

ANNUAL ACTIVITY REPORT

Lead Institution: Northwestern University

Principal Investigator: Atul Wad/Michael Radnor

Project Title: "Science and Technology Partnership for Industrial Competitiveness"

Cooperative Agreement Number: PCE-5063-A-00-2042-00

Report Date: 26 October 1993

Time Period Covered: October 1, 1992 to September 30, 1993

OBJECTIVE I

Activity A: "Applied research in the area of technological capability and competitiveness, and technology choice"

English and Spanish versions of five case studies of Yucatan manufacturers in Technology Management and Business Strategy developed by the NU/UADY team were finalized and teaching notes prepared for each case study. In addition to the case studies, the joint NU/UADY research team have prepared and submitted a report for each company studied which outlines their findings and provides preliminary recommendations.

Activity B: "Applied research in the process of technology transfer, international technology flows and the technology change process"

Rustam Lalkaka, Senior Specialist, CISST, conducted a study trip to Merida to develop recommendations for the roles of small business incubators and technology commercialization centers. The study trip was funded by the Organization of American States through the small business incubator, Centro De Desarrollo De Negocios Internacionales De Yucatan. A copy of this report is enclosed.

Donald Frey, Professor of Industrial Engineering, McCormick School of Engineering and Applied Sciences and member of the linkage advisory board and Atul Wad visited Mexico City to discuss the financing of start up ventures, the development of incubators

in Mexico and curriculum development on innovation and technology management at other Mexican institutions. Don Frey also visited UADY faculty, local business people and the incubator in Merida to develop a better understanding of the Yucatan and to develop an idea of the potential for industry/university activities that could support the economic development of the Yucatan.

Activity C: "Applied research in the area of technology needs assessment, sourcing and acquisition"

The paper entitled, "Impediments and Opportunities for Technological Development: An Exploration of the Yucatan," has been submitted to Economic Development and Cultural Change.

Ms. Molina presented a paper outlining the research conducted in year one at a conference in Brazil in June, 1993 and Ms. Molina and Alan Garcia Lira prepared and presented a version of the paper at an international seminar on technology management issues held in Bogota, Colombia in September 1993. In addition, Hernan Cruz has attended numerous meetings in Mexico with AMiEPAT, CONACYT, and other Mexican universities and organizations to discuss the framework of the project and the results of the first year studies.

In the U.S., Tom Vonk distributed a working draft of the paper at an Association of Management Annual Conference in Atlanta, GA in August 1993.

The development of the technology sourcing model has been delayed due to a basic rethinking of concepts involved in the sourcing process in light of the research conducted in year one. An initial draft will be submitted in 4 to 6 weeks.

OBJECTIVE II

Activity A: "Expand library facilities and information systems in the area of technology management"

NU has provided UADY with a comprehensive technology management bibliography and has assisted UADY in obtaining over 200 of the articles from that bibliography. In addition, matching funds provided by CONACYT have allowed UADY to order \$7,000 worth of books for their library. UADY, CISST and the Northwestern University library staff have begun to identify appropriate journals, and on line and CD ROM databases for UADY's technology management library and a proposal has been submitted to CONACYT to provide additional funds for hardware, software, training and subscriptions.

Activity B: "Establish an academic advisory board consisting of NU and UADY faculty"

Donald Frey's visit to Mexico City and Merida in August gave him an opportunity to become more familiar with Mexico and the Yucatan in particular, to meet UADY's faculty, and to get the UADY-AID project in context so that he can effectively contribute to the content and direction of the program. At this stage of the linkage, CISST/IBD is concentrating on getting one or two advisory board members actively involved in the program so that they can more effectively play an advisory role.

Activity C: "Exchange of selected faculty"

Two faculty exchanges took place in the first year as planned. Tom Vonk, Kellogg Ph.D. candidate in Organizational Behavior and lecturer, visited UADY from 3 - 23 January 1993 and Maria Rosa Molina of UADY's faculty visited Northwestern from 13 June to 4 July 1993. During their exchange visits, Maria Rosa Molina and Tom Vonk worked together on the research in Objective I. In addition to the research, each made formal presentations to faculty and staff and participated in discussions regarding the structure and content of the linkage program overall and the Technology Management Masters Program currently under development.

Activity D: "Improve and expand UADY technology management curriculum, including new courses, course materials and methodologies"

During his visit to UADY, Donald Frey was involved in extensive discussions regarding the Technology Management Masters Program under development and has made specific suggestions regarding the structure and methodology of the course. These discussions will continue in year two when the proposal for the Masters Program will be submitted to the UADY administration. In addition to this input, the case studies and teaching notes developed in Objective IA will provide new material for classroom use.

UADY has also been investing heavily in training their faculty by sending them to courses on Technology Management and Project Evaluation and to several international conferences and has brought faculty from other universities to contribute to their existing courses.

Progress Toward Completion of Objectives:

Significant progress has been made toward completion of the two objectives in the first year. Joint research has been initiated and completed and UADY and NU researchers have successfully worked together as a team. Much of the work conducted

under Objective I contributed to the progress made in Objective II. New materials are now available for courses, UADY's library has been significantly enhanced, faculty have participated in exchanges, training courses and conferences and an advisory board member is actively involved in curriculum development activities of the linkage.

Barriers:

No significant barriers have been encountered. However, there was a decision made to revise the structure and role of the advisory board. It was decided that it would be more appropriate to focus on providing the opportunity for one or two advisory board members to become familiar with Mexico and the Yucatan in particular, the linkage activities and UADY faculty and programs rather than encouraging several people to provide evaluations of activities based on very limited exposure to the program and the region.

Sustainability of the Linkage:

In order to increase the sustainability of the UADY/NU program and to make it an effective component of the economic development process in the Yucatan, the program participants are working to link this program with other Mexican institutions and the local productive sector. Much time has been spent by both NU and UADY participants in meetings with Mexican and international funding institutions, other universities and companies. Year two activities will build on these existing relationships and new project oriented research and outreach activities will strengthen the relationship with the productive sector.

Quantitative Outputs of the Linkage:

The quantitative outputs of the linkage are as follows:

- o 5 case studies, 5 sets of teaching notes and 6 reports prepared for the companies who agreed to be studied
- o 1 report entitled "Building Technology-based Enterprises and Industrial Competitiveness in Yucatan State, Mexico"
- o 1 article entitled "Impediments and Opportunities for Technological Development: An Exploration of the Yucatan" submitted to Economic Development and Cultural Change
- o 2 presentations of research conducted (one in Brazil and one in Bogota, Columbia)

- o approximately 12 copies of a working draft of the submitted article distributed at the Association of Management Annual Conference in Atlanta, GA.
- o 218 articles and approximately 100 books obtained for UADY library
- o 1 advisory board member visit to UADY
- o 2 faculty exchanges
- o 3 presentations made to UADY students, faculty and others by NU exchange participant
- o 2 presentations made to NU faculty, students and others by UADY exchange participant
- o UADY faculty participation in 5 training courses
- o participation of 3 faculty from other Mexican institutions in UADY's current Technology Management Course

Impact on the Internationalization of NU:

The visits by NU linkage participants including Atul Wad, Tom Vonk, Monica Scallon, Tim Lavengood, and Rustam Lalkaka and an NU advisory board member, Don Frey, as well as the presentations of the linkage program by the UADY exchange participant at NU and the distribution of the research paper at the Association of Management Conference in Atlanta have contributed to the internationalization of Northwestern University and the Association of Management. This linkage, which is a component of a larger initiative to link the State, the University and the productive sector has begun to be referred to as the "Yucatan Model" by other Mexican entities. This recognition has considerably enhanced Northwestern University's reputation in Mexico and has attracted the interest of other Mexican states and of several individuals and agencies involved in economic development in Jamaica.

Impact on Partner's Capability to Meet its Societal Development Needs:

Year one of this linkage has focused on capability development through such activities as conducting joint research, developing a library, generating course material and developing faculty. Year two of the program will continue with these activities, but will include a stronger outreach element designed to involve UADY more directly in the

economic development process. By working with companies on business development projects and on projects designed to increase the company's competitiveness, the linkage participants hope to be directly involved in strengthening the economic base of the Yucatan. The importance to Mexico of this type of economic development activity (which is currently being referred to as the "Yucatan Model" as mentioned above) is evidenced by the decision to hold the Second Annual AMIEPAT Conference in Merida in March 1994.

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October 27, 1993

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RE: Interim FSR

Dear Sir or Madam,

Enclosed you will find the Interim Financial Status Report and Narrative Report for agency number PCE-5063-A-00-2042-00 for Principal Investigator Michael Radnor for the period 07/01/93-09/30/93.

Thank you for your continued support of research at Northwestern University. It is greatly appreciated.

If there are any questions regarding this report, please call me at (708) 491-3385.

Sincerely,

Karen G. Vacaliuc

Karen G. Vacaliuc
Sponsored Project Specialist

cc: Files

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