Panel - Science and Technology Entrepreneurship For Economic Development (SEED)

Ramiro Jordan¹, Sul Kassicieh², Alfredo Roldán³, Nelmy Jerez⁴, Roberto Lotufo⁵, Roberto Murphy⁶

Abstract - Over the past 15 years, the Ibero American Science and Technology Education Consortium (ISTEC) has been very successful in its multinational educational, research and industrial collaborative efforts throughout the Americas and the Iberian Peninsula. The Consortium has been established to foster scientific, engineering, and technology education, joint international research and development efforts among its members, and to provide a cost-effective vehicle for the application and transfer of technology. ISTEC is now embarking on a new initiative for “science & technology entrepreneurship” focused on economic, social, cultural and political development across Iberia and Latin America with New Mexico as the gateway.

Index Terms – entrepreneurial activities in engineering, economic development, business planning and new venture creation.

INTRODUCTION

Moving technology from the scientific discovery stage to a commercially successful product is one of the major drivers of economic development in today’s economic order. The other driver that is not as apparent and that many economic developers forget about is the issue of global markets. These are the markets that not only buy these commercial products but markets that can be developed so that they produce, generate income and use the income to buy more innovative products produced by technology commercialization processes. In this loop lies the economic miracle of the 21st century and this proposal is but a small step in that direction.

THE NETWORK: IBERO AMERICAN SCIENCE AND TECHNOLOGY EDUCATION CONSORTIUM (ISTEC)

In an effort to improve international collaborations in Science and Technology, in mid 1990 personnel from the University of New Mexico visited countries in Latin America to identify and evaluate opportunities for successful collaboration in science, technology and education. Meetings were held with officials from various governments, educational institutions, research facilities, and industrial firms to gage interest in establishing efforts for international cooperation in technical fields. The meetings resulted in the identification of areas of common interest for employing hands-on education, research, and technology transfer in state-of-the-art technology and science. As a result of these visits, an organizational meeting was held in December of 1990, at the University of New Mexico, involving personnel from universities, industries, governments, and foundations throughout Ibero-America.

These discussions, which resulted in the creation of the Ibero-American Science and Technology Education Consortium (ISTEC), identified a number of obstacles that need to be addressed:

- Lack of current information for planning and developing technology.
- Lack of expertise in the use of information.
- Lack of international cooperation in developing the critical mass needed for projects and joint efforts.
- Lack of interaction (lack of confidence) among universities, industries, governments, and international agencies.
- Lack of availability of technology.

The above difficulties are aggravated by another problem, which is the lack of awareness of the simultaneous existence and interaction of the above obstacles. It is imperative that efforts be made to address these issues concurrently in order to further the scientific and technological development of Ibero-America. It was a consensus among the participants in the meeting that traditional mechanisms for cooperation are not sufficient, and new, more effective mechanisms are needed. As a result of the meeting, ISTEC was created, and

¹ Ramiro Jordán, Associate Professor of ECE, University of New Mexico and VP for Planning and Strategy, ISTEC Inc., rjordan@istec.org, www.istec.org
² Sul Kassicieh, ASM Endowed Chair in Economic Development and Regents' Professor of Management of Technology, University of New Mexico, sul@unm.edu
³ Alfredo Roldán, Director of Parquesoft, afroldan@parquesoft.com, www.parquesoft.com
⁴ Nelmy Jerez, Marketing and Business Development Director, ISTEC Inc., njerez@istec.org
⁵ Roberto Lotufo, Executive Director, INOVA-UNICAMP, lotufo@unicamp.br
⁶ Roberto Murphy, Academic Dean, Instituto Nacional de Astrofísica, Optica y Electronica, rmurphy@inaoep.mx
universities, industries, multilateral organizations, research centers and other organizations become members by signing a Memorandum of Understanding (MOU). In 1999, the Consortium officially became a U.S. 501 (c) (3) non-profit institution, comprised of a General Assembly to which all members belong that sets policy and direction, a Board of Directors, which is made up of fifteen academic and industrial members of the General Assembly that carries out the policies and promotes the Consortium, and an Executive Office that handles the day-to-day operations.

The Consortium has been established to foster scientific, engineering, and technology education, joint international research and development efforts among its members, and to provide a cost-effective vehicle for the application and transfer of technology.

Mode of Operation: The objectives of the Consortium are to conceive, plan, and carry out activities of higher education, research and development, technology transfer, and business development for the purpose of facilitating scientific and technical progress of the Ibero-American countries. ISTEC participants encourage the free flow and access of information in the pursuit of technical excellence. By coordinating eminent personnel and resources from diverse geographical locations, ISTEC has developed a mechanism called the Initiative, which is an organized effort to create activities to address a specific area of concern. The Initiatives are member-driven, flexible, and run concurrently. Within initiatives, projects are identified, planned, and implemented. The distributed structure from which the projects stem avoids duplication of efforts and inherently responds to the needs of the ISTEC membership. Projects are designed with both short- and long-term goals, with consideration of social impact. They are dynamic and expandable, and coordination is encouraged in order to maximize the utilization of available resources. Currently, there are four Initiatives underway: Digital Libraries, Advanced Continuing Education, Research and Development Laboratories, and Los Libertadores.

Digital Libraries Initiative: One of the basic tenets of science and technology is access to up-to-date information. The Initiative aims to modernize document delivery as a complement to education, research, manufacturing and policy design, to broaden electronic availability of research materials, to upgrade the information skills of library staff, and to sharpen the savvy and independence of the electronic user.

Advanced Continuing Education Initiative: The key to the development of any nation is the availability of highly qualified human resources. This initiative seeks to upgrade the available skills and increase the number of qualified individuals in applicable areas. Projects conducted within this initiative involve curriculum adaptation, design and enhancement, professional development, accreditation, on-site training, web based distance learning, as well as non-traditional faculty, staff, and student exchanges, including “sandwich” graduate programs. Of particular interest is the development of materials that incorporate the latest technology in the education process, both in the way of state-of-the-art textbooks and laboratory materials, and also in the way of development systems.

Research and Development Laboratories: The costs of introducing state-of-the-art infrastructure in education are difficult to accomplish for most countries in Latin America. This initiative has been created to provide a vehicle for performing research and development in a variety of disciplines. The laboratory facilities not only are utilized in teaching situations, but are used to enhance interaction between industries and universities to foster innovation and creativity. Thus, this initiative improves the ability of technology to be applied to the resolution of problems in a variety of areas.

Los Libertadores: This initiative is a “common thread” effort that links together all of ISTEC’s goals and objectives. It seeks to create a flexible network of electronic services (a hemispheric backbone for education, R&D, and business development purposes), computing facilities, and teaching stations, known as “Centers of Excellence”. It pretends to share worldwide expertise and distributed problem solving as well as creating the critical mass needed for regional projects.

In 2004, ISTEC has engaged the network of universities, state institutions, government agencies, industrial partners, research laboratories and multilateral organizations that work with the Ibero-American Science and Technology Education Consortium (ISTEC) for the past 15 years in a new project referred to as Science and Technology Entrepreneurship for Economic Development (SEED). Using the four Initiatives identified above, the SEED effort will capitalize from the existing network of access to information, education of a long-term leadership, access to Intellectual Property (IP) through the R&D efforts, and create a network of entrepreneurial sites through which spin-off business and the generation of wealth needed in the Region.

Key to this Endeavor is the identification of more strategic partners that share the same vision, values, and mission. This is the case of Parquesoft in Colombia. In addition, Research Parks identified in some of the member universities of ISTEC like the Pontificia Universidad Católica del Rio Grande do Sul (PUCRS), Universidade Estadual de Campinas (UNICAMP), both in Brazil; University of New Mexico, University of South Florida, Instituto Nacional de Astrofísica, Optica y Electrónica (INAOE) in Mexico, just to mention a few. Presently, ISTEC’s membership has over 130 universities in 34 countries. Therefore, a goal of SEED is to create a network of Management of Technology (MoT) Programs linked with Engineering, Science and Medical Programs for the identification of ideas in the laboratories, and through strategic alliances with VCs, investment bankers, and high-tech industry to bring these ideas into the marketplace.

San Juan, PR

9th International Conference on Engineering Education

R3C-2

Session R3C
**ISTEC COMMERCIALIZATION EFFORT**

SEED seeks to build a new model that blends business expertise and technical knowledge to benefit the economic, social and cultural development activities in Ibero America. New Mexico and the US. The model can be expanded and adapted to different regions of the globe; it will self-align to support international research and education across science and engineering. Together we can build a better trade, education, research, and technology transfer climate based on technology commercialization.

SEED will use the New Mexico capabilities in Science and Engineering at the University of New Mexico, Sandia and Los Alamos National Laboratories along with the Management of Technology Program at the Anderson Schools of Management to enhance the international research and education agenda of US and Ibero-American universities and scientific institutes through technology commercialization activities.

The program is aimed to:

a) Develop research programs investigating technology forecasting and assessment processes across international markets by developing new and novel market research procedures and tools for technology-based products across international markets. Through this approach, US and Ibero American projects will be identified and used to examine market features. An analysis of strengths and weaknesses of current approaches will be employed to design new models, which will be tested and revised periodically as more results become available.

b) Identify and examine research technology entrepreneurship issues in Ibero America across all scientific disciplines with emphasis on information technology, wireless communications and biotechnology. Issues to be covered include: drivers of technology entrepreneurship in different regions; drivers for country entrepreneurs to look for international markets; differences associated with country demographics, economy, size, or other parameters; and how to encourage more technology entrepreneurs to target international markets.

c) Support technological entrepreneurs in the US and Ibero America to meet international market needs and support product development for international markets. This will include establish product development activities at universities, test their capabilities to support actual cases of tech entrepreneurs that are looking at international markets, and develop market research in new international markets.

d) Support the establishment of Management of Technology (MOT) programs that can work with the engineering, science and technology organizations to increase technological entrepreneurship activities.

e) Identify and examine the intellectual property issues in Ibero-America, which includes examine intellectual property laws and their economic effects in different countries, suggest policy directions in these countries that support the establishment of intellectual property positions and strategies that support technology-based commercialization.

f) Create a collaborative effort between UNM and Ibero-American universities to effect necessary changes.

To enhance its capabilities in commercialization, ISTEC decided to implement a new “commercialization of technology” initiative starting in 2004.

This initiative involves a symposium where technology startups present their business plans to angels and venture capital firms from Iberia, Latin America and the US. To this effect, ISTEC undertakes several endeavors, such as:

- Entrepreneurial Engineering training in its member universities.
- Creation/Enhancement of Technology Management programs at these universities to support the entrepreneurial engineering function.
- Proposals to IDB, World Bank, USAID, Iberian and Latin American funding sources to get this program started.
- Third Symposium scheduled for 2007 in US alternating with Iberia and Latin America every year.

This activity enhances ISTEC’s ability to accomplish its mission. The “commercialization of technology” initiative can be piloted at one or two universities in Latin America with full implementation depending on funding (funding may require matching from local university so that funding agency puts in half of money).

**THE SCIENCE AND ENGINEERING ENTREPRENEURSHIP FOR ECONOMIC DEVELOPMENT CONFERENCE IN CAMPINAS**

The objective of this activity is to create new companies in New Mexico, Iberia and Latin America with technology expertise, business knowledge and market from all of the participating countries. The vehicle by which this is enhanced is a symposium where technology startups from New Mexico, Iberia and Latin America present their business plans to angels and venture capital firms from Iberia, Latin America and the US. Behind the scenes, New Mexico and Ibero American R&D organizations, business schools, companies and venture/equity funds will collaborate to make this happen.

To start the program, a kick-off organizational meeting was organized in Tampa at the 2004 ISTEC General Assembly. Leaders from R&D organizations such as universities and private R&D institutions, university business schools such as Management of Technology (MOT) or entrepreneurial programs, large businesses that could be strategic partners to
the startups, Venture/Equity funding/Angel groups, and other governmental and international organizations were invited to support this effort.

The goal of the organizational meeting was to organize the Campinas symposium. By organization we mean: advertising the event, screening appropriate startups to present, attraction of support for these startups, and logistics for the symposium.

**ISTEC SEED** (Science & Technology Entrepreneurship for Economic Development) and UNICAMP University in Brazil invited Ibero-American and US technology startups to submit their technology business plans to SEED for review and possible presentation at the First SEED conference that was held at Campinas on **December 5 and 6, 2005**.

The business plans were targeted to technology-based startups and should be for companies that are interested in seeking funding from equity sources (angels, venture capital and other financing sources) and should include at a minimum: Executive summary; management team; information about company structure and legal registration; intellectual property position; markets, customers and competitors; financial plans; request for funding and deployment of funds; and other pertinent information.

The First SEED Conference was held on December 5th and 6th, 2005 in Campinas, Brazil. The event was organized in collaboration with INOVA/UNICAMP and the Andean Development Corporation - CAF, institution that supported the event and provided funds to pay for 10 Andean representatives travel expenses.

Over 100 people attended the first version of the SEED Conference where 18 business plans developed in four Latin American Countries: Brazil, Colombia, Bolivia and Ecuador were presented to potential investors interested on creating angels and venture capitals. These business plans were the result of a joint effort of R&D organizations, business schools, companies and venture/equity funds that worked together to take ideas and inventions to the market.

The event was characterized by the quality and innovation of the projects (42% of them were developed in Biotechnology). As a result, the best 5 business plans of the Conference were presented in a Private Equity Forum in New York in March 2006 organized by the VCs Mike Segal and Bryan Emerson.

The second version of the SEED Conference will also be held in Campinas, August 2006.

**CONCLUSIONS**

After 15 years of ground work in the Ibero-American Region by ISTEC, identifying intellectual property (IP) among many issues, we believe the SEED effort is an appropriate outlet for bringing ideas from the laboratory into the marketplace in a global scale. The success of the First SEED event has demonstrated that it is greatly needed in the Region and our challenge is to organize more events to provide the outlet for the existing and in development IP.

**ACKNOWLEDGMENT**

We like to acknowledge Corporacion Andina de Fomento (CAF) for funding the Andean entrepreneurs to attend the Campinas event. Also acknowledge the Ibero-American Science and Technology Education Consortium (ISTEC) for their support in organizing and funding the event. A special thanks to the Anderson School of Management and Electrical and Computer Engineering Department at the University of New Mexico for their support. In addition, a special acknowledgment to INNOVA at the State University of Campinas (UNICAMP) for hosting, coordinating, and organizing the First SEED event.