that the results Inova technology transfer unit and myself have achieved has been impacted by these interactions.”*

**Elias Borges de Athayde Drummond,**  
Technology Transfer Agent at Inova Unicamp

## Joint research programme - Unicamp and the University of Cambridge

Another important outcome of the collaboration is joint research projects between the University of Cambridge and Unicamp. In the long term this will begin to involve companies in Brazil and the establishment of solid links in technology transfer and innovation within the cities of Cambridge and Campinas. Two main initiatives have been implemented within the projects to start the interaction necessary for this outcome:

- **One-Day Seminar 'Research Collaborations: Opportunities, policies and practices'**, hosted by the Vice-Chancellor of the University of Cambridge in March 2012. A group from Unicamp - including the Rector of the University - travelled to the UK to take part in the Seminar. Since the Seminar, there have been significant improvements in developing joint research programmes between the University of Cambridge and Unicamp:

- ✓ Brazil is now identified as one of the University of Cambridge's priority countries;
- ✓ A university officer fluent in Portuguese with responsibility for oversight of the University's work in Brazil was appointed to the International Strategy Office of Cambridge University in early 2012;

he has coordinated efforts to engage with Brazil's major universities and research councils;

- ✓ Cambridge's Department of Chemistry hosted a technical workshop with Unicamp in October 2012 to discuss specific collaborations based on synthetic chemistry, artificial photosynthesis, energy research in chemistry, chemical biology and atmospheric science; and

- ✓ Cambridge's School of Biological Sciences signed an agreement with FAPESP for joint funding of cooperative research projects involving universities in the state of São Paulo.

- **Visits of researchers from the UK to Unicamp** - Inova Unicamp Innovation Agency received visits from three renowned University of Cambridge academics. The professors, with expertise in biochemistry, biofuels and oil exploration, visited Unicamp during March and April 2012. They delivered lectures and seminars, and held meetings with Unicamp academics. These visits created a direct channel between Unicamp and the University of Cambridge's scientific community, aimed at triggering research cooperation.



*Unicamp*

*University of  
Cambridge*



Photo credit:  
University of Cambridge

## Spreading new practices of intellectual property commercialisation and entrepreneurship

The training of professionals in intellectual property commercialisation – and in intellectual property itself – has been required since 2004 when the Brazilian Innovation Law compelled universities to protect and manage – as well as to set procedures for – the transfer, negotiation and licensing of their intellectual property.

The relationship between Inova Unicamp and Cambridge Enterprise has made some specific educational and training initiatives possible:

- The **UKIPO Seminar 'Brazilian IP commercialisation strategies'** – the Seminar – was held at Unicamp in Campinas during two days in February 2012. It was opened by the UK's Consul General in São Paulo. Professionals from Cambridge Enterprise, Isis Innovation, Rothamsted Research and UKIPO delivered lectures. During the UKIPO Seminar, technologies submitted by the Brazilian technology transfer offices (TTOs) were discussed with guest experts from the UK, who pointed out possibilities, opportunities and areas in which the technologies could be further developed before commercialisation.
- The **'Advanced Technology Transfer' course**, organised and presented by PraxisUnico, was held on three days in August 2012 at Unicamp. The course covered several issues related to

intellectual property commercialisation such as practical negotiations, commercial case studies, royalties, royalty stacking, valuation, and what industry wants from academia. Additionally there was an update on current law issues that affect intellectual property and licensing in Brazil.

- **Expert lectures and analysis** – UK professionals with major experience of management of innovation centres, design and delivery of innovation support services, consultancy on knowledge-based clusters and Cambridge Enterprise Seeds Funds – visited Unicamp in December 2011. Besides providing seminars on seed funding and the Cambridge entrepreneurial ecosystem, they also investigated:
  - current regional seed fund provision;
  - training needs and the potential number of spin-outs that could originate from Unicamp's university research; and
  - Unicamp's incubation and venture creation support structure, and what further resources might be required.

This analysis provided an opportunity for Unicamp to make adjustments on how to structure and provide activities to foster and support spin-out creation.

It should be noted that participating delegates were from the TTOs of the main Brazilian universities such as USP, UFSCar, UFPR, UFRGS, UFMG and PUCRS, plus experts from the Brazilian National Institute of Industrial Property (INPI) and Unicamp itself. The benefits and impacts of the

interaction between Inova Unicamp and Cambridge Enterprise are therefore not only for Unicamp, as the learning possibilities were shared with other relevant institutions of the Brazilian innovation system.



## Spreading new practices of education in entrepreneurship

In places where entrepreneurship activities are undeveloped and are not part of local culture, the universities need to take a proactive role in promoting the creation of spin-outs. Among the initiatives that are necessary, academic institutions should have in place provision for entrepreneurship training and education adapted to local demands and circumstances.

Education is the first step in creating an entrepreneurial culture that fosters new perspectives on how academic research results can be translated into economic or societal benefit. Educational activities in entrepreneurship are new at Unicamp and at other Brazilian universities, which have previously lacked entrepreneurship education; they need to offer not just formal courses but also provide professors with training.

In order to fill this gap, Inova Unicamp and Cambridge Enterprise offered two training sessions – one for professors and one for graduated students:

- The **Faculty Entrepreneurship Training** was a two-and-a-half day programme that aimed to share best practice in 'education for entrepreneurship'; to help generate a climate of acceptance for entrepreneurship; and to inspire and stimulate researchers' interest in creating intellectual property which could be commercialised. Around 25 professors

and technology transfer office delegates from Unicamp and 15 Brazilian universities attended the programme. This initiative will help Inova Unicamp to become an exemplar of best practice for other Brazilian universities.

- The **Doctoral IP Course – Researcher impacting on society** – was focused on graduate students. They were introduced to entrepreneurial actions in order to better understand how to commercialise intellectual property resulting from their own research or that of their group. The course approached different paths of entrepreneurship, stimulating students' creativity and helping them to understand the process of technology commercialisation and validation while considering how their research might potentially benefit society. It mixed lectures and hands-on activities to encourage student interaction. Around 30 graduate students from Unicamp and other Brazilian universities attended the Doctoral IP Course.

Both courses were held in October 2013 and were taught by professionals from University of Cambridge who are deeply involved in entrepreneurship issues. These programmes were preceded, in April 2012, by a visit of a renowned professor from the Judge Business School's Centre for Entrepreneurial Learning at the University of Cambridge, who identified enterprise educational activities that might be appropriate for

Unicamp to adopt. The professor also delivered various lectures to Unicamp professors involved in entrepreneurship teaching, which gave him a good insight into specific training demands.

Most professors teaching subjects related to entrepreneurship at Unicamp and in other Brazilian universities are highly qualified in several different areas such as engineering, biology, chemistry or management, but are not familiar with the entrepreneurial universe or with its teaching methods. Therefore it was extremely important to improve their awareness of entrepreneurship teaching skills.

Majority of the staff in TTOs engaged in activities to promote enterprise are trained to a certain level in entrepreneurship. However, by the end of the training, the attendees felt more confident that they could make improvements to the delivery of entrepreneurship teaching.

Further impacts are expected since the professors will deliver several entrepreneurship courses around the country over the next couple of years. These professors tend to see entrepreneurship as a good career option for their students.



## Programmes to foster collaborative research between institutes of Unicamp and local companies

A technology transfer office should not be limited to just managing the protection of intellectual property and commercialisation of technologies. It should also foster a good relationship between companies and universities looking towards strong collaborative research projects and innovation.

Over the years, Cambridge enterprise has been successful in promoting the collaboration between the University of Cambridge and local enterprises. Inova Unicamp has taken advantage of this experience and has adapted for local conditions two initiatives that are well established in Cambridge:

- The **Innovation Leader Programme (ILP)** – launched on October 30 2013, the ILP aims at enhancing the communication between Inova and Unicamp's institutes. Through ILP Inova, Unicamp's TTO, periodic news is sent to the institutes' nominated Innovation Leaders, who are university professors responsible for spreading the information within his or her institute and facilitating the contact between the institute's academics and the innovation agency. Five professors took part in the first meeting. The event was also attended by professionals from Cambridge Enterprise who explained how the programme is managed in Cambridge.

- The **Workshop on Collaborative Projects** – the first workshop was held on October 31 2013 and attracted researchers from Unicamp Biology Institute (IB) and professionals from Cristália Laboratory, a Brazilian chemical-pharmaceutical company. This model of workshop aims to foster new joint research projects and to strengthen the relationship between Unicamp and the company. The workshop is based on the Industry Engagement Forum, a successful initiative of Cambridge Enterprise. For Unicamp's team the workshop was an opportunity to acquire new knowledge as well to interact with Cristália. For Cristália's team, the meeting contributed to improving the company's processes and to making way for more innovative projects with Unicamp. Inova Unicamp intends to replicate the initiative, bringing together other companies and other Unicamp's researchers interested in joint research projects.



## Assessment of barriers to intellectual property commercialisation in Brazil

The interface between universities and industry is key to fostering growth and ensuring a connection between publicly funded research and growth. This element of the project investigated the context for Brazilian TTOs, specifically looking to understand what barriers or issues were most important from their perspective. This was done through desk-based research (literature review, comparison to UK practice) and an online survey developed with the assistance of Inova and sent to 193 TTOs in Brazil. The survey took a new approach as most work in this area has focused on the quantitative measures of inputs and outputs for TTOs (staff numbers, disclosures, patents applied for, etc). Whilst asking those kinds of fundamental questions, we also asked a set of attitudinal questions developed from the literature search and prior work.

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*It is hoped that the review, survey data and commentary are a valuable input into ongoing discussions within Brazil on how to help TTOs move forward and to contribute to sustainable growth across the country.*

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The key findings from the survey were:

- The mandatory patenting of disclosures by TTOs may not reflect the 'natural' dropout rate from disclosure to patent.
- Commercialisation is being thought of narrowly (licensing patents) rather than broadly (including spin-outs and consultancy).
- Institutional support may be weak in some universities, in terms of inclusion in strategies and levels of funding provided.
- There is a perceived lack of domestic and international demand for Brazilian technology from universities.
- Crucially there are very weak links to follow-on financing-to-scale technologies once companies spin-out of universities.
- TTOs may need help in developing commercial and technical skills to better manage the commercialisation process as these were reported as being weak.
- In the opinion of the respondents, the 2004 Innovation Law needs to be improved suggesting that weaknesses in the legal and institutional framework are recognised by those on the ground.

# The Administrative Region of Campinas, Brazil:

Some countries have dramatically changed their development plans through industrial strategies coordinated to science, technology and innovation (S,T&I) policies, investing public resources in innovative companies. In Brazil, there is a strong correlation between the country's development plans and its initiatives in S,T&I.

Developed countries usually have companies with strong research and development (R&D) financed either by the companies themselves or the government. In the case of Brazil, the industry's investments in R&D are low compared to the United States, the European Union and other countries that make up the Organisation for Economic Co-operation and Development (OECD). However, although Brazil is in the middle in terms of productive and academic capacity, it has the right economic conditions to pursue a new path to reach a standard close to that of developed countries.

In Brazil, the regional asymmetries and fragmentation of productive structures means that the knowledge chains are concentrated in the richest states. São Paulo is one of the states with a larger spend in science and technology (S&T) and R&D. The 72 research institutions in the state of São Paulo are diversified. They include three state universities, six federal universities, 16 private universities that do research, 21 technological institutes, seven research

centres, one national laboratory, and a set of hospitals linked to these institutions. Many of these institutions are in the Administrative Region of Campinas (RAC); this can be described as an internationally recognized regional pool of S,T&I development.

The RAC comprises about 27.039 km<sup>2</sup>, which represents 0.44% of Brazilian territory and 1.5% of the São Paulo State. It has over six million inhabitants - or 15% of the population of São Paulo State - and 90 municipalities, of which 19% belong to the Metropolitan Region of Campinas. The city of Campinas is the hub and absorbs 20% of both the economic activity and population of the RAC.

Over the second half of the 20th century the RAC was transformed from an agricultural to a diversified industrial economy. Today, the region is Brazil's third largest industrial centre and an important logistic link. The RAC is the second region of São Paulo State in terms of industrial production value, just behind the São Paulo Metropolitan Region, and is responsible for more than 10% of the total national industrial production. Considering the size of population, area and GDP, the RAC is comparable to countries like New Zealand, Israel and Ireland.

The RAIS (Annual Statement of Social Information) carried out by CNAE (National Classification of Economic Activities),

## An overview on the innovation, research profiles and technological opportunities

provides relevant economic information for the RAC - which employ more than 1000 people and are more than twice important in terms of PIB compared to the national. In comparison with the rest of Brazil, the region stands out with at least 49 different economic activities. In some of these activities, more than a quarter of the relevant Brazilian workforce is concentrated in the region, for example the manufacture of communication equipment and mineral extraction equipment, and the build and manufacture of machine tools. In all these examples, the relative proportion of employed people with Masters and PhDs is greater than the national average.

Other industries that are dominant in the region include automotives, plastic materials, ceramics, metal mechanics, pharmaceuticals, several branches of the chemical industry, electronic components, communication equipment, and machinery and tools for industry and agriculture. Agricultural activities are still apparent, while traditional industries and textiles and petrochemicals are concentrated in some cities. Campinas, Hortolândia and Jaguariúna encompass the high technology industrial and service activities. In addition the region's industries include agro-technologies, information and communication technologies, electrical engineering, energy and bio energy, chemicals, food technologies, biotechnology and healthcare.

The history of the S&T infrastructure deployment indicates RAC's research capacity and explains its current strongest research fields.

Historically, the creation of the Agronomic Institute of Campinas (IAC) in 1897 provided long-term agricultural research for the region. Agricultural research increased progressively in the region during the 20th century with the creation of a number of organizations such as the Biologic Institute test station (IB), the Institute of Food Technology (ITAL), and the Agricultural National Laboratory (Lanagro).

However, it was the foundation of the University of Campinas (Unicamp) in 1966 that drove the deployment and diversification of the S&T infrastructure of the region in the following decades. The S&T capacity in information and communication technologies was further developed in the 1980s with the creation of two public research institutions: the Centre of Research and Development in Telecommunication (CPqD) of Telebras, and the Centre of Information Technology Renato Archer (CTI) of the Ministry of Science and Technology. The Brazilian Informatics' Law, in 2001, triggered further growth in information technology with the creation of several research institutes in the region by private companies; these include the Wernher Von Braun Centre of Advanced Researchers, the Eldorado Institute, FITEc and Venturus.

The S&T infrastructure has been strengthened in the last three decades with the creation of the National Centre of Research for Conservation of Natural Predators (CENAP) of Ibama in 1994 (since 2007, CENAP has been part of ICMBio); the Brazilian Society for Promotion of Software Exportation (Softex), a non-governmental organization aimed at executing and supporting innovation activities, in 1996; the National Laboratory of Biosciences (LNBio) in 1999; the National Laboratory of Synchrotron Light (LNLS) in 2001; and the National Laboratory in Bio Ethanol Science and Technology (CTBE).

Besides Unicamp, today there are two other main public universities in São Paulo State: the University of São Paulo (USP) and the State University of São Paulo (Unesp), and a large group of private universities and several hospitals that support biomedical research. Together this completes the S&T infrastructure of the RAC.

According to the CNPq<sup>1</sup> directory, as a result of Unicamp's location, two-thirds of the region's research groups and employment are concentrated around the city of Campinas. The main research themes of RAC's research groups (measured by the number of researchers and students involved) are: agronomy, education, medical, electric engineering, computing science and food science and technology. The analysis of ISI Web of Science papers indicates that

more than 50% of Brazilian indexed papers publications come from São Paulo State - 13% from the RAC which also contains 22% of the state's researchers and 5.4% of Brazil's researchers.

The RAC's industry profile indicates that innovation tends to be through equipment acquisition and design and engineering and not through R&D; in some cases innovation is through product improvements and design. There are only a few science-based industries that have any R&D activities and these are more inclined to undertake joint research with universities.

The RAC's innovation industry profile might explain why interactions between companies and universities are not very significant. For instance, data from CNPq indicate that from the 739 research groups registered by Unicamp, just 8% mention that they have jointly developed research with companies.

The broad perception is that the number of research projects is low and there is a great deal of space to grow. Companies lack an understanding of the competences of universities and research institutes. This could be because there are no obvious communication channels for industry links to be established. However, despite the RAC's innovation industry profile, there is a relevant group of industries with the potential to do joint research, for example

the chemical, pharmaceuticals, cosmetics and personal hygiene, medical and dental appliances, electric equipment and information technology (IT) companies located in the region.

The most strategically important research fields with the potential for the RAC and Brazil to catch-up in the world's technology frontier are biotechnology, nanotechnology and energy. The region's high concentration of technical and scientific capabilities related to agribusiness could be the start point for new applications in bio fuel, food production and the use of Brazil's unique biodiversity for new applications in drug development and cosmetics. There is large potential for applied biotechnology in the development and application of enzymes, and the use of residues to substitute synthetic materials and create a 'green' industry in Brazil. The energy opportunities are in renewable energy, energy efficiency, smart grid, biomass production, sugar cane biodiesel and the research expansion of Petrobras.

The strengthening of universities, research institutes and companies' relationships is one way to take advantage of technological opportunities. Another way is through the deployment of technology-based companies, especially university spin-outs, which are highly dependent on the latest technology breakthroughs and entrepreneurship initiatives.

The collaboration between Inova Unicamp and Cambridge Enterprise, the University of Cambridge's Commercialisation Office, meets the demands for promoting innovation and entrepreneurship in the region. As such, the partnership is ideally poised to enable both the RAC and Brazil to take swift advantage of the current opportunities in technology, bioscience and innovation.

#### *Source of information:*

Feliciello, D.; Amaral, G. E. (Org.). *Projeto de Ciência, Tecnologia e Inovação do Polo de Inovação da Unicamp e dos Parques Científicos e Tecnológicos de Campinas, Agência de Inovação da Universidade Estadual de Campinas, Novembro de 2010.*

<sup>1</sup> The National Council for Scientific and Technological Development (CNPq) is an agency linked to the Ministry of Science and Technology (MCT), dedicated to the promotion of scientific and technological research and to the formation of human resources for research in the country. Its history is directly linked to the scientific and technological development of Brazil.

The functional structure of CNPq is that of an Executive Board of Directors, responsible for the management of the institution, and a Deliberative Council, responsible for the institution's policies.

In addition to its participation in these bodies, the Brazilian scientific and technological community also takes part in the management of policies by means of the Thematic and Advising Committees.





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[enterprise.cam.ac.uk](http://enterprise.cam.ac.uk)  
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