Report on 1995 Trilateral Materials Workshop

CANADA
MEXICO
UNITED STATES

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I. Introduction

With the approval of the North American Free Trade Agreement (NAFTA) by Mexico, the United States, and Canada in 1993, a major step was taken towards economic integration and deeper understanding and acceptance of each country's cultural diversity.

The North American Free Trade Agreement is unique. It is the first trade agreement between inc and a developing nation, and the first to include intellectual property, labor rights, and the enviror Traditionally, free trade agreements do not create common markets since they do not permit the people, but they do allow for the free trade of goods.[1]

However, NAFTA is more than a trade agreement; it is an investment agreement. It establishes the principle of "national treatment," which gives people in these countries the right to invest and provide services as if they were nationals. The principles of nondiscriminatory treatment also allow for such things as the transfer of capital for investment purposes, freedom from performance requirements, limited exercise of the sovereign right of expropriation, and finally the use of international arbitration rather than a nation's courts to settle trade disputes.[1]

NAFTA presents the three signatory nations with great opportunities for creating an integrated economic system in which the comparative advantages of each are given full opportunity to develop within a larger trading bloc than had previously existed. It is understood that in today's economy, sustained growth and profitability depend on active and broad-based international operations. The challenge and the opportunities of NAFTA are significant. It remains for the Canadians, Americans, and Mexicans to work together over the long term as partners for their mutual benefit.

The closer economic ties afforded by NAFTA will inevitably have cultural and educational implications, but without a new level of cultural comprehension and engagement between the American peoples, trade and capital opportunities will be lost. To illuminate some of the differences, demographics and import and export information of the three countries are given in Table 1.

Table 1. 1991 Trade Figures (in billions of U.S. dollars)[1]

	Canada	Mexico	United States
Mexico			
Exports	2.3	--	31.9
Imports	0.4	--	33.3
United States		--	
Exports	82.5	33.3	--

	Imports	95.6	31.9	--
Canada				
	Exports	--	0.4	95.6
	Imports	--	2.3	82.5

II. The First Trilateral Materials Workshop

NAFTA has provided a challenging opportunity, for professionals in the universities and national laboratories of all three countries may play an important role in shaping a future in which there is not only a better understanding of three diverse cultures but the skills necessary for economic integration.

A first step was taken towards this goal in May 1995 when the National Science Foundation in the United States, CONACYT (Consejo Nacional de Ciencia y Tecnologia or National Council for Science and Technology) in Mexico, and Natural Sciences and Engineering Research Council in Canada jointly sponsored an important scientific workshop. The workshop, entitled the first Trilateral Materials Workshop (TMW-95) brought educators and research scientists from all three countries together at Saltillo, Mexico for an unprecedented intellectual summit. The workshop concentrated on the engineered materials which have played a crucial role in recent technological advancements in areas such as electronics, automotive, biomaterials, metals, and telecommunications. However, the purposes of the workshop went beyond technical discussions and are expected to have far-reaching significance.

The purposes of the workshop were to provide opportunities for educators and scientists in all three countries to:

* Exchange information on materials research, education, and technology,
* Establish joint programs among the three countries,
* Discuss and plan for electronic information linkages and databases,
* Discuss participation and usage of "central" facilities.

A total of 59 educators and scientists attended the two-day workshop including not only participants from Canada, Mexico, and the United States, but also from South America.

III. Panel Findings and Recommendations

Participants were organized into discussion groups based on their scientific interests including optoelectronics, polymers/advanced cement, and metals.

Participants were committed to finding ways to promote economic growth for mutual societal benefit through pre-competitive or generic research in the fields of materials science and engineering and to promote knowledge and acceptance of our cultural diversity. These goals are considered to be of crucial significance to the NAFTA trading partners in light of similar agreements among the member countries of other international

trading blocks such as the European Union (EU).

Each panel provided written reports of their findings and recommendations, which are consolidated below.

A. Issue - Information Dissemination

The participants found that there was little knowledge of the scope of research, the scientists involved, or the facilities available among these countries. Meaningful scientific interactions can not exist in a vacuum. The need for some means of widespread and rapid dissemination of scientific information is of vital importance.

Recommendation #1 - Electronic Links

It is recommended that a U.S. Network be established. The function of this network would be to first serve as an electronic link among scientists within the United States, providing them with vital information in the area of materials research, education, and technology.

The network would be designed to grow with available technologies, eventually providing remote real-time research collaborations, educational programs, research publications, etc. Users and information providers would include researchers from universities, industry, scientific organizations, and government laboratories.

It is also recommended that steps be taken to encourage the formation of similar electronic networks in other North and South American countries. These networks could then be linked together and expanded to form an international materials network capable of linking countries, continents, and hemispheres.

Recommendation #2 - On-going Trilateral Workshops

In addition to electronic links, meaningful scientific interactions require personal contacts among scientists. The Trilateral Materials Workshop provided an important first step towards forging scientific relationships and promoting cooperation and collaboration among researchers in the academic and industrial communities of the NAFTA countries.

Ongoing workshops along this line will improve the educational, scientific and technological development of advanced materials of strategic importance.

Using the Trilateral Materials Workshop as a model, these future workshops will be designed to bring together people from different disciplines who have an interest in the same problem. Each workshop would be organized by a trilateral committee and the location of each workshop would rotate.

The objectives of these workshops would include the following:

* Promote the exchange of scientific information and latest research progress
* Foster new and enhance existing collaborations
* Encourage new research areas
* Facilitate the training, education, and exchange of undergraduate and graduate students
* Generate specific plans of action

The majority of the funding should come from the umbrella of a NAFTA initiative supplemented by cosponsorships from other funding sources. Industrial funding and participation would be actively sought.

B. Issue - Limited Research in Mexico

Although some interactions exist between scientists in Canada and the United States, there are few collaborations between scientists in either of these two countries and scientists in Mexico. Mexico's limited tradition of research has resulted in diminishing numbers of active scientists and graduating PhDs. In 1992, approximately 1,500 students received their postgraduate degrees in science and technology of which there were only about 20 PhDs in physics. In Mexico, 65% of the total government expenditure in research and development goes to education, while only half a percent goes to CONACYT (National Council of Science and Technology) and 6.7% goes to health. In contrast, 48% of the U.S. federal expenditure goes to health, about 12% goes to the NSF and 1.7% to education. In addition, Mexican industry accounts for only a small percentage of research funding (government funds 99%).[2]

NAFTA makes research and development in hi-tech areas an imperative for Mexico. Mexico needs trained workers for manufacturing plants which are being established by U.S. and Canadian corporations in Mexico, even though most of the design and development work is presently done in the United States and Canada. To participate effectively within the NAFTA community, Mexico must increase its capability in science and engineering and build its academic infrastructure in technology.

Panel members found that there are strong indications that Mexico recognizes the need to increase their research and development in high-tech areas. For example, Mexico has recently expended large sums to improve the infrastructure for scientific research. Mexican scientists would like to use their new facilities for collaborative research activities which could be expanded into full cooperative projects.

Recommendation - Providing Educational Opportunities

In order to increase the number and scope of trained scientists working in Mexico, an increase is needed in the number of students from Mexico who receive graduate training in the United States or Canada and who then return to Mexico. The objective is to promote a better capability to interact with the industrial establishment, and to generate highly qualified human resources.

The participation of U.S. corporations which have established factories in Mexico should also be pursued in order to leverage government programs in this area.

C. Issue - Paper Collaborations vs. People to People Collaborations

Exchanging personnel among NAFTA countries is key to the education and training of students, the transfer of skills and/or technology, the expansion of opportunities for cross-border research collaboration, and the expanded use of large federally funded facilities. The ultimate goal would be to promote "people to people" collaborations rather than collaborations which exist only on paper. For example, in 1993 Mexico had 132 cooperative projects with Cuba, 23 cooperative projects with the United States, and none with Canada.

Recommendation #1 - Support for NAFTA Personnel Exchanges

While numerous opportunities for personnel exchange already exist some of this effort needs to be focused specifically on interactions between NAFTA countries. These programs could be used to achieve the additional goal of further strengthening the NAFTA alliance.

For example, Canada has funds for visiting graduate students and for sending people to visit other universities. Mexico has the CONACYT program which provided limited funding to researchers for travel and living expenses, but no funding for research supplies.

The United States has a variety of programs for international cooperation, for visiting scientists and for planning research activities, but they are dispersed throughout various programs and directorates.

It is recommended that existing programs be better publicized and expanded to include exchanges that focus on strengthening ties between the NAFTA countries. Some suggestions include:

1. NAFTA Postdoctoral Fellowships at research institutions, including universities and government or industrial laboratories for a period of two years. Initially, each country would support a minimum of two post docs per year in another NAFTA country.
2. NAFTA Visiting Scientist or Visiting Professor positions at universities or government or industrial laboratories, which are jointly funded by the two governments involved for a minimum of one semester and a maximum of two years.
3. NAFTA Travel Grants to allow scientists to do short term work at a large federally funded facility, plan joint research proposals, or attend NAFTA workshops.

Recommendation #2 - Increased Support for Cooperative Projects

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Identifying and supporting specific cooperative research projects which leverage the strengths of each country's scientific community was established as an important goal. It is felt that to optimize success, cooperative research areas should fulfill the following criteria:

* Be of scientific and industrial importance to all three countries, with particular emphasis on product improvement, new developments, recycling and other environmental issues,
* Make use of established infrastructure, including basic facilities,
* Have practical achievable objectives and use modeling techniques wherever possible.

Cooperative research projects between Canada, Mexico, and the United States would also encourage personnel exchanges at all levels (e.g., technicians, post-docs, and senior scientists). These exchanges would accommodate the differing needs of the scientific communities within these three countries, such as Mexico's need for industry-targeted research, Canada's need for technicians, and the continuing need for high quality graduate students in the United States.

D. Final Recommendation - The Virtual Institute

Panel members deliberated how to achieve the above recommendations. It was concluded that the most efficient and effective course of action would be to establish a overseeing body -- a Virtual Institute -- to organize and coordinate programs and services such as:

* Maintain databases of information vital to this NAFTA initiative, and make this information readily available to researchers,
* Organize, coordinate and publicize workshops which promote cooperation and collaboration among researchers in the academic and industrial communities of the NAFTA countries,
* Establish and maintain a U.S. Materials Network, and encourage the development of similar networks in the NAFTA countries and elsewhere,
* Provide advice and counsel on funding opportunities and proposal preparation,
* Act as a central clearinghouse for proposal applications, either forwarding proposal to the appropriate agency or providing funding from federal NAFTA Initiative funds.

The Virtual Institute will centralize efforts and not only ensure the success of the programs described above but provide the impetus for new incentives. The establishment of a central coordinating office -- a Virtual Institute -- will bring us further to reaching our goal to increase scientific interaction among Mexico, Canada, and the United States, not only in the spirit of NAFTA, but with the understanding that this effort will have a meaningful industrial, economic, and cultural impact.

1. NAFTA - Managing the Cultural Differences, Robert T. Moran and Jeffrey Abbott, gulf Publishing Company, 1994.
2. Indicadores de Actividades Cientificas Y Technologicas, Secretaria de Educacion Publica, CONACYT (National Council of Science and Technology), 1993.