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Diálogos Setoriais
BRASIL
UNIÃO EUROPEIA

Secretaria
de Gestão

Ministério
do Planejamento



Assistência Técnica ao Projecto de Apoio ao Diálogos Sectoriais UE-Brasil

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***Para: Ministério do Planejamento
Delegação da CE***

***MISSÃO
Consultoria de Curto-Prazo como
speaker in the Conference Innovation of Arranjos Produtivos Locais
technical consultant for NANOTECHNOLOGIES***

***Relatório Final
ROBERTO CAFAGNA***



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2 Mission Objectives

The main objective of the mission was to strengthen the exchange of information between European experts and Brazilian clusters, public policies makers, academics and parliamentarians, with performance on the theme of innovation in its widest sense and in order to encourage the Brazilian regional development with focus on exchange and cooperation with European Union

3 Duration of the Assignment

The assignment has been carried out in the period 28 June – 10 July 2010, including the travel from Italy to Brazil, the internal transfers and 8 working days.

4 Start, completion and location of the Assignment

The assignment started on 28th with the flight from Italy to Brazil and ended on the 10th of June with the flight back from Brazil to Italy.

Locations of the assignment have been as follows:

- 28 June leaving Italy to Brazil
- 29 June arrival in Brasília from Italy
- Brasília: 29 June – 1 July
- 02 July leaving Brasília to São Paulo
- São Paulo: 2 July – 6 July
- 6 July: leaving São Paulo to Campinas
- Campinas: 6 July – 9 July
- 9 July leaving Campinas to Brasília
- 10 July leaving Brasília to Italy

5 Activities carried out during the mission

The activities carried out during the mission can be subdivided in two main subgroups:

1. Participation to the International Seminar Brazil-European Union on “Innovation of Arranjos Produtivos Locais”, in Brasília.

Before leaving to Brasil, a presentation of about 50 slides and a document of 20 pages were prepared and submitted to the organizing committee. As for indications received, both the documents focused on nanotechnology and highlighted the following points :

- Access to markets –national and international;
- Technology transfer tools;
- Training and capacity building;
- Investment and financing;



The day before the beginning of the workshop, on the 29th of June a meeting has been organized by the Ministry of Development, Industry and Foreign Trade. During the meeting all the participants briefly presented themselves and the Ministry presented the strategy implemented by Brasil to improve cluster in different sector.

On the 30th of June, has been delivered the presentation that explained the instruments and milestones fundamental for company growth based on emerging technologies. The talk focussed on technology transfer activities (in particular technology scouting) and on life-cycles of European SME's, on the role of stakeholders fundamental for the growth of SME's working in nanotechnologies. The stakeholders such industrial and finance investors, institutional investors, public funding, science parks and university. The Italian cluster for Nanotechnologies as been presented as a specific case study.

During the workshop, a discussion on the brazilian cosmetic industry has been put in place with the other participants. In particular on the following:

- Osvaldo Luís Alves – Pesquisador da Universidade de Campinas – SP. Nanotechnology regulation has been discussed and in particular how nanotechnology can find application in cosmetics following the regulations.
- Caue Ribeiro – Pesquisador Empresa Brasileira de Pesquisa Agropecuária
- Mario Norberto Baibich – Coordenador Geral de Micro e Nanotecnologias - Ministério da Ciência e Tecnologia: the Ministry Intends the nanotechnology sector and the cosmetic industry.
- João Carlos Basilio da Silva – Presidente da Associação Brasileira das Indústrias de Higiene Pessoal, Perfumaria e Cosméticos. Highlighted the growth of the cosmetic industry and the need of product and process innovation of the industry.
- Renata Platcheck Raffin – Diretora Industrial da Empresa Inventiva – RS. Representing a nanotechnology application in the cosmetic industry

5. Activities carried out during the mission – Meetings and technical visits in São Paulo

All the meeting organized in Sao Paolo have been organized and held in the presence of Marina Kobayashi of the Associacao Brasileira da Industria de Higiene Peossal, Perfumaria e Cosméticos.

- a. **On Monday 5th Associacao Brasileira da Industria de Higiene Peossal, Perfumaria e Cosméticos:** Joao Carlos da Silva (Presidente) – Marina Kobayashi

During the meeting, the state of the art of the industry of cosmetics has been presented: The Industry recorded an average deflated compound growth rate of 10.5% in the last 14 years. To date, there are 1,659 companies operating on the Cosméticos market in Brazil. Fourteen of these are large companies, with after-tax sales revenues of over R\$ 100 million p.a., representing 73.4% of total gross sales.

Several factors have contributed to this excellent growth in the CT&F Industry, highlighting the following points:

- Growing participation of Brazilian women in the job market



- Use of state-of-the-art technology, leading to enhanced productivity and benefiting CT&F sector pricing, which has increased less than the price indexes of the overall economy
- Constant releases of new products to meet growing market needs
- Greater life expectancy, prompting the need to preserve a youthful impression

During the meeting it has been discussed the opportunity to create the Cluster for cosmetics, that could foster the implementation of nanotechnologies and other emerging technologies in this industrial sector.

Within this new Cluster, the ABIPEC could cover the role of coordinator and major stakeholder. It could also put in place a dedicated team unit to analyze the “innovation needs” from the members of the cluster in order to create a link with the other members of the cluster.

In this way, the ABIPEC could operate to facilitate the access to innovation management and will accelerate the technology transfer process for SME’s that cannot easily have access to the direct sources of innovation (i.e. Academia).

- b. **On Monday 5th, Natura:** the meeting was organized with the five people representing four Units of the R&D Department.

The innovation management of the company has been explained. There are four Technology Units within the Company:

- New concepts and idea: 80 people
- Product development: 50 people
- Safety: 30 people
- Technology management: 20 people

The Company invest 3% of the turnover in R&D and develops more than 100 new products every year.

The Company is very interested in scouting and selection of new technologies to be held abroad and in particular to the definition of collaboration agreements with foreign Universities for new product development.

Natura already has strong relations with Academia and University and a very high efficient department for innovation.

- c. **On Monday 5th, Cless Cosméticos:** Meeting with Fabio Salik CEO.

Leader Brazilian company in the cosmetics industry with distribution throughout Brazil and exports to 15 countries around the world. Cless has three main production lines: bleaching powder, liquids and hair coloring.

They employ 250 people with a small R&D Unit composed of 10 people.

They do not have continuous relations with Universities and do not have a structure put in place to manage innovation.

Cless showed interest to be included in the Cosmetic Cluster because they need to better define the relations with private and public institutions to innovate their products and create new high level applications.

They also showed interest in further increase their presence on the European market and their market share with innovative products.



They do not possess patents and they need to grow with the R&D unit. Outsourcing services could be helpful in order to analyse and define new research projects and development of new application products.

d. On Tuesday 6th Davene

It is a medium-large enterprise focused on the development of new products increasing natural ingredients and reducing the content of chemicals.

They employ 600 people

Turnover 100% on the Brazilian market.

They have a particular focus on innovation and have a strategy to acquire small start-ups with a strong technological content.

They need to innovate their formulations in order to decrease the production costs related to energy consumption. They also need to develop and find new packaging materials with lower environmental impact but with appealing design.

The R&D Unit is subdivided in two Units:

- Cosmetics
- Cleaning

They possess two patents.

Meetings and technical visits in Campinas

e. 7th UNICAMP: Universidade Estadual de Campinas

f. Osvaldo Luís Alves: Presentation of UNICAMP. The European regulations on nanotechnology and how Brazil should also implement their own. A visit to the laboratories was organized. The visit allowed understanding the high level of the technological platforms of the Chemical department. Were presented the most innovative lines of Nanotechnology research group of Professor Osvaldo Luis Alves, that seemed really advanced and great potential.

g. Ronaldo Aloise Pilli: Pro-Reitor de Pesquisa

It has been asked to the pro-reitor the possibility that UNICAMP could be one of the stakeholders of the cluster of cosmetics.

In this way the University could give it support to the industry segment by providing know-how and technology platforms. On the other side, it would be important that the University could provide new technologies for the cosmetic segment based not only on nanotechnology that it is still under evaluation for regulation issues but also on other technologies.

h. Prof. Nelson Durán: Nanocosmetic And Nanopharmaceutical Group, Institute of Chemistry-UNICAMP

During the meeting the Group presented the Studies on different nanocarriers acting on nanopharmaceuticals and nanocosmetics. The group have developed a platform for different diseases as malaria, tuberculosis, leishmaniasis and cancer. This interest in nanosystems to pharmaceutical delivery has increased because these systems can improve therapeutic efficacy and physical stability reducing the side effects and toxicity. Within the carrier that the group have studied there are: solid lipid nanoparticles, polymeric nanoparticles, nanocrystals and silver nanoparticles. The aim of the research is to evaluate the toxicity of all these



pharmaceutical carriers in cell cultures (V-79 and 3T3 fibroblasts and HACat keratinocytes). The results obtained at this moment in MTT and NRU assays showed that empty solid lipid nanoparticles, polymeric nanoparticles and nanocrystal of an immunomodulator, P-MAPA, were not cytotoxic at the normal application dose. In the case of silver nanoparticles synthesized by fungi, an IC₅₀ value of 10 µM was found when these particles were test in V79 cells. The culture cells appeared as an excellent assay to test several different kinds of nanoparticles. Furthermore, these kinds of particles were good carrier for diseases and cosmetic application without cytotoxicity effect.

Some examples of the studies presented:

- Solid lipid nanoparticles (SLN) for dermal application of tretinoin: *In Vitro* cytotoxicity and phototoxicity. Patent submitted (2010).
- Solid lipid nanoparticles as carrier system of sunscreen and its toxicity in Zebrafish embryos
- Retinyl palmitate flexible polymeric nanocapsules: characterization and permeation studies. Patent submitted (2009).
- Glutathione and S-Nitrosoglutathione in Alginate/Chitosan Nanoparticles. Patent submitted (2010).
- Characterization of different Fusarium species for synthesis of silver nanoparticles: Novel antimicrobial agents. Patent submitted (2009).
- Potential Applications of violacein: A microbial pigment
- Nanocrystal Technologies in Pharmaceuticals

i. **Inova – Unicamp:** Technology Transfer Office of UNICAMP – Director Executivo Roberto de Alencar Lotufo.

Meetings with the following people:

- Eduardo Machado - Assessor Técnico
- Patricia Magalhaes de Toledo - Director of intellectual Property and Technology Transfer
- Patricia Franco Leal - Intellectual Property Manager
- Vanessa Sensato Russano – Coordenadora de comunicação

The patent portfolio management strategies of INOVA as been presented. The Tech Transfer showed interest to present its patent portfolio to the companies that could be part of the cluster of cosmetics and could have a need of new technologies. The main strategies of the Centre of Excellence are based on processes Licencing

j. **Incamp – Incubadora de Empresas de Base Tecnológica da Unicamp:**

Davi I. Sales. Director

The Director presented the strategies for the development of the incubator where start-ups and spin-off from the nano and cosmetics sectors could find space.

Meetings have been organized with the following companies that are located in the Incubator:

- Bruno Sommer Ferreira Ceo of Biotrend



- Silvia Frick ceo of Strat Angels Campinas S.A.
- Mauricio Antonio Jaime Ceo of Meta Material

The incubator has great growth potential, could be implemented processes training in entrepreneurship and Technology Transfer Activities.

k. CNPEM – Brazilian Center of Research in Energy and Materials and CTBE – Brazilian Bioethanol Science and Technology Laboratory – Polo II de Alta Tecnologia – Campinas - SP

Marco Aurelio Pinheiro Lima. Director

The Director presented the strategies for the development of Bioethanol Science, and contributing to the Brazilian leadership in the sector of renewable energy and raw materials for the chemical industry and, development of the production of bioethanol from sugar cane, through research, development and innovation at the frontier of knowledge. CTBE is a national Laboratory integrated to the National Center for Research in Energy and Materials CBPEM is a Social Organization, a non profit private entity, which campus hosts the LNNS (www.lnls.br) the National Synchrotron Light Laboratory and National Laboratory of Biosciences.

Following the visit, which were shown all the new tools and equipment, shows very high level of expertise of the laboratories for testing materials and nanomaterials. The center could be a valuable stakeholders for the cluster of nanotechnology in particular for the analysis of materials.

6 Findings

During the visits in Brasilia, Sao Paulo and Campinas have been met the main actors with the capabilities and expertise to become stakeholder of the new APL. However we should put evidence on the fact that the cluster strategy must be better improved in order to clarify goals, timing and long term sustainability. Hereafter a description of the methodological approach.

Vision and 4 Key Strategic Activity Areas

A vision statement should be defined for the mid - to long - term goals of the Cluster organisation. The vision should be external and market oriented and should express how the organisation wants to be perceived by not only Brasil institution but from the international point of view.

On the basis of the above definition, we therefore propose to define the major stakeholder of APL: it should act as a catalyst organisation of excellence for the development of high quality and efficient TT services and nanotechnology information for SMEs in Brasil and abroad. APL should operate with stakeholder as ABIPEC, other SME supporting organisations as Innova, as well as several qualified University as UNICAMP, and other leading company in Cosmetic Industry and not only.



Stakeholder Perspective: Impact on SME growth and financial sustainability

The APL should be created in order to support the industry represented by the lack of the adequate high quality information and TT business services that are necessary to support the growth and international competitiveness of Brazilian SMEs.

The stakeholders' perspective should be centred upon the following two goals, which APL managers should ensure:

- l. Impact on SME growth is ultimately the most important result for APL stakeholders.
- m. Government support and Financial Self Sustainability.

To achieve the above results, the following strategic goals and activities must be managed: define the APL structure, define the intangible asset (databases, project info, organisational info), define revenue opportunities with revenue-generating TT services, and enhance customer value

Customer Perspective: Managing Value for members and Partners

The Value Proposition of APL is to make available, develop and encourage the use of high quality, certified, advanced TT based business services and information with nanotechnology for cosmetic industry and not only.

Customers and Members of APL services are:

- Brazilian SMEs
- Scientific Partners (private and institutional, national and foreign, University and centre of excellence) that utilise APL as a vehicle of their high quality, certified TT services to Brazilian SMEs.

The customer perspective describes the main activities that are required to create differentiated sustainable value and revenues from targeted customers: pricing, quality, availability and access of know – how, selection and scouting, service and brand.

Internal perspective: Managing the Key Business Processes

The internal perspective identifies the critical processes that produce and deliver the value proposition for customers and members, in order to reduce costs for sustainability: operations management, customer process management, innovation process, regulatory process (procedures to legislative rules and regulations, etc.)

Learning and Growth Perspective

This perspective defines the activities related to managing the intangible assets that are most important to the strategy. Intangible assets should be organised into three categories:

- Human capital: the skills, talent, and know-how required to support the strategy of APL;
- Information capital: the databases, information systems, networks and infrastructure to support the strategy
- Organisation capital: the APL's culture, its leadership, how aligned its people are with its strategic goals, and employee's ability to share knowledge between industry and research



APL should grow as an organisation providing both technical-Scientific knowledge and TT business services. In the long term, organisational competencies related to the provision of SME TT services. Learning and growth perspective is centred upon the following goal: information capital (research & development public and private), organisation capital (TT technology transfer know how and entrepreneurial culture, Brazilian and International team

7 Conclusions:

APL needs to become an organization of itself. At the beginning the APL can be managed as a dedicated Unit. But clearly the mission, vision, strategy, services - and sources of revenue – should be outlined encompass several stakeholders.

Thus, it is recommended that in time APL could become an independent organization focused on its specific mission, managed by a team of highly motivated professionals, with its own budget, staff and structure.

Timing to start-up

The discussions and planning for the development of a new organizational structure for APL should start as soon as the shape of the new APL becomes visible and has been presented.

Necessary Commitments from Stakeholders of APL

The availability of firm commitment on the part of Cosmetic industry to support and the project is a prerequisite for the start-up of the implementation phase. APL commitment should cover: support the Cluster in terms of staffing, training and expenses, involvement of key APL units and marketing support, availability of premises.

Stakeholders: Private Strategic Partners and APL

An initial set of Stakeholders is identified hereunder. These include:

- Private Strategic Partners. These are highly qualified organizations, with a vested interest in the availability of APL to promote technology push and pull between University and Brazilian SMEs.
- Content and Information Providers. These are currently mostly public organizations interested to offer their services and information to Brazilian SMEs within the coherent and unifying framework of nanotechnology rules.

Private and Public Strategic Partners, the list of main potential Partners includes:

- Cosmetic company (Natura, Cless, Davena, etc), University (Unicamp) development agency (Innova), incubator (Incamp – Unicamp), nanotechnology centre of excellence CNPEM, leading cosmetic organization ABIHPEC

Content and Private and Public Information Partners, the list of potential Partners includes:

- Development Agencies in emerging technology and nanotechnology (Brazilian and EU)
- Scientific and Research Center, University
- Human Resources Foundation
- Municipalities
- National Agency for Regional Development



- Chambers of Commerce
- Chambers of Industry
- Employment Offices
- Incubator
- Venture and seed Capital

The APL Team with international expert should develop a procedure for the selection and ranking of technology, company, University based on the relevance of their specific know how or services and information. They also have to setting up an action plan.

8 Recommendations

General recommendations:

- implement technology push and technology pull strategy in the Brazilian cosmetic industry
- encourage use of technology transfer tools to SME in the cosmetics industry as main services of new APL
- necessary to define the stakeholders to start up the cluster in the cosmetics and nanotechnology
- among stakeholders should be identified, association leader in cosmetics, some leading companies, universities' oriented cosmetics industry and technology transfer, public actors involved in technology transfer, private operators are uniquely qualified emerging technology and nanotechnology
- organize stakeholder cluster leader does not focus only on nanotechnology but also on emerging technology
- increase knowledge in nanotechnology and their potential use in cosmetic applications
- encourage the involvement of venture capital and seed investor and qualified for early stage start-up company
- organize intensive courses training between young entrepreneurs and researchers to technology transfer and entrepreneurial risk culture's
- define a qualified Cluster's team that will act as a catalyst organisation of excellence for the development of high quality and efficient TT services and information for SMEs in Brazil.
- define the APL budget and structure organization

Areas of improvement:

- strengthen strategies technology push in universities and centers of excellence, pushing the pre-competitive applied research and development to reduce the gap between research and industry
- transfer the business culture by promoting business incubators that serve as link between universities and cosmetic industry, facilitating the transfer of emerging technologie, launching start-up qualifying and placement of venture capital Activities
-



Opportunities:

- the cosmetics industry is a growing market and is supported by domestic consumption which makes the market attractive and qualified
- few companies have developed in-house units' R & D and many more need new tools of innovation and new technology transfer services for the development of new applications
- many companies are interested in scouting services that allow them access to new technology application and cooperation with Brazilian and foreign University
- unfamiliarity with the use of nanotechnology and its potential 'of improvement, in terms of materials, design, functionality' and packaging.
- creation of virtual platforms to connect clusters of nanotechnology Europeans and Italians, to develop cooperation, technology transfer, a common platform for the regulations and their use in market
- there are no incubators with focus in nanotechnology

Potential risks:

- Not clearly defined regulations for the implementation and management of nanotechnology
- Non-use of nanotechnology by small medium enterprises without a clear regulatory

Strengths:

- Strong interest in government policy for nanotechnology
- High degree of applied research at the University to develop a portfolio patent
- Human capital is available with skills, talent, and know how to support the new Apl
- Good English Knowledge

Weaknesses:

- Weak relationship between industry and university, in particular in the exchange of information; it's not easy to match needs and offer
- Lack of know-how and tools for Technology Transfer (patent licenses only)
- No Venture or Seed Capital funds for investments on Nanotechnology