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TECHNOLOGY TRANSFER TO LATIN AMERICA
FROM SMALL- AND MEDIUM-SIZE U.S. FIRMS:
BROADENING THE CHANNELS

Report of a Study for the Department of State
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I. EXECUTIVE SUMMARY, FINDINGS AND RECOMMENDATIONS

This is the final report on a research project carried out for the Department of State by Arthur D. Little, Inc., during 1977 and early 1978 to design and test, at a preliminary level, the feasibility of a possible new U.S. initiative in the field of international technology transfer.

The activities considered are aimed at broadening the channels through which practical technologies are made available to Latin American business firms by stimulating the active involvement of small- and medium-sized U.S. businesses in transferring such technologies in cooperative ventures. Our research

1. confirms that there is indeed an opportunity to broaden such channels;
2. identifies the principal constraints which would have to be dealt with in making such an activity effective;
3. illustrates, with brief case studies of representative firms in both the United States and four countries of Latin America, attitudes and interests in the private sector relevant to the postulated initiative;
4. establishes the functional requirements for an activity that would contribute to broadening the existing channels of transfer; and
5. points the way to the further study and development work that is required before an interested sponsor can take definitive decisions on creating a new activity for this purpose.

A. BACKGROUND AND OBJECTIVES

The basic concept we were asked to study was presented by the Secretary of State at the 6th OAS General Assembly in Santiago on June 9, 1976, when he stated that the United States will

"... explore cooperative ventures in which small- and medium-sized U.S. firms would provide practical technologies to individual Latin American firms, along with the management expertise needed to select, adapt and exploit these technologies..."

The Secretary's commitment was made against the backdrop of rising dissatisfaction in Latin America, confirmed in a number of interviews with business firms in Latin America carried out in this research project, with the alleged dominance of large, frequently U.S.-based, corporations in existing channels through which many Latin American business firms obtain access to needed technology. Providing alternate channels presumably would tend to ameliorate such dissatisfaction, a presumption also confirmed

in our interview program in Latin America to the extent that the business executives we saw are representative. Thus, a program to provide alternate channels, if effective, could over time broaden and deepen political, economic, and cultural Latin American/U.S. relations, with positive effects for all participants and the governments concerned.

Since the Santiago meeting in mid-1976 other developments on the international scene have added importance to the exploration promised by the Secretary. The most significant is the United Nations decision to convene a world conference in Vienna in August 1979 to examine policy issues surrounding the use of science and technology in furthering the progress of economic and social development in the Less Developed Countries. On the agenda of this Conference will be issues relating to channels of transfer for industrially-significant technology¹. Also relevant to this study are the efforts of the Group of 77 (now some 111 nations) within UNCTAD, to bring about the adoption of legally-binding international regulation of the terms of technology transfers between countries, and the countervailing efforts of the United States and other industrialized countries to limit such action to a code having exemplary effect only.

In this context any initiative that the United States could take, or sponsor with others, that is consistent with policy objectives in the technology transfer field of the Latin American members of the Group of 77, while providing positive benefits to the U.S. economy, could make a special contribution to building and sustaining a constructive atmosphere in these sectors of the North-South dialogue. As will be seen, the initiative under examination in this study seems to offer an opportunity of this kind.

B. METHOD OF APPROACH

For the purposes of this study we have interpreted our obligation to "explore cooperative ventures" to mean an examination of ways to foster international business partnerships--of a continuous and interdependent nature--between small- and medium-sized U.S. firms (S/MSF's) and Latin American firms (size not limited), in which a principal objective is to transfer technology to the Latin American firms and, as needed, the management expertise to complement it. Note that the limitation to "cooperative ventures" and the inclusion in the transfer of "management expertise" excludes from the scope of the study some typical technology transfer activities like equipment and machinery sales, consulting con-

¹The UN Conference Agenda is included as Appendix IV. Most of the findings of this study, as presented in Subsection C of this Chapter, are directly relevant to the proposed discussions there of (1) science and technology for development (in the industrialization field); (2) institutional arrangements and new forms of international cooperation in the application of science and technology; and (3) utilization of the existing United Nations system and other international organizations to implement the objectives of (1) and (2).

tracts, direct foreign investments, or even licensing agreements (unless the license also involves establishing a close and continuing business relationship between the parties broad enough to provide for the transfer of managerial skills). As noted, in making the study we have placed no restriction on the size of the potential user of the transferred technology, the Latin American firm. In the United States, however, we have concerned ourselves only with small- and medium-sized firms. While no single, suitable standard is completely satisfactory, we have adopted for purposes of this study the criteria for loan eligibility used by the U.S. Small Business Administration. These vary according to industry sectors and are expressed in terms of sales volumes and number of employees per firm. Maximum sales of \$200 million and employment of 1,000 are the effective limits; as a practical matter we chose to focus on U.S. firms with sales in the range of \$30 to \$70 million per annum. On the Latin American side, despite the absence of a formal limit but because of the relatively smaller size of virtually all firms, we found ourselves working, in most cases, with firms in the range of \$250,000 to \$10 million in annual sales.

The study, although formally divided into two Phases comprised of nine Tasks, can best be thought of as falling into three major stages. The first stage involved studying the current environment for technology transfers through a review of existing literature and accumulating the judgment and experience of a project team of ADL professional staff experienced in technology transfer operations and in consulting with small businesses in both Latin America and the United States. The output of this stage was a set of preliminary hypotheses and concepts on the subject of technology transfers between S/MSF's in the United States and Latin American companies, the constraints and problems impeding such relationships, how these constraints could be overcome, and what institutional mechanisms could increase the flow and quality of such transfers.

The second and third stages consisted of the U.S. and the Latin American interview programs, the purpose of which was to test the preliminary hypotheses and concepts to discover first-hand the problems involved in bringing S/MSF's and Latin American firms together. The interview programs included (1) United States interviews, (2) Latin American interviews, and (3) follow-up interviews in the United States.

Discussions of the progress of the research with a Monitoring Group within the Department of State took place prior to the initiation of the first U.S. interview program and also before the Latin American interviews.

A preliminary comment on interview program methodology may be helpful in evaluating the significance of the interviews (a more complete discussion of methodology will be found in Appendix I). The study was focused on six industries in Latin America judged to be of high development potential and in need of foreign technology: (1) pharmaceuticals and diagnostics; (2) food; (3) telecommunications; (4) machinery and auto parts; (5) chemicals; (6) electronics. The U.S. interview sample

was made up of 12 firms in comparable industries, meeting the SBA size criteria and judged likely to be willing to discuss the issues at hand. The firms in this sample ranged in size from \$2 million to \$200 million in annual sales, with the majority between \$30 to \$70 million. The sector distribution was as follows: food (four); chemicals (three); pharmaceuticals and diagnostics (two); electronics and telecommunications (two); metallurgy (one). All regions of the nation were represented with the exception of the Southwest.

Since the sample is small, no claim can be made that the findings are statistically significant. We consider the sample to be valid, however, as a basis for testing the preliminary hypotheses. The industry experts who selected the firms believe that the interviews present a representative range of the factors which determine the decisions firms make regarding technology transfer. In addition to sectoral, size, and geographic diversity, the sample exhibits a wide range of types and sophistication of technology, experience with foreign ventures, and responses to the issues being studied.

The representative nature of the U.S. sample was further strengthened by the U.S. follow-up interviews. This series of 10 interviews included some with firms of the original sample and others with additional firms.

The selection of Latin American firms to be interviewed was primarily the responsibility of ADL country experts based in Brazil, Venezuela, Mexico and the Dominican Republic. These countries had been chosen as targets for the study under the contract in part because of ADL's extensive contacts in them, the known preference of U.S. firms for involvement in the more prosperous nations, and the desire to include one less prosperous, and small, island nation in the sample, for contrast.

Seventeen firms in these countries were selected. Efforts were made to match them with the U.S. firms already interviewed. No strict size criteria were applied, but the focus was on small- and medium-sized firms partly because it was found that the larger firms often already had adequate access to technology. Four "large" firms (in the crude sense that they were considered large in the countries in question) were, however, interviewed for purposes of comparison.

The sectoral distribution of the Latin American interviews was food (four); chemicals (three); diagnostics (one); electronics (four); telecommunications (two); machinery and auto parts (three).

As in the case of the U.S. interview program, the Latin American interview findings cannot be said to be statistically significant due to the size and selection process of the sample, but we believe that the findings are representative and important.

The first round of U.S. interviews, and the Latin American interviews, focused on obtaining a sense of the general and technological background of the firm; experience with technology transfers; experienced or perceived obstacles; pre-conditions for transferring or receiving

technology; and eliciting suggestions on how technology transfers could be stimulated and institutionalized. The follow-up interviews involved presenting a concrete opportunity identified in Latin America, to a U.S. firm already interviewed in order to determine interest or change in response, or to a firm new to the program.

C. PRINCIPAL FINDINGS

1. There is an opportunity to broaden the channels for making practical technologies available to Latin American business firms by stimulating the active involvement of small- and medium-sized U.S. firms in various forms of cooperative ventures.

- a. There is little apparent involvement to date in such activities by small- and medium-sized U.S. firms.

~~The experience of ADL's Latin American staff and industrial specialists, confirmed in the interview program in this study, is that U.S. S/MSF's do not usually enter into business ventures in Latin America which include significant transfers of know-how and technical skills. Most of their experience has been limited to exports and an occasional licensing agreement.~~

Few Latin American respondents had even been in contact with U.S. S/MSF's, and none had acquired technology from one through a business venture. In fact, Latin Americans seem to assume that U.S. sources of technology will be large corporations. They argue that few S/MSF's take the initiative to come to Latin America, while the Latin American firms lack the resources and means to identify appropriate S/MSF's.

- b.2. At the same time there is strong interest in most of the Latin American firms interviewed in ~~this study in establishing cooperative ventures involving~~ technology transfers from U.S. S/MSF's. As expressed by many of our Latin American respondents, most of them would prefer to enter into business relationships with U.S. S/MSF's than with larger U.S. companies since it is thought that S/MSF's would be more compatible and less domineering. Few Latin Americans, however, take the initiative to interest a S/MSF in a venture.

- c.3. There appears to be a wide range of technologies in the hands of U.S. S/MSF's that are useful, appropriate, and perceived as needed by Latin American counterparts. While our study was limited in scale, we were able, through the techniques described in this report, to match potential partners in the U.S. and Latin America, a number of whom

many others - in the following separate list:
[x-x]

~~we expect now to proceed with active exploration of mutually interesting ventures. This interest has been generated despite the initial skepticism and reluctance exhibited by U.S. S/MSF's when we made first contact.~~

2.4 The key to stimulating action is presenting to a businessman a defined opportunity with profit potential. The most significant development in our interview program was the positive reaction in the follow-up interviews when a specific project could be proposed. A

2.5 There are a number of constraints which operate to limit the interest of U.S. S/MSF's.

a. • Many U.S. S/MSF's tend to have a negative perception of the Latin American business environment, to some extent based on inadequate information. Our interviews generally indicate that they perceive limited potential and great risk in Latin America. They are particularly concerned about inadequate markets, stringent regulations, and limited returns. The consequence of this attitude by S/MSF's has been that they have established a rigorous set of pre-conditions to considering ventures in Latin America. In this environment most S/MSF's are unlikely to take any initiative toward exploring a venture.

b. • Knowledge of specific opportunities which would stimulate exploration is not readily available to U.S. S/MSF's.

c. • The increasingly rigorous regulatory constraints which most Latin American governments are now applying to the entry of foreign firms, and to licensing agreements, joint ventures and similar arrangements--designed primarily with the large foreign firm in mind--also inhibit interest on the part of the U.S. S/MSF. Their existence, even if on close examination tolerable in a specific case, contributes to the negative environment.

2.6 There are also constraints within Latin America which have operated to limit the interest of Latin American firms in becoming associated with U.S. S/MSF's.

a. • Information about technology in the hands of U.S. firms, other than the larger companies, is not readily available, particularly to the small- and medium-size firms.

b. • Regulations which require majority control of joint ventures to be in the hands of nationals of the host country, limits on repatriation of capital or profits, cumbersome requirements for official approvals, and restrictions on measures for protection of imported proprietary technology

create obstacles seen by the Latin American company as difficult to overcome in bringing in a partner.

c. Language incompatibility is an inherent problem, for many managers and executives.

d. Doubt that the U.S. partner, from a small business with no prior exposure to Latin American conditions, can conform to national business practices and norms is prevalent.

4. Some of the constraints that inhibit the association of U.S. S/MSF's with Latin American partners can be relieved by expanding the availability of well-conceived information and support services.

a. 1. Better information service is needed in the U.S.

- to dispel misleading conceptions and stereotypes about the Latin American business environment widely prevalent among U.S. S/MSF's;
- to bring to the attention of the smaller U.S. firms who do not have internal research and information resources facts about economic conditions and trends in relevant sectors and countries;
- to make it easier to assess the practical implications of Latin American laws and regulations, and the political system;
- to signal the availability of specific opportunities and potential partners.

b. 2. Better information service is also needed in Latin America

- to alert firms to alternative technologies which would be useful in solving problems or opening up growth opportunities;
- to identify for Latin American firms those U.S. S/MSF's with specific available technologies and potential interest in cooperative ventures.

c. 3. In both regions constraints would be less formidable if there were available a support service that would have responsibility for stimulating new business relationships through a variety of functions and devices. This is so because small- and medium-size firms in both regions frequently lack resources for identifying and screening possibilities, negotiating a deal, coping with constraining regulations, and starting up a venture. In the absence of official or other institutional support, most of them will be passive.

D. POTENTIALS FOR ACTION

Most of the foregoing findings first took shape in this study as hypotheses about the situation when, in the first stage of the work, we pooled the experience of the ADL project team in both Latin American and U.S.-oriented technology transfer work. These hypotheses were then tested in the interview programs in both regions and have emerged as the findings just summarized.

A second set of hypotheses was also advanced in the first stage of the work; these were concerned with what in practical terms could be done in the face of the difficulties noted. These hypotheses about potential actions which would broaden channels of transfer by opening them more effectively to the U.S. S/MSF's, were based primarily upon the seasoned judgment of the ADL project team. They were then exposed to the views of the business firms interviewed in both regions and reformulated to be responsive to these views. They can be summarized as follows:

1. The functions which need to be provided for in any program aimed at stimulating U.S. S/MSF's and their Latin American counterparts to become more active in ventures transferring technology include:
 - Identification and maintenance of a supply of potential candidate firms (sources and users);
 - Assistance in defining a user firm's specific technology requirement--the technological alternatives applicable to the problem at hand;
 - Search for technological information;
 - Identification of the specific potential supplier(s) for the defined requirement;
 - Matchmaking service--bringing the parties into contact with each other;
 - Facilitation service--providing technical evaluation assistance, analysis of contractual terms, negotiation advice, locating financial support, easing red tape;
 - Influencing the development and maintenance of a favorable environment for technology transfer, particularly with regard to governmental regulation.
2. To carry out these functions successfully, the following activities are needed:
 - For identifying user candidates, the preparation of industry surveys aimed at identifying technology transfer opportunities in industry sectors;

- To develop recognition of need and stimulate user demand, a program of visits to firms to convince them of potential advantages, carried out by "technology transfer agents" operating in a consultant mode. These agents need to be supported by general promotional activities.
 - 3.3. • For assistance in formulating the specific technological requirement, provision of the services of the agent or a specialist;
 - 3.4. • For identifying potential suppliers, except in those cases where they are already known to the firm, searches through data banks, institutional information sources, the use of consultants;
 - 3.5. • For developing recognition of opportunities by suppliers, a program of visits to firms by technology transfer agents;
 - 3.6. • For bringing the partners together, matchmaking, personal involvement ~~with tact and dedication~~;
 - 3.7. • For facilitating the transfer after the partners have been matched, the interaction of specialists having legal, technical, managerial, and accounting skills;
 - 3.7. • For influencing and maintaining a favorable environment, unflagging attention at the general management level.
- 3.9. Many of these functions are now being discharged by a wide range of organizations; but no organization is performing them all in an integrated, purposeful way and none is focusing closely on the specific opportunity confirmed in this study: the U.S. S/MSF as an underutilized but highly appropriate source.

The actors in this field are:

- The banking system;
- Technology research institutes both in the United States and in Latin America;
- Private consulting, engineering and research service organizations as well as technology brokers;
- Export promotion centers (Latin America);
- Development banks and corporations;
- The International Executive Service Corps (IESC);

- The U.S. Commerce Department's Overseas Product and Investment Opportunities Staff (OPIOS);
 - International investment assistance organizations, e.g., OPIC;
 - Technology information services such as the U.S. National Technical Information Service (NTIS) and the UNIDO service,
4. This research project, as carried out with ADL's professional staff resources and its offices in the target countries, constitutes a mini-scale demonstration of most of the functions and activities needed on a much larger scale. It has in fact stimulated the kind of involvement which is sought, even though no single cooperative venture has yet been finalized.
 5. The most practical way to proceed with capitalizing on the opportunity that is confirmed in this study is to move toward establishing a new program, initially within the structure of an international organization, development institution, or governmental agency--a Latin American technology clearinghouse (LATCH) service.

While there are many options for its siting, organizational form, sponsorship, scale, operating style, and method of development, the following characteristics will be in every case critical to the success of a LATCH service:

- It should operate through existing institutions, such as those listed above, to the maximum practicable extent, mobilizing capabilities already in place while focusing these capabilities sharply on the S/MSF resource. This implies contracting out rather than performing most services directly;
- It should emphasize the identification of specific attractive projects and specific potential partners as the target of the activity;
- It should see to it that a comprehensive service is available, covering all the critical functions we have identified, so that there is integration and follow-through to the final objective: an active cooperative venture in technology transfer involving a U.S. S/MSF;
- As a long-term goal it should seek to make the service self-sustaining and independent of the sponsoring institution.

E. GETTING STARTED

Over the long run a LATCH service could become very large and far-flung, linking firms in all or nearly all Latin American countries with thousands of firms in the U.S. small- and medium-size industry sector¹. It seems wise, however, to begin with modest steps and build toward larger-scale activity on the basis of experience and experimentation, in a flexible, learning mode. We therefore make the following recommendations:

1. On the basis of the findings of this study, an appropriate international organization, development institution, or agency of the United States Government should commission, by contract with a competent, multidisciplinary private sector industrial research organization with experience in Latin America (there are a good number of potential candidate organizations), a research and demonstration project which would carry into experimental action for at least a two-year test period a pilot program of LATCH services meeting the criteria established in this report.
2. While there are many options for such a research and demonstration project, we propose the following guidelines:
 - a. Scale: 100 professional man-months of effort a year (costing about \$1-million, including expenses).
 - b. Latin American country coverage: not less than 3 countries nor more than 5.
 - c. Objectives:
 - Bring into being each year at least 100 actual new cooperative ventures in technology transfer involving U.S. S/MSF's
 - Evaluate the process in depth while doing so
 - Design in detail a next-step program--a broadened experiment, the launching of a permanent LATCH service; a variant; or recommend termination of the effort.

¹An estimate by ADL, based on the 1972 U.S. Census of Manufacturers, is that, in 8 industry sectors likely to have technology of potential interest to Latin American business, there are about 57,000 U.S. S/MSF's which meet SBA criteria. Sectors included: drugs, food processing, telecommunications, electrical and electronics, metal fabrication exclusive of machinery and transportation equipment, chemicals and allied products, paper and allied products, leather and leather products. This list of sectors could be expanded.

- d. Mode: use in-house professional staff primarily but subcontract to a Latin American counterpart organization in each test country.
- e. Seek maximum practical involvement of development finance institutions and the private sector investment and commercial banking communities in both Latin America and the U.S.
- f. Maintain close liaison with government activities and institutions in both the United States and Latin America, but minimize their involvement in program activities.

F. BENEFITS TO THE UNITED STATES

In the technological and management capabilities of its small- and medium-size manufacturing businesses, the U.S. has a resource especially well matched to the industrial development needs of many Latin American countries. It also happens to be well matched in the political sense, in the current environment of the North-South dialogue. Finding a way to take advantage of this almost unique resource, for the mutual benefit of all concerned, seems eminently worthwhile.

What this study contributes is a demonstration, on a limited scale, that it is possible to do something about mobilizing this resource, and a definition of the main elements of a program of action for doing so.

In the long run the benefits to the United States could be substantial:

- expansion of a direct export--know-how--from a sector of the U.S. economy not now capitalizing on this market for its resource
- expansion of exports of other products--through the market development that would almost certainly follow the establishment of broadened relationships in the technology transfer field
- from both of these expansions, contributions to the international trade and payments balance
- a contribution to the legitimate needs of Latin American countries for better access to appropriately scaled technologies in the hands of counterpart firms of compatible size and orientation
- through all of the foregoing a contribution to the quality of the environment of political relationships.

II. THE CURRENT ENVIRONMENT

A. TRADITIONAL TECHNOLOGY TRANSFER CHANNELS

The most significant transfers of technology from the United States to Latin America have come about through the operations in Latin America of the subsidiaries of U.S. firms--usually large ones--or by the purchase of technology in the form of equipment, licenses, trademarks, and designs. There is also considerable outright copying of equipment.

Technology transfer has thus been largely a free market activity in which technology is bought, sold or rented, reflecting the fact that much technology is proprietary and that the technology which is in the public domain can usually be applied only through the expenditure of time and talent. Since technology has often been developed at great expense by a private firm to create or extend the market for a product, it is likely to be considered crucial to the firm's success and jealously protected. As a result, when technology is marketed across national boundaries, the owners normally want to retain control, either through ownership of a controlling interest in the using firm, or by contract provisions in a license agreement. In addition, in some instances, a firm will transfer hardware and/or parts of complementary software, but withhold crucial know-how or information in order to retain de facto control over use and loss.

Another channel for technology transfer, increasingly important since the 1950's, is represented by various forms of voluntary technical assistance, commercial consulting services, financial support programs, and official foreign aid.

B. LATIN AMERICAN ATTITUDES TOWARDS TECHNOLOGY TRANSFER

In recent years, Latin American leaders (and those in other LDC's) have been attaching greater importance to the role of technology in industrial development as well as in alleviating related employment, trade, and balance-of-payments problems. This new emphasis is at least equal to that given to capital accumulation and the creation of physical infrastructure. Most would agree that the experience of developed countries illustrates that technology and technological advancement are crucial. It is also evident that there is a huge gap between most Latin American countries and the United States in the size of the actual technological stock and in capability for developing new technology.

Latin American countries historically have relied on the traditional mechanisms of transfer for building up technological capability. That is, it has been left to individual firms to acquire technology by whatever means possible, or in many instances foreign firms have been given incentives to invest and set up subsidiaries.

These mechanisms have come under increasing fire in Latin America for a number of reasons. The first has already been touched on: much

of what has been transferred has not been technology in the real sense of the term. It has involved the sale of equipment without complementary know-how; licensing agreements that withhold critical information; and subsidiaries or joint ventures where know-how is withheld from nationals. Thus, what is acquired may not be properly utilized or does not effectively increase the recipient nation's technology stock or capability.

A number of other criticisms are directed at the terms under which firms in the United States and other developed countries are willing to transfer technology. Some resent the withholding of information. Others argue the opposite--that firms try to sell or license entire technology "packages" (equipment, raw materials, technical support, designs, etc.) when only parts of the package are required. Hence, it is argued, Latin American firms pay too much for a small piece of technological know-how. A related criticism is that technology transfer contracts are too restrictive in limiting the recipient's use of the technology, marketing of the product (particularly with respect to exports), changes in product designs and in requiring the purchase of raw materials, equipment and components from the supplier of the technology.

A growing number of Latin American analysts have developed an even more sweeping critique of transfer mechanisms. Their argument holds that allowing proprietary control of technology creates, in the real world, a monopolistic market. This leaves firms in advanced countries free to sell technology at unreasonably high prices, transfer and control it through subsidiaries, or withhold the most desirable technologies altogether, transferring only the less sophisticated and obsolescent. In such cases, the argument goes, both the basic know-how and the R&D capability are retained in the advanced country. The net result is seen as a drain on the recipient country's resources, an increasing dependency on foreigners for technology, and a broadening technology gap.

A final area of criticism, less clear-cut, revolves around issues of appropriate technology. Some would argue that technology developed in the United States is not in many cases appropriate to Latin America's resources. Given its abundant nonskilled labor, shortage of skilled labor, and capital, and limited absorptive capacity for sophisticated technology, a more labor-intensive, more capital-saving, and less sophisticated technology than that usually developed in the United States would be more appropriate. Other Latin Americans sharply disagree, arguing that basing technology policy on this theory leads toward perpetuating the technology gap, and that Latin American nations have had little difficulty in adapting and absorbing even advanced technology. Furthermore, differences in resource availabilities and costs may not be as great as is claimed.

Critical thinking along these lines has, however, become so pervasive in Latin America that it has led to action along three broad fronts: (1) efforts to establish a "new technology order;" (2) attempts to regulate the supply and demand for technology through legal means;

and (3) efforts to achieve greater national and regional technological autonomy.

Several Latin American governments have been in the forefront of a collective LDC movement to secure a new technology order that would respond to their critique. The primary vehicle would be a worldwide, binding Code of Conduct that contains ten fundamental strategies for changing the relationship between supplier and user:

- Increase the capability of local governments to intervene directly in the transfer, sale, licensing, use and adaptation of foreign technology.
- Restructure the pricing of technology as well as the method of payment and the duration of the agreement.
- Facilitate the "unbundling" of technology from direct foreign investment packages; and allow for transfer of select parts of technological packages to create flexibility of choice.
- Remove restrictions on the further use of technology and on exports, marketing and product and technology modifications.
- Limit the proprietary nature of technology.
- Relocate R&D facilities in developing nations.
- Reduce supplier control over user decision-making.
- Insure appropriateness of technology.
- Provide for the speediest possible local ownership of technology.
- Make freely available all information regarding technological alternatives.

The second area of activity has been to regulate the supply and demand for technology. Shaping the supply side involves controlling the way in which firms are allowed to transfer technology to Latin America, while the demand is manipulated by trying to get Latin American firms to seek technology officially deemed appropriate. Influence on demand is sought through both regulatory means and offering incentives.

Although it is difficult to generalize about the policies of Latin American governments as a whole, a quick glance at the situation in Brazil, Mexico, Venezuela, and the Dominican Republic is indicative of the general picture¹.

¹Appendix III presents a more detailed summary of the policies of these nations.

By far the greatest emphasis has been on controlling the supply side. All four nations have institutions charged with screening and approving all contracts involving direct foreign investment or any type of technology transfer. They are in a position to reject or require modification of any arrangement that does not meet national objectives or criteria. In the Dominican Republic this power is limited to the ability to refuse foreign exchange, but the other three countries have developed much more sophisticated institutions. Similarly, the Dominican Republic has still not spelled out its criteria and objectives clearly. Venezuelan law follows the restrictive guidelines set forth by the Andean Pact Decision 24, but its interpretation of the law is still not clear. Mexico and Brazil have been the most sophisticated in spelling out their objectives and criteria, as well as in their enforcement. The latter three countries prohibit any arrangements that contain restrictive clauses, demand excessive payment, involve majority foreign ownership, and are not adjudged to be in the nation's interest. The broad nature of these criteria allows the regulatory agencies to approve and reject contracts with wide discretion.

Efforts to shape the demand for technology are, for the most part, rudimentary. Among the countries considered, only Brazil has implemented policies in this area. The government provides financial assistance, scientific and technological information, and technical evaluation to encourage users to select technology carefully. Furthermore, the laws regulating supply are used to force those seeking technology to meet government criteria. Mexico is beginning to implement similar policies by disseminating information on alternative sources of technology. Venezuela has the same policies officially, but at this stage lacks the machinery to implement them. The Dominican Republic, with no such policies at this stage, is representative of the majority of the less prosperous and less sophisticated.

The third area of activity is exemplified by attempts to achieve national and regional technological autonomy. Again, Brazil is the only nation to have made any significant effort in this direction. A National Plan for Science and Technology has been implemented that calls for substantial government support of research and development at various levels. The goal is to develop new technologies, install the ability to modify imported technology to better fit local conditions, and to improve the technological infrastructure and absorptive capability. The other three countries are thinking along similar lines, but only Mexico has accomplished anything at all while Venezuela and the Dominican Republic trail behind.

C. THE U.S. POSITION

The U.S. Government has taken the position that there is merit to some of the Latin American critiques, that new initiatives are necessary, and that discussion of these issues in international forums is in the best interest of the nation. In formulating its policy, however, the U.S. Government must take into consideration the strong objections

voiced by U.S. labor and business to aspects of the Latin American position.

Organized labor in the United States holds that transferring technology creates competition abroad and eventually results in the displacement of American jobs. Japan, Korea, Taiwan, Brazil and other developing countries are pointed to as examples, as well as recent experiences in the shoe, apparel, and steel industries. Labor does not agree with the argument that jobs are being displaced only in labor-intensive industries and counters with the example of electronics. Labor believes that U.S. MNE's transfer their most sophisticated technologies to low-cost labor and tax-sheltered areas that leave U.S.-based operations in a noncompetitive position. Hence they argue for strict controls on the export of technology.

The U.S. Government's position on this issue to date appears to be that in fact the United States will experience a net benefit from open trade and from development and technological assistance for the LDC's. Development and increased trade expand the demand for U.S. products and technology and result in greater employment.

The second group that any U.S. Government initiative would have to take into consideration is the business community that develops and owns technology. While labor argues for strict controls on technology transfers out of the United States, industrial management appears to adhere strongly to a continuation of the existing open policy towards technology transfers with as few controls as possible in both the United States and Latin America. The only advocated form of control is the maintenance of an international legal code that will insure proprietary rights. Lack of guarantees for the security of intellectual property rights in technology in international trade is regarded as a sure way to greatly slow the flow of technology among nations as well as the development of indigenous technological capability. Most U.S. spokesmen believe that regulating technology transfers will backfire: "unbundling" technology from a traditional direct investment package would deter the large number of enterprises that transfer technology as a part of an overall market strategy rather than for the sake of selling it as a commodity. Increasing controls would increase costs and render new ventures less attractive. Prohibiting all restrictive clauses in contracts would also reduce interest in technology transfers to undesirably low levels. Controlling the price paid for technology tends to remove it from the market since many will judge that the price does not justify their risks and R&D costs.

While many make these and other criticisms of the Latin American and LDC proposals, others believe that they will be able to cope with the control systems. Notes on interviews in this study illustrate in detail the current attitudes of businessmen on many of these issues (see Appendix II).

As of the middle of 1977, the U.S. Government was considering an International Code of Conduct prepared by the developed nations, which included the following points¹:

- Technology and science play a critical role in LDC's.
- LDC access to technology must be encouraged and facilitated.
- A Code of Conduct can create conditions to assist LDC's in the selection, acquisition, and use of technology.
- Restrictive business practices must be eliminated.
- Greater availability of information is needed to facilitate the selection of appropriate technologies.
- The right of states to regulate the transfer of technology should be recognized.
- Parties involved in technology transfers should have the freedom to negotiate under conditions which are not unduly restrictive.
- Property protection must be respected to induce R&D.
- User and supplier should have access to mutually agreeable international arbitration.

An exemplary--non-enforceable--Code of Conduct along the foregoing lines would apply mostly to the private sector in the United States since technology is largely owned and managed by private business. It is recognized that most of the initiative for technology transfers would have to come from this sector, and hence that some form of an incentive and protective system must be maintained.

The U.S. Government's options for actively pursuing the objective of a greater flow of technology to LDC's are limited. However, a number of specific initiatives for government participation or sponsorship have been proposed: a Technology Corps, Firm-to-Firm Cooperation, an International Center for the Exchange of Technological Information, Technical Exchange Service for Latin America, the Appropriate Technology Fund, an International Resources Bank, an International Energy Institute, and an International Industrialization Institute². In addition the U.S. Gov-

¹From Walter B. Lockwood, "Transfer of Technology: The U.S. at the UNCTAD Negotiations."

²Some of these are not under active consideration at this time although others are. It is not within the scope of this study to discuss the initiatives or their status and feasibility. A useful summary will be found in Baranson, "North-South Transfer of Technology--What Realistic Alternatives are Available to the U.S."

ernment could put greater emphasis in its development aid programs, on providing easier access to information about sources of U.S. technology as well as assisting Latin American governments and firms in developing their own technological capabilities.

D. U.S. S/MSF'S AS SUPPLIERS OF TECHNOLOGY

The recommendations of this report, presented above in Chapter I, represent a form of development aid. The basic logic is that U.S. S/MSF's are an underutilized source of technology. As a result almost all technology transferred to Latin America has been through large-firm activity whether in the form of direct investment in subsidiaries or joint ventures or by licensing or technical support activities. Transfers from S/MSF's have been almost entirely in the form of equipment, components, and raw material sales. Only a small minority of U.S. S/MSF's are involved in joint ventures, broad licensing agreements, or technical support contracts. Since many S/MSF's in the United States have unique technical capabilities, extensive managerial, marketing, and production know-how, and interesting product lines, they represent a vast and largely untapped technology resource.

Technology from U.S. S/MSF's could help meet many Latin American development goals as well as overcome some of the current objections to presently dominant transfer mechanisms. Among the major advantages of obtaining technology from S/MSF's, rather than from larger firms, are:

- The management style of S/MSF's is likely to be more compatible with that of the majority of Latin American managers who operate firms of a similar size.
- S/MSF's are more likely to become associated with a small- or medium-sized Latin American firm than with the larger Latin American firms. Developing small- and medium-sized industry is an important objective in many Latin American countries.
- S/MSF technology is often thought to be more appropriate for many LDC situations. It may utilize more labor-intensive or older technology, but even if it is capital-intensive and sophisticated, it tends to have been modified for use in smaller-scale operations.
- Latin Americans would have an easier time bargaining with smaller U.S. companies.
- S/MSF's are less visible than larger foreign firms and Latin American governments could be more flexible with them.
- S/MSF's might be more interested in innovative and flexible relationships.

Involving S/MSF's could also be beneficial from the U.S. point of view:

- It could open a whole new area of business for S/MSF's.
- Demand for U.S. equipment, components and raw materials would be spurred.
- The U.S. trade deficit would be favorably affected.
- An area of comparative advantage would be better utilized.

III. THE U.S. INTERVIEW PROGRAMS

A principal feature of this research project has been its emphasis on interviews with business firms as a primary source of insight into the feasibility of broadening channels for technology transfer. Three rounds of interviews were carried out. The first involved 12 firms in the United States; the second, 17 distributed among Brazil, Venezuela, Mexico and the Dominican Republic. The third--a follow-up program in the United States--involved 10 firms, of which four were visited in the first U.S. round and six were seen for the first time.

Much valuable information was obtained in this exercise, the overall implications of which are evident through this report but are summarized in Chapter V. The most significant outcome, however, was the positive attitude toward participating in cooperative ventures with Latin American firms exhibited by the U.S. firms seen in the second round of U.S. interviews. This attitude, which contrasted sharply with the general skepticism and coolness displayed in the first U.S. interviews arose, in our opinion, from the availability in the second round of specific, interesting projects for consideration, derived from the preceding round of Latin American interviews. In the first U.S. round, six of twelve U.S. firms estimated that they would be likely to have interest in a cooperative venture of some kind--in many instances with substantial qualifications and reservations. In the second U.S. round, by contrast, eight of the ten firms involved not only displayed positive interest but expressed specific intention to move into active discussions with the Latin American candidate partner identified by the ADL team.

The inference is strongly presented that the key to involving a broad spectrum of U.S. S/MSF's in a program of technology transfer with Latin America is the availability of specific interesting projects to overcome prevalent misinformation and inertia. A related inference is that the four-step process engaged in by the ADL team to reach this point¹ is a useful model for a large-scale research and demonstration project, as well as ultimately for a continuing program.

The methodology for selecting the U.S. and Latin American interview sample and a summary of its principal observations is presented in Appendix I. The results are summarized in Table 1, First Round U.S. Interview Results; Table 2, Latin American Interview Results; and Table 3, Follow-Up U.S. Interview Results. Detailed notes of all interviews appear in Appendix II.

¹Steps: (1) identify promising groups of candidate firms in Latin America by sector survey or informed judgment; (2) select U.S. respondents to match these and, by interview, develop information about technologies available in their hands; (3) select specific Latin American firms believed to be in a position to use such technologies and interview them; and (4) re-interview the U.S. suppliers with a specific project in hand.

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TABLE 1

FIRST ROUND U.S. INTERVIEW RESULTS

<u>Firm</u>	<u>Experience in Latin America</u>	<u>Evaluation of Latin American Experience</u>	<u>Perceived Obstacles</u>	<u>Pre-Conditions</u>	<u>Suggested Support Function</u>	<u>Likely Future Interest if Conditions Met</u>
Specialty Finishes	Joint ventures-2 Licensees-3	Mostly good Not as good	Payment and repatriation Finding partner	Suitable partner Worthwhile returns	Could manage without	High
Telecommunications	Small licensee	Poor	Small market Finding partner	Opportunity identified	Information	Moderate
Soybean Processor	Exports Technical support	Poor	Develops competition Business methods Lack of benefits	Financially beneficial Support of members	Information Risk guarantees Staff support	Low (technical support only)
Irrigation Equipment	Technical support Licensees	Good Poor	Low returns Risk Market size Costs	Full control Profitable Export potential Minimal risk	Support - repatriation Support - costs Information	High, particularly technical support
Diagnostics	Exports	---	Market size and structure Bureaucracy and legal problems	Full control Proprietary guarantees Incentives	Logistic support	High
Bakery	None	---	Cost Risk Negotiations	Profitability Skilled work force Profit repatriation	Information Financial support Identify partners	Moderate
Dehydrated Foods	Exports	---	Market size and sophistication Business environment	Large market Suitable partner Good business environment	Identify opportunities	High
Home Entertainment Electronics	Exports	---	Can't spare resources Small market	Financially profitable Financial support	Financial support Market information Identify partners	Low
Nuclear Diagnostics	Exports	Poor	Business ethics Finding Partner Securing proprietary guarantees	Suitable partner Proprietary guarantees	Information - business methods Identify partners	Moderate
Specialty Chemicals	Exports	---	Market size Little in return	Full control Market Two-way flow of technology	Consulting	High
Dried and Frozen Foods	Exports Subsidiaries	Negative	Political risk Lack of proprietary guarantees	Not interested at all	None Sufficient	None
Auto Parts	Exports	---	Unattractive environment Legal constraints	Greater freedom Profitable venture Attractive environment	Not specified	High

TABLE 2

LATIN AMERICAN INTERVIEW RESULTS

<u>Firm</u>	<u>Technology Transfer Experience With U.S. Firms</u>	<u>Perceived Problems</u>	<u>Pre-Conditions</u>	<u>Suggested Support Functions</u>	<u>Interest in Venture and Preferred Mechanism</u>
<u>BRAZIL</u>					
Specialty Chemicals	None (Equipment purchases)	None	Joint venture Long-term relationship Ability to communicate	Identify potential partners Matchmaking Follow-up support	High; Joint venture
Electronic Equipment	Technology purchases	Bureaucratic delays Government regulations Size difference	Confidence Minimal government constraints	Financial support	High; License or joint venture
Auto Parts	License (German) (Equipment purchases)	Size difference Negotiating Financing	None sufficient	Stimulating S/MSF's Negotiating support Matchmaking	Low
Chemicals	None	None	Communications and understanding Non-competitive market Full control	Information	High; Flexible
Telecommunications and Other Equipment	Negotiations (Equipment purchases)	Size difference	Attractive opportunity Compatible firms	Matchmaking Neutralizing size difference	Low
Boiler Operation	None	No basis for comment	Growth of operation	No basis for comment	None
Ball-bearings	Joint venture (England)	Negotiations	Suitable partner Detailed contract Real technology transfer	Identification of opportunities	High; Joint venture
Telecommunications and Electronic Equipment	Equipment and component purchases; negotiations	None	Reasonable cost Low import content	Identification of suppliers	High; Technical support contract
<u>MEXICO</u>					
Electronics	Technology contracts for specialized items	None	Full control	Identify opportunities Support for S/MSF's	High; Joint venture
Specialty Chemicals	None	None	Communications	Identification of opportunities	High; Joint venture or other
Locks and Auto Parts	Purchases	None	S/MSF's as suppliers Time limit on venture	Identification of opportunities	High; Joint venture or license
Auto Parts	Equipment purchases	Size difference	Highly profitable S/MSF as supplier	Not specified	High; Joint venture

TABLE 2 (Continued)

<u>Firm</u>	<u>Technology Transfer Experience With U.S. Firms</u>	<u>Perceived Problems</u>	<u>Pre-Conditions</u>	<u>Suggested Support Functions</u>	<u>Interest in Venture and Preferred Mechanism</u>
<u>VENEZUELA</u>					
Telecommunications	Joint Venture (Latin America)	Size difference Finding partner	Suitable partner	Stimulating joint ventures	High; Joint venture
Chemicals and Technology	Various	Size difference	Flexible	For smaller firms only	High; Flexible
Frozen Foods	Equipment and Information	None	None	Improve existing agencies	High; Joint venture
<u>DOMINICAN REPUBLIC</u>					
Bakery	Equipment purchases	Government policy Lack of information	Appropriate technology	Information Motivation of S/MSF's	Medium
Vegetable Oils and Other	Technology support contract, Purchases	None	Flexible	For smaller firm only	High; Joint venture

TABLE 3

FOLLOW-UP U.S. INTERVIEW RESULTS

<u>Firm</u>	<u>First Round Interview</u>	<u>Interest in Latin American Venture Expressed in First Round</u>	<u>Latin American Opportunity Identified</u>	<u>Reaction to Specific Opportunity</u>	<u>Intentions for Further Action</u>
Home Entertainment Electronics	Yes	Very remote interest in Latin America; Negative assessment of markets.	Mexican electronics firm	Positive; see possibility of venture.	Would like more information; Then will establish contact.
Dehydrated Food	Yes	Never considered Latin America, due to market size, business environment.	Brazilian poultry co-operatives	Positive	Would like more information; Will now consider venture in Latin America
Specialty Chemicals	Yes	No current ventures; Concerned about market size; Would require full control and return flow of technology.	Mexican specialty chemicals firm with R&D capability	Positive; interesting nature and technological capability of firm appealing.	Will bring Mexican firm to attention of appropriate division head.
Irrigation Equipment	Yes	Poor evaluation of licensing and joint ventures; Established long list of conditions.	Mexican locks and auto parts firm; Products not really compatible but interesting firm	Moderate	Will investigate firm but low priority; Would like to replace current weak licensee.
Electronic Supervisory Systems	No	--	Brazilian electronic firm	Positive	Already negotiating with another Brazilian firm; Would like to enter into immediate contact with firm to choose best alternative.
Naval Stores	No	--	Brazilian specialty chemicals and resins firm	Positive; very much interested in idea of Brazilian venture.	Would like immediate contact.
Frozen Dinners	No	--	Venezuelan frozen foods producer	Moderate	Would like to contact firm to find out if mutually beneficial venture possible.
Frozen Orange Juice	No	--	Same Venezuelan frozen foods firm	Negative; does not want to stimulate competition	None
Frozen Orange Juice	No	--	Same Venezuelan frozen foods firm	Negative	None
Telecommunications Equipment	No	--	Venezuelan telecommunications and electronics firm	Positive	Needs information on regulations regarding foreign telecommunications firms; Also an access to regional markets. If information positive, will enter into immediate contact

The following sections highlight conclusions based on the two rounds of U.S. interviews.

A. FEW S/MSF'S ARE CURRENTLY ACTIVE IN TECHNOLOGY TRANSFER TO LATIN AMERICA

There is no major trend toward S/MSF's entering into business relationships in Latin America that involve the transfer of technology. In fact the Latin American experience of most firms is limited to exporting on a small scale. Only a few S/MSF's have ever transferred technology to any significant degree through firm-to-firm relationships.

Some firms do have joint ventures, subsidiaries, or licenses in Europe and Canada, but offer a number of reasons why they have not made a similar commitment involving the transfer of technology in Latin America:

- A primary reason is the market; it is too small to justify local production; their products require sophisticated and well-developed consumer preferences which are not yet widespread enough in Latin America; and there is government interference.
- Some firms have already been fully committed elsewhere or have found more attractive opportunities in Europe and Asia.
- It is difficult to find a suitable partner who can properly manage the technology and guarantee the security of proprietary information.
- Rapidly-growing concerns also want to receive a return flow of technology from a venture, but few Latin American firms have capability to provide it.
- Many companies are wary of Latin America because of the general business environment including legal requirements, profit repatriation restrictions, "underhanded" business practices, bureaucratic delays, and general policy instability.

The experience of the S/MSF's interviewed which have had relationships involving technology transfers in Latin America illustrates the attitudes of managers and reveals what they perceive as constraints. Most technology transfers represent a minimal involvement, and few managers evaluate their experience as positive.

A medium-size Midwestern specialty chemicals manufacturer has had the most extensive and successful involvement in Latin America. Among 12 joint ventures and four licensing arrangements worldwide are joint ventures in Brazil and Venezuela and licensees in Colombia, Mexico, and Brazil. The President's motivations in expanding into these areas are threefold:

- To serve customers that have extended into these countries;
- The challenge of entering new markets; and
- The opportunity to make a profit.

On balance, the experience has been positive. The interviewee argues that the generalizations usually made about institutional constraints and undesirable business methods are exaggerated and can be dealt with. The major obstacles involve profit repatriation and identifying and screening a suitable partner.

An important diagnostics manufacturer does half of its business through exports, a small percentage of which is destined for Latin America. While it has not yet developed a long-term Latin American market strategy, it does have a number of marketing subsidiaries and affiliated distributorships in Latin America, most notably in Mexico and Brazil. The firm's management believes it is engaging in an important form of technology transfer through these organizations by training sales and service personnel as well as by sponsoring a free training program for its customers on how best to utilize the products. Furthermore, the firm has developed and introduced a product specifically designed for Latin American needs. Finally, in response to Mexican import substitution regulations, some assembling of diagnostic kits is being done there. A similar operation is being considered for Brazil. Manufacturing subsidiaries and joint ventures have not been considered in Latin America, because of the lack of market size and demand for sophisticated products; political and bureaucratic obstacles to regional markets; and legal and bureaucratic constraints in individual countries. Hence, they have not really transferred technology through cooperative ventures in the manufacturing area.

An important manufacturer of irrigation system components has transferred technology to Latin America through two mechanisms: (1) licensing agreements in Mexico and Colombia; and (2) technical service contracts for major irrigation projects in various countries (which also generates demand for their components). The licensing arrangements have been judged to be more trouble than they are worth because of their small size which does not warrant the financial and manpower costs of training, product quality control, and management. Furthermore, finding a partner is too risky and profit repatriation is difficult. The technical services contracts are seen as worthwhile since they involve excellent fees as well as create demand for the company's products. The contracts include training local personnel in irrigation system design, maintenance, and operation and, hence, are an important form of transferring technology.

A soybean-processing cooperative does not have any joint ventures or licensees in Latin America, but it does transfer some technology indirectly. The president has traveled extensively through Latin America helping to develop nutrition programs and local fortified foods. Separate efforts to establish more formal ventures with the Mexican, Dominican Republic, and Trinidadian Governments to develop new foods for mass consumption failed because of a lack of follow-through as well as "underhanded" motives on the part of the officials involved. The cooperative has not established processing ventures because its members fear that competition would be developed. Other concerns include business methods and government instability.

A telecommunications and electronic equipment concern does 50% of its manufacturing in Japanese joint ventures. It exports little to Latin American and the management has never considered that market seriously. However, it did export a fair amount to Mexico at a time when high tariffs were imposed. To protect the market, a license was granted. The experience has been good insofar as the licensee is considered to be responsive and competent, but because of its small scale, the operation is suffering from financial difficulties. Otherwise, no consideration has been given to a venture in Latin America because of a complete absence of information on conditions and opportunities there.

A food-processing company was recently acquired by a corporation which had some of its Latin American operations expropriated. As a result, no further commitments in the area are being considered.

B. MANY S/MSF'S PERCEIVE AN UNATTRACTIVE ENVIRONMENT IN LATIN AMERICA

The concerns of U.S. respondents who have had no experience in Latin America to date are similar to those held by the six firms whose views have just been presented. The array of constraints as perceived by both groups can be summarized as follows:

The array of constraints can be summarized as follows:

- Almost all the interviewees believe that the lack of market size and structure, along with a low level of consumer sophistication, makes local utilization of their technology uneconomical. Most base this belief on their current level of exports to the area, the success of licensing agreements, or on the judgment of regional sales representatives. Several firms admitted to knowing nothing at all about market characteristics in the region. No one has ever made a detailed market study. Hence, few can base their apprehension on concrete evidence.
- Political risk and instability is the second most important concern. Again, this is usually based on hazy notions and Latin America's general reputation. Only one company has ever actually been hurt by such circumstances.
- Bureaucratic obstacles, such as extensive paperwork, long delays, and the need for personal contacts and illegal arrangements, have worried several respondents. This perceived constraint is grounded on both reputation and experience.
- Legal constraints on the level of foreign control, repatriation of profits, proprietary guarantees, and exchange and royalty controls are often mentioned. Again, this concern is based on experience and reputation.
- A few respondents are particularly apprehensive about finding a suitable partner, particularly given the cost and difficulty involved in identifying and screening.

In short, it appears that most S/MSF's perceive an uninviting environment for major commitments which would involve significant transfers of technology. This image holds true for companies of all sizes and from the diverse industrial sectors. It also applies to both firms with highly sophisticated and unique technology and those with standard technology. Most interesting, the perception between experienced and non-experienced firms does not differ greatly.

While many of the concerns about the business environment may be real, there are other causes as well. It should be noted that many large companies have done well in Latin America. The principal problem seems to be a lack of information. Policy regarding Latin America is determined on the basis of scanty information on general and specific opportunities, a negative reputation, and marginal experiences in the area. (Some respondents were aware of this information gap, while in others cases it was apparent to the interviewers.) A second element is the S/MSF insecurity in coming to terms with the constraints. They believe they lack the resources to deal properly with the problems of:

- Identifying and screening opportunities;
- Taking on a risk in an unknown area, particularly when safer possibilities are already known;
- Performing management, training and marketing functions in a new operation; and
- Learning to work within the limits set by legal and bureaucratic constraints.

C. S/MSF'S ARE INTERESTED IN LATIN AMERICAN VENTURES--WITH CONDITIONS

Almost all of the firms interviewed maintain some interest in the possibility of entering into business arrangements with Latin American companies in the future if certain conditions are met. Despite a negative perception of the Latin American business environment, U.S. firms are willing to take a wait-and-see attitude in the hope that the situation will improve. The preconditions set forth by firms differ; some make minimal demands while others are much more complex and difficult to meet. A majority of the respondents would seriously consider a Latin American business venture if their pre-requisites were met, making the business environment more attractive to them.

Not surprisingly, the principal preconditions required are closely related to the major constraints identified earlier. The two most commonly mentioned are market considerations and potential returns. Almost all firms emphasized the importance of a large and well-developed market. Not only should there be a potential market, but it should already be at least partially developed. Two respondents, with greater knowledge of Latin America than most, said they believed that access to regional markets, such as the Andean Common Market, the Latin American Free Trade Association, and the Central American Common Market, was essential. Manufacturers of sophisticated products desire a large middle class and sophisticated consumer tastes. Because of these concerns for market size and sophistication, most have focused their attention on Mexico, Brazil, Venezuela, and Argentina, and, to a lesser degree, on Colombia, Peru, and Chile. To the extent that information identifying favorable market conditions can be made available, this requirement could be met.

The desire that a venture produce high returns on investment of capital, time, and manpower, as well as for compensation for the risk involved, is not a surprising precondition. The respondents were not usually willing to fix a specific rate of return. One indicated a 20% annual return on investment would satisfy them. Others simply narrowed it down by requiring that a potential project promise to be more rewarding than current activities. With respect to licensees, one interviewee wanted at least \$20,000 in royalties. Several others would demand at least 5% royalties, depending on the size of the market and the level of technical support required.

While there are abundant business opportunities which could provide lucrative returns, many Latin American countries regulate royalty payments, profit repatriation, and foreign revenue through legal and fiscal means. These controls often limit earnings to levels lower than those required by many of the interviewees. If these companies are to be satisfied and attracted to Latin America while also meeting government guidelines, they must be more flexible or be able to develop new types of business relationships. The follow-up interviews cited below help to illustrate to what degree any of these solutions is likely to occur.

Majority control is a high-priority requirement by most of the firms considering an investment in a Latin American manufacturing operation. Firms considering the possibility of local manufacture of their products put heavy emphasis on their having full control of management, quality control, marketing and use of the technology. Some would prefer the grassroots development of a fully-owned subsidiary if control of a joint venture is not possible. Only one respondent took the position that minority participation is preferable because the Latin partner can provide local contacts and knowledge of native business and market conditions.

This precondition would be difficult to meet because majority control is untenable in many Latin American countries, including most of the wealthier ones. The limit is usually 49%, or lower, foreign participation in a joint venture. Fully-owned and self-developed subsidiaries are not always allowed. It remains to be seen if U.S. S/MSF managers would be willing to develop new partnership arrangements satisfactory to them where they have a minority position.

The majority of respondents stressed the importance of suitable partners as a precondition for a venture. Some emphasized the management and marketing skills of the potential partner, while others sought a skilled labor force. Firms with sensitive and sophisticated technologies want proprietary guarantees from the Latin firm. One firm added that the partner should be in a position to provide technology to the U.S. company. Interestingly, no interviewee expressed any particular concern over the size of the Latin American counterpart, and only one specifically required a strong financial position on the part of the Latin firm. However, a concern with size is implied by the desire for a high return.

Finding suitable partners should be a manageable requirement. The identification process could either be performed by the firms themselves, by outside consultants, or by information services. Several respondents specifically indicated that outside help in identifying opportunities was a prerequisite. Some also wanted financial help in covering the costs of personally screening and negotiating with potential counterparts.

The final category of preconditions revolves around the concerns with political instability, business methods, and bureaucratic delays. Firms want assurances that political risk in a given country will be minimal. Several would act only when legal and bureaucratic constraints are removed or alleviated, while others want help in dealing with and understanding these problems.

It should be noted that only one company has totally ruled out Latin American ventures and a second is limited to minimal technical support, but these are due to special circumstances.

The type of Latin American venture preferred by the rest depends on the preconditions of the S/MSF. Joint ventures and wholly-owned subsidiaries are favored by the majority of interviewees because they provide for greater control and hold the promise of worthwhile returns. In contrast, no respondent is particularly interested in a licensing agreement because it involves too much effort for the limited return. Of the two firms that prefer technical support contracts for a fixed fee, one does not have the resources for a larger commitment and the other has already found this approach rewarding.

D. A SUPPORT PROGRAM WOULD BE OF INTEREST

Because S/MSF's perceive a negative business environment in Latin America, they have developed a number of stringent conditions which would have to be met before any action would be taken in the region. The interviewees identified a number of outside support activities which would stimulate the process by helping to overcome psychological hurdles, accelerating the evaluation of specific opportunities, and helping firms to implement a plan of action. A majority of the respondents indicated that they would be much more likely to undertake serious commitments in Latin America if some kind of outside program would provide the services they suggested. One respondent is already actively working on expanding his interests in Latin America and will continue to do so with or without outside help. He did indicate that, based on his experience, this kind of stimulus would be crucial in motivating other S/MSF's into doing business in Latin America.

~~The most commonly mentioned type of support function which the respondents said they badly needed was information services.~~ The most important would be the identification of specific opportunities and potential partners in Latin America. This process is time-consuming and expensive, and less experienced firms are not sure quite what they are looking for. Given that finding an opportunity and a partner is seen as difficult and that many think a venture would have limited success, few would ever make the necessary effort. If the management of a S/MSF were provided with some specific possibilities, it could easily evaluate to what degree these fulfilled company specifications.

A similar need is for market studies which would complement the identification of specific opportunities by helping to determine the viability of a venture, thus putting a firm's management in a position to evaluate whether its prerequisites for a foreign venture were being met. S/MSF's with no previous interest in the region might be stimulated if they could see attractive markets for their products and technology.

Other forms of informational support suggested include:

- Information on a country's fiscal, profit repatriation, and royalty regulations as well as other laws regarding foreign businesses;
- Advice on how best to understand and cope with local business habits;
- Descriptions of local business conditions;

- Analyses of relative political stability and outlook; and
- Counsel on how best to design a contract with a Latin American counterpart.

A number of other support functions were mentioned, but they were less commonplace. One would be financial assistance to cover the costs of screening and negotiating with Latin counterparts. Another would be a matchmaking function; helping to establish contact with a Latin firm and facilitating a follow-up, negotiations, and start-up of a venture. A number of respondents are interested in active support in dealing with foreign regulations and bureaucracies. They argue that S/MSF's do not have the resources to push permits and other needed approvals through the bureaucratic labyrinths. One felt that an institutional framework could provide S/MSF's with access to regional markets.

All of the S/MSF's interviewed who were interested in Latin America agreed that at least some of the above services were not available to them. One respondent thought they were available or dispensable only with a great effort on the part of the firm. Only this respondent thought that he could easily do business in Latin America without some support package. It appears evident that outside help is crucial in:

- Stimulating interest in Latin America by helping to overcome a negative perception of the area;
- ✓ ● Providing greater confidence in coping with the array of obstacles identified;
- ✓ ● Offering the information needed to evaluate whether a venture is feasible; and
- ✓ ● Supplying the tools to get a venture under way.

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The respondents were not nearly so specific about how all these support functions could be integrated in a program, and how a program should be financed and structured. Most indicated that a new government initiative was called for. One person specified its function as integrating existing information and support activities. A small office could meet S/MSF requests for help by drawing upon the resources of existing institutions and agencies. Some interviewees stressed the need for the S/MSF to pay a fee for services so that they would be taken seriously. Another specification was the need for a program to be as autonomous as possible.

Two respondents strongly believe a support program is necessary, but that it should be placed in the private sector. One suggested a consulting firm format; the second criticized the idea of a government agency on the grounds it would not have any incentive to provide good performance and would lack the means of guaranteeing the quality of the service. Instead, he conceptualized an autonomous institution, or private-firm, in which the staff would work for a commission. Its staff would acquire information and identify opportunities in Latin America, and they would try to sell the idea of going into Latin America to S/MSF's, offering to find suitable opportunities. If one were found, a commission or finder's fee would be paid, with additional fees for matchmaking and other support services. This approach would have three advantages: it could guarantee a quality product; the information provided would be taken more seriously; and the program would have an incentive to motivate S/MSF's which had never even considered Latin America.

E. SPECIFIC OPPORTUNITIES EVOKE INCREASED INTEREST

The Latin American interview program helped to identify a number of firms greatly interested in acquiring U.S. technologies through a venture with a S/MSF. Most were interested in expanding into new product areas deemed to have strong market potential. The firms had developed competent managerial and marketing skills as well as a technological base. Furthermore, they had experience dealing with legal and bureaucratic problems and thought they could overcome these fairly easily. In short, they represented attractive opportunities and covered many of the conditions established by the U.S. firms.

As noted above, information about the Latin American firms, their technological needs, management and technological capabilities, prerequisites, and their evaluation of local markets and problems was presented to 10 S/MSF's in the second round of U.S. interviews.¹ All the firms which had previously been interviewed and had indicated an interest, provided their conditions were met, responded favorably. They would like to enter into contact with the Latin American firm described to them to explore the possibility of a venture.

Another group of firms had not been interviewed previously. Most of these also expressed interest in establishing contact with the Latin American firms. One respondent was willing to explore a joint venture with the Latin American firm immediately. The few negative responses were all in depressed economic sectors already threatened by imports. These interviewees felt that technology transfers and ventures abroad would further aggravate their situation by developing competition.

¹ Notes on these interviews appear in Appendix II-C.

It appears that, by providing even the most rudimentary support, interest in technology transfers by S/MSF's can be stimulated. In this case, all that was done was to identify one potential partner for the U.S. firm and provide some basic information. Clearly, S/MSF managers are more likely to respond positively to the idea of a business venture in Latin America if they can base their consideration on specific possibilities. This type of response also indicates that a sales approach by some type of outside support program could stimulate activity among S/MSF's.

IV. THE LATIN AMERICAN INTERVIEWS

The Latin American interview results indicate that the experience of most firms with foreign companies is limited to the purchase of equipment, components, and licenses. Only a minority has engaged in relationships which involve more substantive transfers of technology. The experience of these firms shows that the current environment is only conducive to technology transfer arrangements by larger Latin American enterprises. Smaller firms lack the resources to identify appropriate potential partners. In the current environment, they are likely to know only the large multinationals with whom they believe they cannot confidently do business.

The interviews revealed that there is a strong desire, particularly among the smaller firms, to acquire technology. Their interest is conditional on the U.S. supplier firms being S/MSF's and the provision of various types of outside support.

The following sections summarize the Latin American interviews.¹

A. MOST LATIN AMERICAN FIRMS DO NOT CURRENTLY HAVE A TECHNOLOGY TRANSFER ARRANGEMENT

The experience of the Latin American firms with U.S. and other foreign firms is mostly limited to the purchase of equipment, components and product designs. In a few cases back-up technical and management support are included.

A minority among the respondents did have substantive technology transfer arrangements. Most of these were licensing agreements with technical support and various vehicles for acquiring know-how and information. There was only one example of a joint venture in the sample. A number of other respondents had made unsuccessful attempts to establish business relationships with foreign firms as a means of acquiring technology.

B. EXPERIENCE WITH TECHNOLOGY TRANSFERS HAS BEEN MIXED

To develop an understanding of the problems and constraints involved in transferring technology, it would be useful to review the experiences of firms which either have established relationships with foreign firms, or have attempted to do so. These should help to illustrate the current environment from the viewpoint of the Latin American firm manager.

¹More detailed notes on the Latin American interviews appear in Appendix II-B; see also above, Table 2, Latin American Interview Results.

A medium-size Brazilian manufacturer of various types of ball bearings and casings for engines and machinery represents the only joint-venture case in the Latin American sample. The joint venture was established with a large, well-known manufacturer for the purpose of expansion and technical improvement of existing product lines, rather than for diversification into new areas. The foreign firm received 25% of the stock in return for its technology and an unspecified investment of capital. No money payments have ever been made to the foreign firm. The firm gets a 25% share of the profits, but must reinvest as much as its Brazilian partner does to maintain its level of participation. It appears that this mechanism leads to a high level of reinvestment, and the repatriation of profits never becomes an issue.

The negotiating process was very lengthy and was hindered by a language barrier. Furthermore, the Brazilian was most interested in the transfer of knowledge, work habits, and capital -- all of which he felt were more important than equipment. However, it was also more difficult to negotiate, particularly when both parties insisted on mutual obligations being thoroughly detailed. Mutual understanding and confidence were crucial in helping them through the ordeal. The effort is thought to have been very worthwhile in that it has allowed the firm to modernize and expand and opens the way for more of the same.

A medium-to-large Dominican producer of soaps, detergents, animal feeds, and vegetable oils is another example of a successful technology transfer. Its approach has been to open as many channels of technical support as possible. It prefers to purchase hardware, patents, and designs outright, rather than through licensing or royalty schemes. The necessary know-how on applications, processes, and procedures comes from: (1) suppliers of raw materials which may be either individual firms or producer organizations; (2) professional and industrial associations; (3) educational opportunities; and (4) private consultants. Hence, for a new detergent plant about to come onstream, the raw material supplier has provided an on-site technician, consulting firms have helped to design the plant and determine markets, a soap manufacturers association has provided extensive information and know-how, and technicians are being trained in U.S. universities and factories. Other information sources for the firm include the U.S. Oil Chemists Association and the Soybean Council. The firm tried to enter into a joint venture as a means of getting into a very difficult market, but it lost out to another local firm. In short, this company feels that there really is no problem gaining access to technology and in getting it transferred. They feel that by belonging to associations and reading available literature, sources of technology can easily be identified.

A pioneer frozen foods concern in Venezuela is the only small firm to have any established technology-transfer mechanisms. The company writes various U.S. companies for advice on what machinery to purchase, and then only purchases the one selected if know-how is included in the deal. This firm is also a member of industrial associations. The management is highly-educated and sophisticated, with great ability for finding information and making the best use of it.

A new technology organization division of one of the largest corporations in Venezuela is responsible for securing technology for the corporation, which includes paint, specialty chemicals, agribusiness, printing, and other diverse holdings. While the technology unit is developing its own R&D capabilities, its main function has been to help the affiliates acquire foreign technology. The major divisions of the corporation have never had trouble securing technology. They have the resources to develop much of it on their own and the rest is secured through licensing. Because of their strong financial position and experience, they also have the negotiating leverage to ensure that all necessary know-how is made part of the contract. However, until the technology division was created, the smaller companies in their group had great difficulties. They lacked the resources to do their own R&D or to search for and negotiate with technology suppliers. Few U.S. companies have been interested in dealing with them unless they are represented by the corporation. One small company seeking technology went to the largest and best-known U.S. firm in the business, but could not arouse any interest -- even when 49% of the company's stock was offered.

A similar situation exists with a large Mexican electronics firm with very strong financial support. It is large enough to allow for a substantial R&D capability and the ability to imitate foreign products. They have to seek know-how abroad for manufacturing many components. This is done through contracts for very specific items and technological packages are strictly refused. It is thought that packages cost too much for too little, lead to dependence, and rarely involve the transfer of real know-how. The company also secures know-how from materials and component suppliers, although only when these do not manufacture the product in question. The company works closely with INFOTEC, the Mexican technological information agency, which has given them access to an extensive source of information on alternative technologies and suppliers. Hence, they are confident about their ability in the technological area, whether through transfers or their own R&D.

A fairly large Brazilian electronics firm has had mixed experiences with technology-transfer arrangements. One successful deal involved the purchasing of technology for a new product from a large U.S. company. The association was developed through visits to the United States, during which the two firms found that they were compatible. The deal included extensive technical support.

The most disastrous situation involved a very promising relationship with a French firm for the manufacture of a TV monitor. After a very long delay in getting the contract approved by the government, a huge investment was made in tooling. The government then promptly prohibited the domestic sale of the product, apparently because of pressure from huge MNE's in the same market. Only some of the investment has been recovered through exports, while the fiasco forced the lay-off of almost half the workforce.

Another possible deal for technology was unsuccessful because a huge down-payment was demanded. Besides having been unreasonable, any down-payment is illegal in Brazil.

Finally, some bids for joint-ventures were lost to other local companies. This firm considers transfer agreements to be possible, but finds itself regularly impeded by the government.

A number of other firms have also been unsuccessful in their attempts to secure technology-transfer arrangements. One small producer of plastic automotive parts and PVC pipes had two negative experiences. It negotiated a complete technology-transfer package with a German company after a difficult search for a firm with the desired technology. The negotiations were very difficult, but this was blamed on the size difference between the firms. The Germans, they felt, were trying to take advantage of their size and experience, and drive an unfair bargain. The deal was never completed. A technology-transfer agreement for the manufacture of battery containers was completed, but the Brazilian company pulled out because it involved being completely dependent on one supplier and customer.

Another medium-size Brazilian firm, dealing in telecommunications equipment and packaging machinery, discussed the possibility of a joint venture with several German firms. Contact was established through information provided by the state development bank and the relevant embassies. None of the negotiations had any results and the firm came out of them with negative feelings

toward any kind of venture with foreign firms. They complained of size differences which resulted in the foreign firm trying to make unfair use of their greater resources and experience. Second, they believed that they were being charged exorbitant prices for standard technology. Third, too many onerous and restrictive conditions were made. Fourth, the negotiation process was too long, and the language barrier and legal and financial aspects presented major barriers. Finally, the foreigners offered inappropriate technological packages due to their ignorance of the local market.

A different case is that involving a Venezuelan electronics and telecommunications firm which believed that to survive it would have to develop new technology very rapidly and have a multinational dimension. However, the traditional relationship with an MNE was not thought to be appropriate, because a Latin American firm would have nothing to offer in negotiations and would become an insignificant dependent of the MNE. Instead, its approach has been to take the fundamental electronic technology which is freely available, supplement it with small amounts of purchased technology and components, and then develop and adapt it to local needs. To give it a wider technological capability and a multinational dimension, it has created a Latin American cooperative of similar firms. They all work toward developing a common technology and results are shared. This gives them economies of scale and eventually greater leverage in negotiating for more sophisticated technology with MNE's. They feel they can now offer technology and marketing know-how suited to Latin America. In practice, there has been little two-way flow of technology up to now and the Venezuelan firm has had to supply the know-how for its partners.

Although only less than half of the sample has had successful formal technology-transfer arrangements with foreign companies, this is not to say that the others have not had access to some technology. They tend to depend on a combination of the educational background of the managers, their own R&D efforts, technical literature, and industrial associations, conventions, and trade fairs. They also pick up bits and pieces when purchasing equipment and materials and apply their own common sense. It should be noted that five firms do not believe they need any technological support at all: two auto parts firms, the Brazilian telecommunications and industrial equipment manufacturers discussed above, an integrated broiler processing plant, and a bakery. They either feel that their own R&D efforts and know-how are sufficient, or that their sector does not warrant outside support.

C. THE CURRENT ENVIRONMENT IS CONDUCIVE TO TECHNOLOGY TRANSFERS ONLY BY LARGER FIRMS

A composite picture of technology-transfer arrangements from the point of view of the Latin American firm can be drawn from their experiences. It is evident that not only do a minority of firms have successful and broad technology-transfer arrangements, but that usually only the larger, sophisticated, and self-confident firms have succeeded in this area. The largest firms interviewed in all four countries believe that acquiring technology is no problem for them. They attribute this to their size, financial and manpower resources, and reasonable technological capability. These are thought to be crucial in negotiating with large U.S. firms and those of other developed countries.

On the other hand, most medium-size firms that have tried to reach an agreement with foreign firms have been frustrated by the negotiating process and its length, and have felt that they were being taken advantage of. They are acutely sensitive to the size difference between their own firm and the foreign company, and lack self-confidence in dealing with that situation. Other medium-size firms have not even tried to seek foreign partners or assistance. Again, the difference in size, experience, and general negotiating leverage is the reason. To retain its autonomy, a firm should first build up its bargaining and technological capability. A few just feel that foreign know-how is not needed. Others do not feel that negotiating with an MNE is a problem, but do not know how to go about getting the technology they seek.

Only one of the small firms has managed even informal technology-transfer arrangements. The others think a U.S. firm would not take them seriously, and that a venture would result in a loss of autonomy. Furthermore, the process and the technology would be too expensive to be warranted. Information on alternative technologies and supplies is not thought to be accessible enough.

The following conclusions can be reached about the environment for technology-transfers from the Latin American firm's viewpoint:

1. Large firms which have the least need for know-how and technical support have the best access to U.S. firms and technology, and are in the best position to negotiate broad and advantageous technology-transfer agreements.
2. Larger and more sophisticated firms have the negotiating skills and bargaining power to ensure that their experience is successful.

3. Latin American firms assume that a technology-transfer agreement would be with a large foreign firm. This helps to confirm the hypothesis that U.S. S/MSF's have not entered into this area. It is clear that the size difference has been the most important obstacle for Latin American S/MSF's in their efforts to secure technology.
4. Small- to medium-size Latin American firms have also perceived the demands made by large foreign firms as a major threat to their autonomy. This is true for both those with and without actual experience.
5. Smaller companies do not have access to or knowledge of sources of information on suppliers of technology, nor do they have the resources to follow up any leads. Larger companies already know the "names" in the field, or at least how information can be acquired.
6. Smaller companies do not believe they have the necessary experience, legal and financial expertise, or foreign language competency to successfully negotiate.
7. In short, the existing environment favors technology-transfers only by larger and more sophisticated firms. In order for S/MS Latin American firms to benefit, new mechanisms must be developed. These must come to grips particularly with the size and resource differential as well as a number of other existing obstacles.

D. MANY FIRMS ARE INTERESTED IN FUTURE RELATIONSHIPS AND TECHNOLOGY-TRANSFER AGREEMENTS WITH U.S. FIRMS

Almost all of the respondents expressed great interest in entering into future relationships with U.S. firms which would involve the transfer of technology, particularly considering the limited number of successful past experiences. The most enthusiastic group included all of the firms already successfully involved, as well as some S/MSF's with limited or no previous firm-to-firm transfer arrangements. Those with little interest were firms with negative experiences in the past, or those involved in industrial sectors where little technology is needed.

The strong response indicates a vast, latent demand for appropriate technology-transfers among firms which, up to now, have not put this interest into action because of perceived dangers and difficulties under existing circumstances. The demand among Latin American S/MSF's was uncovered by introducing the assumptions that any venture would be with a U.S. S/MSF, and appropriate support could be provided if desired. The extent to which certain conditions and demands for support must be met to maintain this interest will be analyzed in more detail below.

There are a number of reasons why so many firms are interested in business relationships with U.S. firms. Large firms need know-how as they expand into more sophisticated products, or seek to manufacture components and intermediate materials as well. Several firms want to diversify into entirely new product areas where they lack know-how. Since Latin American markets are often small, it is necessary to enter new product areas in order to expand. Almost no company sought management or marketing assistance for their current activities, although many did think that other companies required this type of assistance. Only in areas of technical expertise did interviewees believe that they could use some assistance from foreign firms.

E. LATIN AMERICAN FIRMS SHOW PARTICULAR INTEREST IN JOINT VENTURES

Joint ventures emerged as the preferred mechanism for acquiring technology. Some would divide between a joint venture and a license, depending on circumstances; others would be completely flexible as to what type of venture they preferred. One respondent specifically desired a long-term technical support contract.

All those who indicated an interest in a joint venture are seeking a serious commitment from a U.S. firm. There were different interpretations of what type of a commitment is desired. One way of thinking holds that a smaller Latin American firm would only be taken seriously through a joint venture. A large group of interviewees believe that an investment in time and capital by a U.S. firm is necessary, so that it would have a vested interest in the project. Another argument is that the technology would not be priced so highly in a joint venture. The more sophisticated firms would prefer a joint venture if a long-term project were being considered, or if an area where technology was likely to change rapidly were involved. A joint venture would assure a long-term commitment and a continuous flow of know-how.

All respondents insisted on majority control of the firm as well as total control of management. However, this point is academic since this is mandatory by law in Brazil, Venezuela, and Mexico, and only somewhat more flexible in the Dominican Republic. One firm might consider a 49-49-1 relationship with a neutral institution holding the deciding 1% interest.

There was no clear preference as to what type of participation was desired. Some wanted investment in capital as well as technology by the U.S. firm, while a few were willing to turn over a share of the ownership for a broad package of technology and know-how. No firm completely ruled out U.S. participation in a venture, unless there was no need for the technology, or if it could be acquired through a one-time purchase. One firm insisted on a timetable for eventual total ownership in accordance with the overall Mexicanization policy.

Several firms would consider licenses with technical support under certain circumstances. Specifically, this would be in areas where no long-range and broad technological support is needed, or where technology is most likely to change much.

One firm seeks only a five-year technical support contract with a set fee for services rendered. They feel that after five years, they would have learned all that there was to know. Several concerns prefer to enter into contact with U.S. companies with no predetermined mechanism in mind. They want to be flexible and work out the best arrangement possible.

Most interviewees set a number of preconditions which would have to be met before they would proceed with the type of venture in which they expressed interest. Not surprisingly, the most important concern is with size difference considerations. Some firms would only deal with U.S. S/MSF's. A related demand is that all conversations and communication take place at the top level. The owners or presidents of the Latin American firms do not want to have to work their way through the bureaucracy of an MNE. They realize that they can usually only deal with the counterpart president if the latter is with a S/MSF. Similarly, some want to work with partners with whom trust and communication is possible. Size compatibility facilitates such ventures.

Another group of responses also revolves around the size question. If the U.S. firm is not an S/MSF, Latin respondents would need assistance in the negotiating process to equalize the bargaining positions. This could take the form of financial assistance, support in developing a negotiating position and in contract evaluation, help with language barriers, etc.

Market considerations are also an area of concern. Several respondents would be interested in a venture with a foreign enterprise only if it appeared to be a lucrative opportunity. This would either mean no local competition in the product area, particularly from MNE's; an exclusive right to the technology; or high tariff barriers which would ensure profitability, regardless of costs. Similarly, some firms look for products which could be successfully produced in small volumes. Others were not so concerned with competition as they were with being assured of a large market to justify the cost and effort involved in forming a joint venture or licensing agreement. One respondent actually welcomed competition, and particularly the MNE's, into the market. This was because it was a new product area, and it was thought that the foreign giants would help to create a market.

A number of other diverse preconditions were cited by one or two respondents. These included: any venture would have to be restricted to a predetermined time limit; assurances would have to be made as to the appropriateness of the technology; government delays and constraining regulations would have to be eliminated; the Latin firm would have to be given the right to select certain items from a technological package;

and the U.S. firm would need to have a well-known reputation. Several firms set no conditions at all.

F. FEW PROBLEMS ARE FORESEEN IN ESTABLISHING TECHNOLOGY-TRANSFER VENTURES

Despite the number of firms which had expressed serious concerns about the current technology-transfer environment, few anticipated serious problems in their efforts to establish a venture with a foreign firm. This optimism is even stronger when the question of size difference is dispensed with, by assuming that U.S. S/MSF's would be the counterparts.

The most common concern was with government regulations and bureaucratic obstacles and delays. Many fear that their ability to negotiate properly is hindered, that costs are increased by the delays, and success is made less likely. Most of these firms do believe the regulations to be necessary, but take the position that implementation must be made more efficient and understandable. This comes up most strongly in Venezuela and Brazil. Companies with successful experience in coping with the regulations and those in priority sectors are least concerned. Respondents viewed these problems as an irritant rather than as an insurmountable constraint.

The second most commonly mentioned area of concern was with the motives, practices, and lack of knowledge of the U.S. firms. Most Latin American businessmen strongly believe that their U.S. counterparts have very little knowledge of Latin America in general. They argue that most U.S. businessmen, particularly in S/MSF's, have little understanding of the fact that market conditions, technological needs, and business methods differ in Latin America. They also tend to have a poor opinion of the capabilities of the Latin American manager. The Latin Americans believe this attitude could be a problem when dealing with a U.S. S/MSF. (However, most felt that it was still preferable to do business with smaller firms.)

The objectives of the U.S. firm are anticipated as a problem by several firms. By their seeking to recoup their investment as rapidly as possible, to maximize their revenues in Latin America, or to restrict the use of the technology, it would be difficult to establish a successful and legal relationship. A final problem mentioned by two large firms is that U.S. S/MSF's do not know how to properly transfer technology. They do not realize modifications may be necessary, that flexibility on their part is crucial, and, most important, that technical support and know-how must be provided in addition to hardware.

The third area of potential problems is seen as the negotiating process itself. It is perceived to be a very difficult, time-consuming, and expensive process.

Somewhat surprisingly, only two firms identified finding information on potential technology suppliers or in evaluating a prospect as particularly difficult problems. However, several larger and experienced companies

suggested that the lack of knowledge of sources of information did present an obstacle to smaller firms.

G. SUPPORT FUNCTIONS WOULD ALLEVIATE PERCEIVED PROBLEMS

Most of the interviewees made suggestions as to what type of support activities would help to minimize the various problems involved in establishing a business relationship for the transfer of technology. It is interesting to note that there is not a clear correspondence between perceived problems and the suggestions of activities to alleviate them. The most commonly mentioned, in order of importance, were:

1. An interest in various types of informational services was the most common. Respondents feel it would help to have assistance in identifying S/MSF's and appropriate technologies in the United States. Only a few think that this function is now properly performed. Information on legal and market considerations would also be useful.
2. Much support was expressed for informational services in the United States to help educate the S/MSF business community. They need to learn about specific and general business opportunities in Latin America, business methods, the legal structure, etc.
3. Different kinds of support in communicating, negotiating, and maintaining good relations with a foreign firm are seen as being very useful. These would include help in establishing contact, technical backing during negotiations, technical evaluation of the contract, assessment of the technology being offered, and various other forms of counselling. Follow-up services to help maintain good relations were also mentioned. These functions were largely suggested by smaller firms and by the larger ones which thought the S/MSF's could use them.
4. Several firms thought that major efforts were needed to stimulate both U.S. and Latin American S/MSF's into entering into technology-transfer agreements. This could occur through informational services, advertising campaigns, and door-to-door selling of the idea.
5. Financial support to cover the costs of exploration and negotiation was sought by a few companies.
6. Only one company thought that help in coping with the bureaucracy was needed.
7. Three respondents thought that no support activities were needed, and that companies could easily manage if they tried.

H. SUPPORT ACTIVITIES SHOULD BE PROVIDED BY A NEW PROGRAM OR INSTITUTION

The majority of firms interviewed held the position that the support activities should be provided by a new program initiative. Only a few were strongly opposed to the idea of a new program. Most argued that it was essential to have a new approach which would focus specifically on S/MSF's. To do this successfully, a number of support functions would have to be provided and integrated, as well as tailored specifically for the needs of a S/MSF.

Two of the three negative responses were that too many wasteful and unsuccessful programs have already been instituted, and there is no reason to think a new effort would be any different. If anything, existing business development mechanisms in international lending agencies should be improved or a private brokerage should be encouraged. A third negative response was that any initiative would be an unnecessary and unsuccessful U.S. attempt to improve its image abroad.

Those in favor offered suggestions as to how such a program could be structured. Some argued for a complex establishment coordinating international and local development agencies, existing technology information services, and private business interests. Others thought a support program could only be successful and respected if it were private. The only specific criticism by a few respondents was that it definitely should not only be associated with the U.S. Government.

The following are some of the suggestions put forth:

- A technology-transfer program providing intermediary, match-making, follow-up, and interest-generating services should be associated with the Inter-American Development Bank, local development banks, existing technological institutions, and not just with the U.S. Government. It should function as an intermediary between these institutions, drawing upon and coordinating their services. Government subsidies are needed to get it started, but financial independence is desirable.
- A program for stimulating technology-transfers and providing technical support should be jointly subsidized by all American governments, as well as private institutions, foundations, and firms. However, it should operate autonomously. Fees should be charged for services rendered to ensure that they be taken seriously.
- A match-making and follow-up service should not be associated or dependent on one government. In order that it become independent, the service could get a small participation in any joint venture established or some kind of commission. This would provide incentives for quality services.

- Rather than a government agency performing the information services needed, a consulting firm or similar private institution could serve as an information center and technology clearinghouse. It could have agents or contacts in various Latin American countries gathering information, identifying opportunities, and looking for suitable partners. Firms would be more than willing to pay for these services.
- A private technology broker should be encouraged to extend his services to S/MSF's. Match-making information services could be performed for a finder's fee, commission, or participation in a joint venture.

V. IMPLICATIONS OF INTERVIEW RESULTS

A. UNITED STATES AND LATIN AMERICAN ATTITUDES ARE THEORETICALLY COMPATIBLE

Although the thinking of Latin American and S/MSF managers differs with regard to technology transfers and business relationships, they are by no means incompatible. Even the more significant conflicts of interest should not present overwhelming barriers. This conclusion can be reached by contrasting the results of the U.S. and Latin American interview programs and seen in Tables 4, 5, and 6.

At the present time, the Latin Americans are much more enthusiastic about doing business with their U.S. counterparts than vice versa. They are particularly interested in acquiring technology through firm-to-firm relationships and would much prefer to associate with S/MSF's than with a large company. On the other hand, U.S. respondents project a tenuous interest in Latin America. Their interest is dampened by a negative image of business conditions in the region and would only be rekindled if an array of prerequisites was met. Furthermore, for S/MSF's in the United States, the transfer of technology is, at best, a secondary concern. Potential returns from transferring technology are viewed as only part of a fundamental desire for a financially rewarding venture.

Latin American and S/MSF managers perceive different types of constraints impeding the establishment of business relationships between them. On the U.S. side, the concern is largely with the lack of attractive markets and business opportunities or with their inability to identify them. Regulatory, bureaucratic, and political conditions are also viewed as important obstacles. Actually doing business with a Latin American firm is only a secondary worry if it is expressed at all. The Latin Americans identify communicating, negotiating, and generally cooperating with U.S. firms as the principal constraint. Since this is usually attributed to the large size of the U.S. counterpart, many feel the problem will disappear when working with S/MSF's. Once this barrier is removed, few feel there will be great difficulties establishing a venture--outside of their problems in identifying appropriate U.S. counterparts.

The fundamental prerequisite of U.S. firms--the identification of an attractive and secure opportunity--has been noted. Furthermore, most S/MSF's would like to control any venture established if they are to participate. Latin Americans, in contrast, also insist on majority control as well as preserving their autonomy, and are supported in this by the local legal system. Otherwise, their preconditions are that a venture promises to be financially rewarding, and that it have a large and high quality technology transfer component.

TABLE 4

PERCEIVED CONSTRAINTS TO LATIN AMERICAN/U.S. BUSINESS VENTURES¹

	<u>U.S. Response</u>	<u>Latin American Response</u>
Governmental fiscal and regulatory roles; bureaucratic obstacles (Latin America)	S	W
Unsuitable potential partners	M	S
Deficient and unsuitable information	M	M
Inadequate market size and sophistication	S	W
Political risk and instability	S	W
Limited anticipated returns	S	W
Language barrier	W	M
Demands and conditions by potential partner	W	M
Negotiating process (difficulty, time and money involved)	W	M
Inappropriate technology	W	W
None	W	M

¹ Tables contrast U.S. and Latin American attitudes. The symbols are based on the importance attached to each issue and the number of times it was mentioned in the interview programs.

S = Strong response: Major constraint brought up very often.

M = Moderate response: Major constraint for some; minor for others.

W = Weak response: Important constraint for few; of less importance to others.

TABLE 5

GENERAL PRECONDITIONS AND SPECIFIC REQUIREMENTS FOR ENGAGING
IN BUSINESS VENTURE INVOLVING TECHNOLOGY TRANSFERS

	<u>U.S. Response</u>	<u>Latin American Response</u>
Large and well-developed market	S	S
High returns on investment	S	M
Control of venture	S	S
Compatible and suitable partners	M	S
Profit repatriation and currency exchange	M	O
Minimal bureaucratic constraints	M	W
Long-term and broad commitment	W	M
Strong bargaining position	O	M
Outside assistance (financial, consulting, etc.)	W	M
No conditions necessary	O	W

S = Principal precondition by many firms, considered indispensable.

M = Major concern of some; of moderate importance to others; may not seek venture if not met.

W = Important to few firms, or less pressing prerequisite; may not be indispensable.

O = Not mentioned.

TABLE 6

CONSTRAINT-RELIEVING ACTIVITIES

	<u>U.S. Response</u>	<u>Latin American Response</u>
Providing information for identifying and evaluating market opportunities	S	S
Identifying potential suppliers and users of technology	S	S
Bringing the potential partners into contact with each other--matchmaking and follow-up	M	S
Consulting on venture design and negotiations	W	M
Identifying governmental incentives and disincentives; and influencing policy so as to develop a favorable environment	M	W
Providing some financial assistance	M	M
Stimulating interest in user community	O	W
Assisting users to define specific technological requirements	O	W

S = Support activity of great importance

M = Activity of moderate importance

W = Helpful, but not essential except to few

O = Not mentioned

The preferred mechanism on the part of Latin Americans for establishing a relationship is a joint venture. Technical support contracts are also, however, sometimes favored. Technology purchases and licensing agreements are disdained unless the technology involved is standard, cheap, and unlikely to change in the future. United States managers also favor joint ventures, but because of their desire to control, would sometimes opt for a wholly-owned subsidiary. They also follow the same pattern of some interest in technical support contracts but almost no interest in licensing.

If one assumes attractive opportunities exist for S/MSF's, then there are only two aspects of the U.S. attitude vis-à-vis Latin America which are not compatible with the Latin American viewpoint. These are the desire for majority control and the dislike of many regulatory and fiscal policies. Latin American governments are unlikely to radically change their policies in these areas; hence flexibility must be shown on the part of S/MSF's if anything is to happen. Subject to this qualification, there should be no major impediments in theory, at least, to S/MSF's entering into business relationships in Latin America to the extent that they are technically and managerially able to do so. The assumption is that, if the market is attractive, some U.S. firms will exhibit the necessary flexibility.

B. THE LEVEL OF TECHNOLOGY TRANSFERS WILL CONTINUE TO BE LOW IN THE CURRENT ENVIRONMENT

Business relationships and technology transfers involving S/MSF's indeed appear to have a huge potential. There is an excellent, if latent, market for U.S. technology, large numbers of potential suppliers and users, and great official interest in stimulating the process. However, in the current environment the number of successful relationships is likely to continue to be low. From the samples we have examined, it is clear that few U.S. S/MSF's are likely to enter into any serious commitments in Latin America, while Latin American firms will almost never establish arrangements with S/MSF's.

The reasons for the low level of likely success are as follows:

1. S/MSF's view Latin America as a risky and difficult area in which to do business and do not believe there are possibilities attractive enough to overcome these problems. Most such firms are not aware of opportunities which may exist and there are only low probabilities that they will become aware through existing channels.
2. Since the S/MSF's do not take the initiative to make themselves known in Latin America, firms there necessarily establish ventures and acquire technology almost exclusively from large U.S. companies. Latin American companies, particularly smaller ones, are not made aware of the potential availability and interests of S/MSF's.

3. The S/MSF perception of risk in Latin America results in their establishing an array of prerequisites which are difficult to meet. These are often in fundamental conflict with the necessities which face Latin American counterparts.
4. Neither the Latin American nor the U.S. firms find much official and outside support in their efforts to establish ventures. Both lack the resources for identifying and screening possibilities, negotiating a deal, coping with constraining regulations, and starting up a venture. Without this support, most prefer to go in an easier direction.

C. NUMBERS OF TECHNOLOGY TRANSFERS WOULD RISE SIGNIFICANTLY WITH OUTSIDE SUPPORT

Almost all of the major obstacles presently inhibiting technology transfers and business ventures could be overcome by different kinds of outside support. The most important would be an array of informational services. One category, in particular, would help improve S/MSF perceptions of Latin America and create a feeling of greater understanding and comfort including:

- Provocative literature on general conditions in Latin America, including information on what countries look like, economic and political conditions and outlook, interesting places to go, and on the misleading characteristics of stereotypes and generalizations about Latin America which are prevalent in the United States.
- More detailed information on economic conditions and trends including sector studies, comparative costs, potential markets, and consumer tastes.
- Detailed literature on the laws relating to foreign business, how they are interpreted and enforced, and how they affect the foreign business.
- Descriptions of the impact of the political system on business.

A second type of information would identify specific opportunities. It would be intended to allow the S/MSF to evaluate whether there really are attractive markets for its capabilities.

- For S/MSF's, technological needs in Latin America and products in great demand can be pointed out.

- Specific Latin American firms which would make suitable partners and make good use of the technology can be identified.
- Market studies can help in evaluation of the feasibility of a project.

Latin American firms also badly need similar kinds of information service since:

- Few are now in a position to identify S/MSF's in the United States;
- Information is lacking on alternative technologies;
- Market studies are not readily available to help Latin American firms evaluate what types of technology would be appropriate to their needs and what product areas would be attractive.

Managers in both regions need information which would help them understand each other better.

- Both sides could definitely use a thorough understanding of the Latin American legal situation, government policy and regulatory mechanisms.
- Information on the types of objectives and motives of both sides relevant to establishing ventures would be highly useful.
- Information on how to transfer technology is needed by S/MSF's in the United States.
- More knowledge about the pros and cons of various types of arrangements is called for.
- An understanding of what is involved in negotiating a joint venture contract is widely missing.

Direct and active stimulation of new business relationships through the provision of support services would also be valuable. Among the needed types are:

- Meeting a specific request, from a party in either region, to locate and identify a suitable partner;
- Doing consulting-type work on request--evaluating specific opportunities, technological needs and alternate technologies or partners;

- Door-to-door selling of the possibility of a particular S/MSF-Latin American venture on the basis of offering to find an appropriate opportunity;
- Matchmaking services where assistance is given in contacting, negotiating, communicating, and understanding a partner;
- Financial assistance to cover the costs of screening potential partners and starting up a venture;
- Legal advice throughout the process of establishing a venture;
- Assistance in dealing with regulations and officials.

Such support services would provide at least partial solutions to all of the major constraints identified in this study. They would also offer incentives to business people on both sides, develop interest among those presently uninvolved, and provide the basis for higher quality relationships.

Without further study it is not possible to determine how much impact such services would have. However, the business communities in both regions are enthusiastic about the value of such services, indicating that the availability of some or all of these supporting activities would greatly enhance the probability of entering into new bi-national business ventures. Several firms have taken positive action when supplied with even the most rudimentary information during the course of this study.

The extent of impact would also depend on what services and support are actually offered. A passive information service would benefit only those with enough interest and confidence already to take an initiative on their own, while currently unmotivated and uninterested firms would remain that way. A dynamic information service, which would take the initiative in providing information, could stimulate firms into further action. The number stimulated would, of course, depend strongly on the scope and range of the program. A program offering both information and matchmaking services would have the greatest chance of stimulating successful ventures. Again, the result will be strongly dependent on the scope and structure of the program.

D. MANY ALTERNATIVE TYPES OF TECHNOLOGY TRANSFER SUPPORT PROGRAMS ARE POSSIBLE

There are a large number of possibilities for structuring a support program. A selection among them must combine (1) which activities are to be incorporated; (2) the level and form of backing for the program; and (3) the outcome of a thorough study to determine the most feasible and efficient structure.

The simplest response to the needs demonstrated in this study would be to strengthen existing technology information institutions. Both public and private archives, data banks, and catalogues, which provide information about potential suppliers of technology could be encouraged to focus more on S/MSF's. This would take place in both the United States and Latin America. Existing technology information and extension services in Latin America--such as INFOTEC in Mexico, CONICIT in Venezuela, INDOTEC in the Dominican Republic, and STI in Brazil--could be strengthened and expanded. They would also require a capability in the S/MSF area. Another way to extend existing institutions would be to develop mechanisms for greater multi-directional flow of information among the various sources. A number of specific possibilities along these lines have already been suggested in the OAS, LAFTA and other forums.

Other existing institutions could also be strengthened. OPIC can help neutralize the S/MSF concern about political instability. The Inter-American Development Bank could redirect some of its Business Development Funds into a program of loans to Latin American companies for the specific purpose of helping them secure technology via a venture with a U.S. S/MSF. Local development banks could establish similar programs.

There are a number of problems with limiting action to the strengthening of existing institutions. First, the diverse required support activities are spread among a large number of agencies and programs with little or no integration. It would be difficult to strengthen or expand more than a few of these at a time. Second, the focus is rarely on S/MSF's. The special needs of these companies, as well as those of the smaller firms in Latin America, almost never get the attention they deserve.

An alternate approach would be a new program focusing specifically on the functions needed to stimulate cooperative ventures between S/MSF's and Latin American companies. Ideally, the innovative effort would encompass all of the areas of required assistance identified above. The most productive and efficient way of doing this would be for a program staff, in an appropriate agency, to draw upon, integrate, and coordinate existing resources for the purpose of providing a support package. In effect, such an effort would redirect existing resources to make them useful to S/MSF and Latin American firms. When needed functions are not available, they would be developed specially; this would apply particularly to matchmaking and support activities. Ideally, a new program would include a professional staff performing the following functions:

1. Collecting information relevant to the needs of S/MSF's and preparing useful packages;

2. Disseminating the information in the United States and Latin America;
3. Motivating firms in both regions, including those currently with little interest in a venture;
4. Working with specific firms to find suitable opportunities; and
5. Providing matchmaking and follow-up support.

Questions on exactly which functions should be provided, how they can best be integrated and disseminated, how such a program should be structured and financed, where it could best be located, with whom it should be affiliated, and what level of effort is desirable cannot be fully resolved in the context of this study and report. They remain important issues for resolution in a future larger-scale research and demonstration project along the lines suggested in Chapter I.

E. FURTHER CONSIDERATION OF A SUPPORT PROGRAM IS WARRANTED

Further consideration of a support program is warranted not only because it would be beneficial to the firms involved, but also because such a program would be consistent with policy objectives, endorsed by governments in both hemispheres, for stimulating beneficial transfer of technology among smaller firms.

The benefits to Latin American firms are clear: easier access to greatly needed and more appropriate technology and to more suitable partners. For United States S/MSF's the benefits lie in developing a presently underutilized opportunity area for business, utilizing their available technology and getting access to Latin American markets not otherwise open.

Latin American governments support acquisition of technology which contributes to the sound development of their economies, in appropriate forms and circumstances. A support program for transfers through S/MSF's would frequently meet policy criteria, helping to achieve technological goals in a politically acceptable manner.

From the point of view of the U.S. Government, there are also benefits to be obtained:

- Trade expansion (invisible exports);
- Support of the industrial development objectives of Latin American countries in a manner compatible with host country policy;

- Synergy with domestic U.S. policies of support for small business; and
- Overall favorable impact on relations with Latin America.

In the current environment few U.S. or Latin American firms are likely to establish cooperative ventures without a support program for stimulating the process. Further study is therefore recommended to determine the most desirable form and level of effort and to provide an evaluation of the extent to which it would be in the interest of the United States.

APPENDIX I

METHODOLOGY FOR SELECTION OF U.S. AND
LATIN AMERICAN INTERVIEW SAMPLES

A. THE U.S. SAMPLE IN PHASE I

The U.S. firms interviewed in Phase I were selected as follows:

1. On the basis of ADL experience in Latin American industrial development six fields of high development potential were identified:
 - Pharmaceuticals and diagnostics;
 - Food;
 - Telecommunications;
 - Machinery;
 - Chemicals; and
 - Electronics.
2. In each field ADL's Latin American specialists listed companies known to them, in each target country, believed to be interested in acquiring U.S. technology. The resulting list included 36 Brazilian firms, 7 Mexican companies, 4 in Venezuela, and 4 in the Dominican Republic.
3. ADL industrial sector specialists in the six selected fields then applied their knowledge to identify about seven U.S. firms in each field with interests matching those on the Latin American lists as closely as possible while meeting U.S. Small Business Administration standards for loan eligibility (maximum employment 750 to 1,000, depending on industry sector; and maximum sales \$200-million per year).
4. An additional criterion was then applied, for practical reasons, and preference given in final selection of the U.S. sample to companies in which an ADL team member had well-placed and close working contact.

The resultant sample presents the following characteristics:

1. Size range: \$3-million to \$200-million sales, with the majority in the \$30-70-million sales range.

2. Sector distribution:

Food Processing	4
Pharmaceuticals and Diagnostics	2
Chemicals	2

Electronics and Telecommunications	2
Auto Parts	1
Agricultural Equipment	<u>1</u>
	12

3. Geographic distribution:

New England	4
Mid-Atlantic	2
Mid-West	4
West	2

4. Technological character:

The sample companies represent a wide range of technology in terms of sophistication and what they consider to be their distinctive technology. While some had proprietary technologies that made them leaders in their field, others used standard techniques but saw their management and organization as the crucial technologies.

B. THE LATIN AMERICAN SAMPLE (PHASE II)

The selection of Latin American firms to be interviewed in Phase II was primarily the responsibility of ADL country experts based in Brazil, Venezuela, Mexico and the Dominican Republic. These countries had been chosen as targets for the study under the contract in part because of ADL's extensive contacts in them, the known preference of U.S. firms for involvement in the more prosperous nations, and the desire to include one less prosperous, and small, island nation in the sample, for contrast.

Seventeen firms in these countries were selected. Efforts were made to match them with the U.S. firms already interviewed in Phase I. No strict size criteria were used, but the focus was on small- and medium-sized firms partly because it was found that the larger firms often already had adequate access to technology. Four "large" firms (in the crude sense that they were considered large in the countries in question) were, however, interviewed for purposes of comparison.

The firms were distributed among the four countries as follows:

Brazil	8
Mexico	4

Venezuela	3
Dominican Republic	2

The Brazilian interviews were with firms in Curitiba, Paraná and Rio de Janeiro. The interviews in the other three countries were all with capital city firms.

The sectoral distribution was:

Electronics	4
Telecommunications	2
Food Processing	4
Chemicals	3
Machinery and Auto Parts	3
Diagnostics	1

C. THE U.S. FOLLOW-UP SAMPLE (PHASE II)

The basic objective of the follow-up interviews was to discuss specific Latin American opportunities with U.S. firms. Several Latin American firms, highly interested in ventures with a U.S. S/MSF and with specific technological needs, had been identified in the Latin American interviews of Phase II. The ADL industry experts then identified counterpart U.S. firms to see whether the response to the possibility of a venture would be different when a concrete opportunity could be discussed.

Ten follow-up interviews were performed. Four of them were with first-round interviewees. The other six had not been interviewed previously. They were distributed among the following sectors:

Food Processing	4
Chemicals	2
Electronics	2
Telecommunications	1
Agricultural Equipment and Metallurgy	1

APPENDIX II

INTERVIEW NOTES

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A. INTERVIEWS WITH U.S. FIRMS

1. Specialty Chemical Finishes Firm (Midwest U.S.)

a. Products and Technology

This is a rapidly-growing manufacturer of synthetic protective linings for steel and concrete, waterproofing and construction materials, cements, adhesives, and fireproofing products. Their product line is geared towards the petroleum, chemical, construction, marine, and other industries. Most of the products have been developed by the company which maintains a large and innovative R&D program. Sales are about \$35 million.

b. Experience with Technology Transfers

The company has sales offices in 12 foreign cities, joint ventures in 12, and four licensing arrangements, accounting for 13% of net sales. Technology is the basis for the joint ventures and licensing agreements. They feel they can offer a unique product line and processes, know-how for manufacturing, suggestions for marketing, and a continuing technical input. Joint ventures are preferred to licensing because they involve greater participation, are longer term, are taken more seriously by both parties, and tend to be more profitable. However, they are also seen as more problematic. The foreign ventures have been undertaken because of: the challenge of entering new markets; the desire to serve customers that have extended into these countries; and the opportunity to make a profit.

The company has had extensive experience in Latin America with licensing agreements in Colombia, Mexico and Brazil, and joint ventures in Brazil and Venezuela. On balance, the Latin American experience has been positive.

c. Obstacles to Transferring Technology

It should be re-emphasized that this firm believes that their Latin American experience has been largely favorable. Furthermore, the interviewee argued that most of the generalizations about Latin America simply do not hold. While many of the institutional constraints do exist, these can be dealt with if an effort is made.

Perhaps the principal obstacles perceived are the questions of payment and repatriation which are strictly regulated by law. However, usually a way around the problem can be found.

Identifying and screening a suitable partner is time-consuming and difficult, but this would be the case anywhere. Joint ventures are particularly difficult to negotiate because of the number of details

that must be covered. In licensing agreements it is sometimes hard to get the desired long-term and detailed contract. The stringent laws covering foreign investment and technology transfers, as well as business in general, could be problems but can be handled by sophisticated local legal advice.

d. Requirements for Transferring Technology

By far, the most important requirement is a suitable partner. The process of finding a partner can be lengthy, difficult, and risky. Besides finding a management that one can work with, the size of the firm is important. A large and diversified firm will be likely to ignore the U.S. company's interests. A small firm is likely to be underfinanced and may have marketing difficulties. Most important, the firm must be extremely interested in the product line and technology being supplied.

With respect to profits and payments, the company expects a 5% royalty from licensing agreements and at least some repatriated profits from joint ventures. An income of at least \$20,000 a year is necessary.

It is not believed that majority control in joint ventures is necessary. It was argued that because of the different culture, business methods, and market, the local firm could do a much better job of handling business matters.

The company would not undertake a joint venture in any country. The wealthier and rapidly-growing countries are clearly preferred.

e. How Could A Technology Transfer Support Program Be Useful?

The interviewee prefaced his comments on a transfer program by stating that an increased flow of technology transfers was essential for the well-being of the U.S. economy. He argued that the strength of the U.S. economy lay in its technology and not in protectionism.

A number of functions which are crucial to the transfer process and that are not adequately provided for at the present time were identified, including: general information on the Latin American countries; identification of specific opportunities; various matchmaking services; and assistance with obstacles such as the legal system, the bureaucracy and local business methods. Some kind of support program could be instrumental in providing these, although a firm can manage well now if it is willing to make an effort.

The firm would not have much trust in a government-staffed program. A "bureaucrat" would have little reason to provide good work performance and would not have the means for guaranteeing the quality of the service.

These misgivings led to the conceptualization of a program in which the staff works for a commission. The agency (or private firm) would acquire information and identify opportunities in Latin America. The staff member would then try to sell the idea of going into Latin America to U.S. firms, offering to find suitable opportunities. If something was found, a commission or finder's fee would be paid. Further fees would be charged for additional matchmaking services.

2. Telecommunication and Electronic Equipment Firm (New York)

a. Products and Technology

The company manufactures electronic intercom, sound, monitoring and pocket-page systems as well as telephone interconnecting systems and manufacture relays. Its 1976 sales were over \$26 million.

The firm's distinctive technologies are thought to be technical know-how combined with well-developed marketing and servicing capabilities.

b. Experience with Foreign Ventures

About 50% of the manufacturing is done in Asia, almost completely in Japan. The Japanese concerns are associated through joint ventures.

The company also has a licensing arrangement with a Mexican firm in which parts and technical and management support are sent in return for royalties. Licensing was found to be necessary to preserve the export market that had been developed and then threatened by tariffs. They do not have significant exports to other Latin American countries so this precedent would not apply elsewhere. The Mexican experience has been good insofar as the management there is considered to be responsive and competent. However, the firm has had financial difficulties, largely resulting from a small scale of operations.

c. Perceived Obstacles to Transferring Technology

Since the firm had never considered going into Latin America, the interviewee had no idea of what conditions and impediments might exist there. He was asked to comment on what these might be. The principal obstacles were thought to be the small market size.

Other problems included a lack of appropriate firms in Latin America or at least the absence of knowledge of any.

d. How Could A Technology Transfer Program Be Useful?

Initially, the interviewee indicated that his firm had no ambitions in Latin America, but it became increasingly evident that this was due to a lack of information, indicating that further exploration of the possibility might be warranted. Hence, if a technology transfer organization were to supply information on market conditions and identify promising potential partners, the firm might then be interested in a venture in Latin America.

3. Soybean-Processing Firm (Midwest U.S.)

a. Products and Technology

This large (sales \$90 million) soybean-processing cooperative is owned by 60,000 farmer-suppliers. Besides the basic soy products--meal and oil--a wide line of products are processed including textured soy flour, soy flour, soy grits, and white flakes. A major installation for meat analogs is under construction.

While the technology for processing the basic products is standard, the cooperative also does sophisticated research on new uses for soybeans and ways to commercially implement them.

b. Experience with Foreign Ventures

The company's products are exported to a large number of countries, including several in Latin America, and its grits are sold through the PL 480 program. Exports have been the basis of whatever experience the cooperative has had abroad.

Several efforts have been made to set up business ventures in Latin America (although none actually involved soybean processing). Trinidad sought help in developing a fortified flour and a school lunch program but nothing came of it. A potential venture with the Government of the Dominican Republic fell through because officials there insisted on double invoicing. Mexican officials came to the U.S. plant in a joint effort to develop a fortified corn flour, but the people involved chose to turn it into a vacation.

The president has been to 11 Latin American countries as a member of a nutrition program or as an advisor and consultant. He is personally very interested in helping the LDC's and has committed the company to training individuals from various countries and inviting them to spend time at the mills.

c. Perceived Obstacles to Transferring Technology

The most important obstacle, which precludes any joint ventures with mills in Latin America, is that there is little chance that the farmer-owners of a cooperative such as this one could be convinced that they should help develop competition for themselves. Other obstacles include:

- It is not clear how a venture would benefit the company;
- The cooperative cannot accept the way in which business is often done in Latin America;

- Government instability; and
- The manpower involved in a venture could not be spared unless the commitment was long-term enough to warrant additional hiring.

d. Requirements for Transferring Technology

The interviewee made it clear that he considered it impossible for the cooperative to participate in a joint venture or technology transfer program outside of training foreign technicians and managers. If it were possible to participate, the following conditions would have to be met:

- It would have to be financially beneficial to the company;
- The venture would have to be a long-term commitment; and
- A government guarantee against loss would be required.

e. How Could A Technology Transfer Program Be Useful?

Among the important functions for a transfer program, the interviewee identified government guarantees, recruiting retired professionals and managers to help overcome the staffing problem; and supplying information on the existing opportunities and services.

4. Irrigation Systems Components Manufacturer (California)

a. Products and Technology

This is a privately-held manufacturer of components for irrigation systems. Although it produces only about 5-10% of an irrigation system, it is still the largest exporter of irrigation equipment. It manufactures sprinkler heads, valves and control systems.

The most interesting area in terms of technology is a Technical Services division offering services including troubleshooting, operational training, farm development, irrigation audits, computer services and irrigation system design assistance. The Technical Services division has been specifically designed as a means for transferring software.

b. Experience with Foreign Ventures and Technology Transfer

The company has licensing arrangements in South Africa, Egypt, France, Canada, Mexico, Colombia, and New Zealand. Overall, licensing is considered to be more trouble than it is worth since the royalties tend to be severely limited by law and administration costs are too great. Other problems in Latin America are:

- The licensees tend to be very small, particularly given high costs;
- Choosing licensees is a difficult and risky business;
- Quality control is too expensive but failure to maintain standards damages the firm's reputation;
- Repatriation of funds and currency exchange is difficult; and
- The project tends to be too great a drain on human resources.

The only real joint venture is in Canada and previously in Greece. The firm has branches or representatives in 20 countries.

Once again, the most interesting experience has been in the Technical Services division.

A final form of technology transfer has been educational programs. Seminars and training programs around the world, as well as technical literature, are supposed to be a marketing technique, a profit center, and a way of developing contacts.

c. Perceived Obstacles to Transferring Technology

The obstacles pertaining to licensing agreements have been noted in the preceding section. Besides those problems, the company has only limited interest in joint ventures because:

- Local production in Latin America does not make sense for either the company or the country. Mexico, Central America, Venezuela, Colombia, and Ecuador have been good markets for its products, but it is unlikely that local production would be warranted. Brazil has exchange problems but it offers an excellent market.
- The company would want an 80-20% ownership relationship that would give them complete control, but this would be unacceptable in most countries.
- The costs of tooling and staffing are too great and it is not felt that most of these ventures would be profitable.

d. Requirements for Transferring Technology

In order for the company to engage in a technology transfer arrangement, the following conditions would have to be met:

- In a joint venture, complete control would have to be retained;
- The venture would have to be profitable and represent more than a small royalty or consulting fee;
- Local production in a Latin American country is only likely if there is significant export potential;
- The venture must be more profitable than any being considered in the United States;
- A local market must already be developed;
- Political risk must be minimal; and
- Profit repatriation must be relatively simple.

e. How Would A Technology Transfer Support Program Be Useful?

Although the company has not shown great interest in Latin American joint ventures in the past, they are willing to investigate opportunities. Furthermore, the interviewee indicated interest in a technology transfer support program. He felt that the program could be useful by helping to

assure the repatriation of profits; and helping to overcome high overhead costs. The interested firm should share some of the costs in order that the program be taken seriously.

The firm believes that, based on its experience, the following information and services would be useful in easing the entry of S/MSF's into Latin America:

- A picture of the market and the macroeconomic scene;
- Assistance and prodding in order to "break the ice" for companies apprehensive about their first investment abroad;
- Identification of good projects. This is a major concern, but the interviewee expressed doubt as to whether the program could do this. Either the firm itself or a consulting firm would have to fulfill this function.

5. Diagnostics Manufacturer (New England)

a. Products and Technology

This firm is a rapidly-growing and well-known manufacturer of filters for precision filtration and analysis, and of enzymatic diagnostic reagents. Net sales in 1976 were about \$70 million.

b. Experience with Foreign Ventures

Almost half of the company's sales are exports. Most of these are to Europe and Japan where the firm is working on optimizing its sales strategy, while Latin American sales are a small percentage. The management has not entirely gotten around to developing a Latin American strategy.

They do have several marketing subsidiaries and affiliated distributorships in Latin America, most notably in Mexico and Brazil. The company believes it is engaging in an important form of technology transfer through these, by offering a gratuitous training program to its customers on how to best utilize the products.

In response to the strict Mexican regulations and in an effort to protect that market, some assembling of diagnostic kits is performed in that country. A similar establishment has been considered in Brazil.

c. Perceived Obstacles to Transferring Technology

The principal area of difficulty lies in the market size and structure. The market size for most of their products does not usually warrant its production in Latin America. The only way to overcome this would be to take advantage of a regional market, such as the LAFTA, AnCom, or Central American Common Market. Access to the regional markets is made very difficult because of the constant squabbling between member countries, the politicization of decision-making, and the way in which industries are assigned.

The bureaucratic problems are not limited to the regional markets, but are equally applicable to individual countries. The time, costs, and complications of having to cope with this situation are considered to be greater than the perceived returns from a Latin American venture. Legal constraints, such as import restrictions, local ownership requirements, price controls, and profit repatriation limits, are also seen as obstacles.

d. Requirements for Transferring Technology

A number of requirements or preconditions would have to be met before a business venture in Latin America would be undertaken:

- Adequate existing markets;
- Identification of specific opportunities to develop products with a mass market. One such product has already been developed for Latin America;
- Protection of sensitive proprietary technology;
- Minimum bureaucratic, legal and tariff obstacles; and
- Clear-cut incentives, such as no alternative way to penetrate or protect a lucrative market.

The company wishes to control its own destiny, and hence, it is not particularly interested in joint venture. It recognizes that fully-owned subsidiaries would be a problem in many countries.

e. How Could A Technology Transfer Program Be Useful?

The interviewee felt that the major function of a technology transfer program should be that of logistic support for the companies seeking to set up a venture in Latin America, perhaps similar to that offered by the Japanese Government. Hence, the program should help to expedite the fulfillment of bureaucratic and legal requirements with which a small or medium firm would not have the resources to deal.

A second and similar function would be to provide a link to LAFTA and the Andean Common Market, lobbying and working out ways for a joint venture to take advantage of regional markets.

The firm differs in its perception of a technology transfer program from those who feel that the primary function should be to fill an information gap. They believe that a level of sophistication has been reached by the firm where it is already aware of conditions in Latin America, potential markets, and even have a sense for possible partners for a venture from their 15-20 employees in Latin America. Hence, the program would not be a catalyst for stimulating interest, but rather a vehicle for eliminating the pragmatic obstacles, already identified, which are currently keeping the company out of Latin America. The interviewee indicated that his firm would avail itself of a program.

6. Baking Company (Midwest U.S.)

a. Products and Technology

This is family-owned small, independent bakery (sales \$3-million) producing a full line of breads, rolls, and buns.

The firm is a member of an independent bakers cooperative. The importance of cooperatives as a source of information, technology, and strength, helping the independents to survive, was greatly stressed. The interviewees feel strongly that one of the three major cooperatives would be the best supplier of technology in the baking industry.

The interviewees believe that as a small and independent bakery they have a special technology to offer. In terms of management know-how, they believe their small size permits them a flexibility lacking in the large bakeries. The interviewees also believe that their know-how in operating a small bakery is a transferable technology. The major doubt expressed about the transferability of the technology is that their capital-intensive and labor-replacing technologies would not be appropriate or desired in Latin America.

b. Experience with Foreign Ventures

The firm has had not experience with any kind of foreign venture, largely because of its small size and because the local market is as much as the management believes can be handled at the present time.

c. Perceived Obstacles to Transferring Technology

The major constraint to transferring technology to Latin America perceived by the interviewees is the lack of time and manpower. The lack of "pocket money" and the costs of exploring and establishing a business venture in Latin America are also seen as obstacles.

The interviewees are also apprehensive about making any capital investment. The manager expressed fear of losing an investment in a country with a military dictatorship, which he believes would be inherently unstable.

Bureaucratic red tape, legal constraints, exchange problems, host country conditions, and paperwork are perceived as moderate problems by the interviewees.

The difficulty involved in negotiating a contract with a Latin American firm is another perceived obstacle. This would be particularly true with a partnership or joint venture of some kind. About a 50% ownership was thought desirable in this type of arrangement. The interviewees noted that there would be great difficulties in deciding

who would contribute what to the partnership, what each faction would get out of the deal, and who should make what decisions. The U.S. firm would want some decision-making input if they were involved.

The difficulty in managing a joint venture led the president to suggest a fixed fee for the transfer of know-how. This would be preferable to Latin American bakers because control of their firm would be retained, and to the U.S. counterpart because much of the risk would be eliminated. A third possible way of structuring a transfer would be for several U.S. firms to pool their resources and know-how. The fourth suggestion was for retired U.S. bakers to work for a time or buy into Latin American firms. However, the possibility most often referred to was the use of baker cooperatives as technology suppliers, thus overcoming many of the perceived obstacles.

d. Requirements for Transferring Technology

The major requirement for transferring technology would be for the venture to appear highly profitable. The manager said that if the profit potential was 20% on the investment, they should go tomorrow. They also indicated that the Latin American operation would have to be highly profitable in order to be able to afford the technology.

Another condition would be a fairly skilled and disciplined work force and there was some concern with work habits in Latin America. With respect to legal requirements, the greatest interest was in laws relating to profit repatriation, currency exchange and taxes.

e. How Could A Technology Transfer Problem Be Useful?

The interviewees had not had the time to consider how a transfer institution could be structured, but they did have some thoughts on what support functions were needed. First, filling a knowledge and information gap is considered crucial. A second function would be extending some type of loan or grant to help cover the costs of exploration and of establishing a joint venture. Also, they would look to have their investment insured against confiscation or other unforeseen events. Finally, they would not explore the possibility of a venture in Latin America unless a strong possibility is identified for them.

7. Dehydrated Foods Producer (New York)

a. Products and Technology

This company is the world's leading producer of dehydrated egg products for industrial users. It has expanded into dehydrated meat products.

As the leader in a relatively small industry, the company has had to develop its own technology, including equipment. It has developed a complete manufacturing system for the dehydration of eggs.

The interviewee believes that his firm's technology is transferable if certain pre-conditions are met. Most important, consumers in the recipient nations must achieve a high level of sophistication in their tastes. Secondly, the producers acquiring the technology must have developed a marketing sophistication. The final problem is that the equipment involved is very expensive, and only a very large-scale and long-term operation would warrant its purchase.

Because the company has developed its own processing equipment, it is now in the equipment sales market and units have been sold to producers all over the world, among them two Brazilian concerns. It should be pointed out that their older technology, no longer applicable in the U.S. market, may have application in the developing economies of Latin America.

b. Experience with Foreign Ventures

The enterprise has recently started a joint venture with a Dutch firm in an effort to maintain its position in the increasingly protective EEC market. In general, most of the firm's foreign experience has been in Europe and Japan, where about 25% of its products, and almost all of its exports, are marketed.

Although the company perceives Latin America as a potential market, it has not had much experience there. Dehydrated egg products are exported to Venezuela, Colombia, and Mexico, although the latter market is threatened by tariffs. A joint venture in Mexico has been considered in order to maintain the market and as a consequence of government incentives. It decided not to proceed because of the instability of government policy regarding the venture and the lack of any long-term opportunities.

c. Perceived Obstacles

The principal concern of the interviewee is the probable absence of a market for sophisticated specialized egg-based products in many parts of Latin America. He argued that this demand would depend on the development of a large middle class and, hence, he expected strong future opportunities in Brazil and Venezuela. He acknowledged that he really did not know what the current opportunities or situation were in those countries. Another problem related to the market is the concern with its size, and doubt about the existence of adequate supplies of surplus eggs.

The interviewee identified a set of potential obstacles related to conditions in Latin America. First of all, concern was expressed about tariffs, legal requirements, bureaucratic barriers, and the instability of government policy. A second problem mentioned was the general unrest in many Latin nations. The lack of marketing sophistication as a constraint has already been reviewed. Fourth, the people involved are seen as a crucial consideration. Finally, the high cost of the technology is seen as an important constraint.

d. Requirements for Transferring the Technology

Pre-conditions include demand for the product, a stable source of raw materials, and positive legislation. At the firm level, marketing, management and technological skills and a compatible management would be required. Majority control in a joint venture would be preferred but this condition is not essential. Overall, the interviewee expressed willingness to engage in a joint venture, provide marketing expertise, technical training, and monitor the venture if most of the above conditions were met.

e. How Could A Technology Transfer Support Program Be Useful?

As the interview progressed, the interviewee became increasingly aware that one of the major reasons for his company's failure to become involved in Latin America was the lack of information on conditions and opportunities there. He believes that a technology transfer program's major function should be to identify opportunities and potential participants and then disseminate this information. A third function of the program would be some kind of financial support for the exploration and establishment of a joint venture.

The interviewee expressed interest in participating in a program, particularly if it would furnish information on opportunities and potential participants.

8. Home Entertainment Electronics Firm (New England)

a. Products and Technology

This company manufactures "home-entertainment" electronics, most notably video-beam projection color television sets, loudspeaker systems, FM radios, and cassette desks. Its sales were about \$27-million in 1976.

The company is engaged in very unusual and sophisticated technologies, especially in the video-beam projection televisions. The management does not currently consider much of its most advanced technology to be transferable.

b. Experience with Foreign Ventures

The firm has had almost no experience with foreign ventures despite the fact that their products are distributed worldwide. Its only joint venture of any kind (which the interviewee termed a "business relationship") is with a Canadian firm.

c. Perceived Obstacles

The principal concern is that the firm is undertaking all it can handle in the United States market. This constraint could disappear within the next two years when the United States market is expected to be saturated (due to a short product life cycle).

Another obstacle would be the limited market perceived for their products which would not warrant local production. Finally, the company does not think it has the management and technical depth to support a joint venture.

d. Requirements for Transferring Technology

The interviewee has not had the opportunity to develop opinions on what pre-conditions or incentives the company would require before pursuing a joint venture. However, he hinted that the opportunity would have to be highly attractive and further indicated that United States Government (or a technology transfer supporting program) financial help would be helpful.

e. How Could A Technology Transfer Program Be Useful?

Besides the financial help already mentioned, a technology transfer program could be most helpful by providing market studies and dossiers on candidate user firms. However, any government activity or interference past the original matchmaking would keep the firm from participating. At any rate, the firm does not anticipate being interested in the program for about two years.

9. Food Processing Firm (California)

a. Products and Technology

This company produces a number of dried and frozen foods. They consider their technology to be unique and the factor that gives them a competitive edge. The firm was acquired by a larger corporation during the course of this study.

b. Experience with Foreign Ventures

The firm's foreign experience has been limited to exports which is the basis of much of their business. This applies to Latin America as well. The corporation that acquired them does have a number of manufacturing subsidiaries and joint ventures in Latin America. Their interests in one unidentified country were expropriated as the result of friction with the authorities. As a result, their evaluation of Latin America is quite negative.

c. Perceived Obstacles

Not surprisingly, the major obstacle perceived is political instability and risk in Latin America. The other major problem is the lack of proprietary guarantees for technology. They are one of a few firms in this area and do not feel that the Latin American market warrants risking the loss of sensitive and protected technology.

d. Preconditions for Transferring Technology

Because of their recent experiences in Latin America and the perceived risks, the interviewee did not think the firm would be interested in a major commitment in Latin America at this time. They do not feel that outside support could provide them with enough protection, support, or incentives to induce them into a new venture in Latin America.

10. Diagnostic Manufacturer (New England)

a. Products and Technology

The company has the best reputation in the country as a supplier of radio-labeled biochemicals. More recently the company has diversified into radioimmunoassay and radiopharmaceuticals. Sales in 1976-1977 were about \$40-million.

b. Experience with Foreign Ventures

The firm has explored a joint venture in Brazil at the invitation of the Brazilian Government. However, they were able to get no assurances as to the commitment of their partner while they themselves had to give such assurances. This turned them off from doing other joint venture work in Latin America. They have exported products into South America, but the interviewee says that "there are nothing but problems". They have had little success because they have been uncomfortable in dealing with the "ethical business considerations".

c. Major Obstacles

The major impediment would be finding a partner that meets the terms described below.

d. Requirements for Transferring Technology

The interviewee emphasized that to transfer their technology they require a company not only with a pre-existing knowledge of the market and the technical capability to learn their approaches but also with appropriate facilities for manufacturing these unique products. They would also require a partner who could give them assurances that proprietary information would not get out. They are especially concerned with information getting back into the United States. The technology transfer would be made if they could gain assurances of proprietary protection and if it would not require major investment on their side.

e. How Could A Technology Transfer Program Be Helpful?

A number of activities of a support program could be helpful. First would be the provision of information on the normal terms of doing business in the specific product area in a specific country so as to help in coming to contractual terms with the partner. The second help would be in finding a partner that met the U.S. firm's requirements.

The firm would make use of the technology transfer program. They do not have much faith in their ability to make money by doing business in Latin America but are interested in pursuing it further.

11. Specialty Chemicals Manufacturer (New England)

a. Products and Technology

The company is made up of five divisions, producing specialty industrial chemical finishes, specialty adhesives and insulating materials, specialty inks, and nonwoven materials used as filtration media, and absorbent and reinforcing materials. The firm is at the upper end of the size limit for this study. Only the technologies for specialty papers, adhesives and insulating materials are relevant for transfer to Latin America.

b. Experience with Foreign Ventures

The corporation has had a great deal of experience abroad, partly because of the nature of its product line. The specialty products are often associated with specific industries so that, as the latter expand abroad, it must follow suit in order to protect its markets. Most of the foreign experience involves exports, but important acquisitions have been made in Europe and more are planned.

The firm does not have any business ventures in Latin America, but it does export about \$3-million a year to the region and the total is expected to continue to grow.

A few Argentinian interests and one Mexican firm have expressed interest in participating in a joint or transfer arrangement of some kind. The Mexican firm looked like a strong possibility, especially as a result of protective trade barriers, but the lack of an adequate water supply interfered. The Argentinian firms were mostly interested in the U.S. company's technology but it was not felt the former were in a position to utilize it properly.

c. Requirements for Transferring Technology

If they were to expand abroad, they would prefer to do so via acquisitions which would allow them the management and quality control they feel is necessary, as well as the entire return for their investment. Given the strict laws in most of Latin America with respect to foreign acquisitions, they would opt for grass roots development of a Latin American plant. If this in turn was either illegal, economically untenable, or if conditions appeared just right, a licensing arrangement would be considered. The firm is seeking longer term arrangements in which the licensee can provide a return flow of know-how and technology.

d. Perceived Obstacles

One of the constraints to transferring technology to Latin America seems to be the perceived market size.

A second obstacle is that the firm is seeking new technology and diversification for itself and is unwilling to be a donor if there is no reciprocation. Finally, cultural barriers to the acceptance of their high-technology products are perceived.

e. Is There Interest in Using A Technology Transfer Support Program?

Since they have identified mechanisms for exploring opportunities abroad, principally the use of consulting firms, and the firm has the resources to finance this kind of exploration, they would have little need for any new type of outside support.

12. Automobile Parts Manufacturer (Midwest)

a. Products and Technology

The firm manufactures automotive replacement parts including piston rings, various types of filters, engine and transmission additives and fuel pumps. Annual sales are about \$35 million.

The firm's technology is standard. However, it would be of great interest in many Latin American nations where legislation is forcing the nationalization of the automotive industry. A firm such as this one would be very attractive since it does not have the stigma of the larger auto manufacturers.

b. Experience with Foreign Ventures

The firm has a few licensing agreements in Europe and a Canadian subsidiary but no experience in Latin America. They have not been too happy with their licensees because the firms have not been strong enough to properly utilize the technology.

c. Perceived Obstacles to Transferring Technology

The firm does not believe that the business environment in Latin America is conducive to their engaging in a venture there. The legal trend in Latin America is towards nationalization. The policy seeks to acquire foreign technology for local manufacturers. The U.S. firm does not want merely to sell its technology or enter a venture in which technology is its only participation. It seeks markets for its products, and technology transfer would have to be a secondary aspect of a Latin American venture.

d. Preconditions to Transferring Technology

The firm realizes that there are attractive markets for its products in Latin America. However, management believes government regulations render the market inaccessible or at least not very attractive. Furthermore, their perception is that government policies seek to acquire U.S. technology with little compensation to the U.S. firm. The interviewee indicated his firm would have little interest in a Latin American venture until these situations change considerably.

e. Suggestions for Support Activities

The respondent thought that a program which would identify specific opportunities for U.S. firms and act as a clearinghouse and matchmaker would have merit for most S/MSF's. However, the interviewee argued that his firm had little need for these services because their preconditions could not be met by an agency. It was thought that the firm already had mechanisms for identifying and acting on opportunities in Latin America, but would not do so until the regulatory situation changed.

B. INTERVIEWS WITH LATIN AMERICAN FIRMS

1. Telecommunications and Electronic Equipment Firm (Brazil)

a. Products and Technology

The firm has been in the telecommunications and electronic equipment business for 20 years. It presently manufactures various types of standard telecommunications equipment, electronic control systems, radar speed measurement devices, and various other electronic instruments. Most of the markets were entered as a result of protective tariff barriers. At this time, the company uses its own technology which is largely embodied in its high-quality personnel.

Its principal customers are the government telecommunications and electric power companies.

b. Technological Needs and Interest in Technology Transfer

The firm is interested in entering new, more sophisticated markets. Its main interests are in electronic supervisory systems and micro-processing systems. In both cases, the company needs help in micro-mechanics and learning how to manufacture and assemble the equipment. The help would have to come from abroad.

The firm would consider two mechanisms for acquiring the technology. The preferred approach would be a technical assistance contract of no more than five years' duration. In this time, all the important advancements and fundamental technology could be learned. The alternative would be a one-time purchase of technology. This has the disadvantages that foreign components would probably have to be imported, there would be no follow-up, and the price would likely be too high.

The company was offered a technological package by a Canadian firm. It was rejected because too many components would have had to be imported in order to properly utilize the technology. Furthermore, the package included a number of items in which the company was not interested.

c. Obstacles and Conditions

No major obstacles are foreseen as long as the package offered by the foreign company fits into the limits described above. The major problem would be getting a contract approved and this should be expedited since the technology falls into a priority area. Working out payment terms, securing capital and markets were not expected to present problems.

2. Ball-Bearings Manufacturer (Brazil)

a. Products and Technology

The interviewee is an important state official as well as being president of the firm. It was agreed that he would speak as a private businessman rather than as a government official.

The firm manufactures various types of ball-bearings and casings for engines and machinery. Its technology is standard.

b. Experience with Technology Transfers

The company has made a joint venture with a very well-known English manufacturer of ball-bearings. The purpose of the venture is to allow for expansion and technical improvement of existing product lines and it was not intended to be a means for entering into new areas. The English firm received 25% of the Brazilian company's stock in return for its technology and an unspecified capital investment in the venture. No actual money payments to the foreign company for the technology are involved. They do receive their share of the profits, but are forced to reinvest them to maintain their level of participation in the firm (apparently all profits are reinvested).

The respondent had heard of the English firm and contacted them by letter expressing interest in a joint venture. Further correspondence led to personal visits. The negotiation process was lengthy and was hindered by a language barrier. The effort was worthwhile in that it allowed the firm to modernize and expand and allows for more of the same in the future.

c. Obstacles and Requirements in Transfer Process

The most difficult and important aspect in setting up a joint venture is the negotiating process. Both the language problem and the delays can become severe problems. Confidence and understanding are needed in order to overcome problems, but achieving these is a time-consuming process in itself. The contract negotiated must thoroughly detail the obligations of each party. It is essential that a transfer arrangement involve the transfer of knowledge, work habits, and capital, all of which are more important than machinery.

d. Technology Transfer Program

Some kind of a technology transfer program could provide a number of important and much needed functions.

- Stimulate interest among entrepreneurs in both regions by demonstrating opportunities;

- Serve as an intermediary between U.S. and Latin American agencies which have already identified potential technology suppliers and recipients; and
- Provide a matchmaking function and support in the negotiation process once the identification process boils down to two parties.

The program should be associated with the IDB and other national development banks as well as with local technological institutions, and not just with the U.S. Government. It should act mostly as an intermediary between these institutions. Although in the long run it could be financially independent, it must be capitalized by government subsidies to start with.

3. Broiler Processing Firm (Brazil)

a. Products and Technology

The concern is a new integrated broiler operation. They hatch, raise, slaughter, prepare and market their own birds. While production is still not very substantial, they hope to produce 120,000 broilers a week in the near future.

The company is part of a multinational firm which has similar operations and other interests elsewhere in Latin America. It utilizes standard technology in its operations since it would be too expensive to develop or acquire a more sophisticated technology line.

b. Experience with Technology Transfers

The director is Argentinian and previously worked in a similar operation there for the same conglomerate. In effect, his moving to Brazil was a form of technology transfer. Otherwise, the only form of transfer is the occasional employee sent to study in Argentina.

c. Technological Needs and Interest in the Program

The interviewee believes that his company has already had all the technology it needs for fully developing its broiler production, particularly since the technological needs are not so great.

Until broiler production is fully developed, the firm cannot really consider taking on new projects.

4. Telecommunications and Other Equipment (Brazil)

a. Products and Technology

This firm manufactures telecommunications equipment, industrial machinery (mostly for the packaging industry), and plastic packaging. Their telecommunications branch is completely dependent on TELEBRAS, the government-owned telecommunications company.

For the most part, the company believes it is able to develop its own technology. It is in the process of building a lab, largely financed by a technology development institute, where it expects to develop new products and the technology needed to make them economical. Products with export potential are being concentrated on. It appears, however, that it was largely working on technology which was in standard use worldwide--such as simple vacuum pumps.

b. Experience with Technology Transfers

The firm has discussed the possibility of a venture with three to four firms, most of which are German. Contact was established through the state development bank and embassies. None of the contacts resulted in anything and the company came out of them with negative feelings towards any kind of venture with foreign firms. First of all, the size difference between the Brazilian and the foreign firms presented a problem. The former felt that they were being taken advantage of and that the experience and resources of the foreign firms gave them a tremendous advantage in negotiations. Second, the management felt that the foreign firms made too many onerous conditions and charged exorbitant prices for standard technology. Third, the negotiation process itself presented difficulties. The Brazilian firm's representatives felt totally lost in the process, partly due to the language barrier. They had particular difficulty with legal and financial aspects. Fourth, the lack of knowledge of the Brazilian market by the foreign firms led to unreasonable demands and inappropriate technological packages. Finally, it was felt that the negotiating process was unbearably long.

c. Requirements for Successful Technology Transfer

The interviewee did have some general remarks about what conditions would have to be met if a venture were to be successful and in order to interest the company:

- A very attractive market would have to exist to justify purchasing technology or forming a joint venture.
- A successful joint venture is impossible if the Brazilian party does not enter the negotiations with adequate resources; otherwise the foreign firm would have all the bargaining power and the resulting contract would be disadvantageous for the former. Furthermore, the foreign firm would be unhappy about supplying all the inputs.

- Financing any kind of a venture is a problem and should be attended to.
- Communications must be between presidents and the Brazilian firm should not be forced to work its way through the hierarchy.
- The Brazilian firm requires various forms of assistance.
- The firm would want a nice, neat technological package and contract virtually handed to them.

d. Transfer Program

The functions of a technology transfer program are implied by the conditions stated. It should provide market studies, assistance in making contact with foreign firms, support in the negotiations, help in communicating, and financial assistance. As already mentioned, what is really desired is a complete package only requiring final approval.

It should be stressed, however, that the company was not interested in any ventures or program at the present time.

5. Medical Chemical Products (Brazil)

a. Products and Technology

This manufacturer of chemical products for hospitals was a small family firm until the interviewee began to actively work in it. Since then, it has begun to grow rapidly.

For the most part, it purchases chemicals for packaging and distribution. Very little processing of any kind is now done.

b. Technological Needs and Interest in Technology Transfer

In order to maintain its rapid growth, the company is interested in getting into new products, again particularly in the hospital and laboratory supply business. Any marketable product would be acceptable, including diagnostics. Furthermore, it wants to do processing and combining of raw materials as well as packaging. In order to go into the new product areas, know-how is needed and it could best be acquired through a technology transfer arrangement. The firm would be willing to talk to anyone if they seemed interesting and had something to offer. In return, the firm could offer its marketing network and attractive opportunities in the area as an inducement.

c. Obstacles and Conditions

No major obstacles are foreseen which might impede a joint venture or other transfer agreement. Any problems would be the result of a lack of information and understanding of each other's legal systems, business methods, bureaucracies, etc. If the effort to secure the necessary information is made and if a suitable partner is found with whom communication is possible, all problems can be solved.

The most important condition for a joint venture is that no multinationals, and preferably no competition at all, be in the market with the products being considered. Second, the products would have to be well known. Third, the total production costs would have to be such that the price would be attractive on the Brazilian market. It was felt that any chemical products or reagents meeting these conditions would have a tremendous market in Brazil.

The interviewee would be open to any kind of an arrangement as long as they maintained control of the operation. The specific form of an agreement would depend on what looked best to both sides.

d. Technology Transfer Program

The interviewee had a number of general comments to make on the support functions needed. A general survey of the technological needs of the country would be very useful. A very important function for a possible program would be to provide information, particularly on legal

questions, to both sides. Finally, assistance in dealing with the bureaucracy is needed for both partners in a venture.

With respect to how a program could be structured, the interviewee felt that it should not be directly associated with any one government. Instead, it should be jointly subsidized by all American governments, private institutions and foundations and private firms. How such an association could be brought together was not explained. The program should operate independently. Fees should be charged for services to insure that they be taken seriously.

6. Automotive Parts (Brazil)

a. Products and Technology

The firm is in two product lines: plastic automotive parts and PVC pipes. The president of the firm was not enthusiastic about how things have gone for his company. He was concerned with the very high fixed costs of importing equipment and raw materials. Combined with dependency on one customer in a fluctuating industry and government regulations, the result has been unstable returns and much more risk than the management was willing to take.

b. Experience with Technology Transfers

The company negotiated a technology transfer arrangement with a German company after a difficult search for a firm with the desired technology. It was felt that the size difference between the firms presented a major problem. The German firm, with experience in these affairs, tried to take advantage and drive a very hard bargain.

The firm did have a technology transfer agreement for the production of battery containers. The Brazilian firm pulled out because it involved being completely dependent on one supplier and customer.

The importation of machinery for PVC pipes was, in effect, a purchase of technology, but there was no further agreement for technical assistance and know-how.

c. Obstacles and Conditions

The principal constraint to technology transfer agreements is the size difference between the Brazilian firms and the average supplier of technology. Each firm has a different set of values and objectives making it very difficult to negotiate. The difference in size and experience makes it difficult for the smaller firm to avoid being taken advantage of. The language barrier aggravates the situation.

It is difficult to come to an agreement on some clauses in a contract. For example, the Brazilian firm usually wants to be the only recipient of the technology, as well as have the exclusive rights for the production and distribution of the product involved. The supplier is rarely willing to give in here.

A final problem would be financing the negotiation process and a joint venture.

No comments were made as to what circumstances would induce this firm into arriving at a transfer arrangement because the company does not want to expand its manufacturing operations and is not really interested. The lack of interest applies particularly to joint ventures.

d. Technology Transfer Program

Although the president of the company has no interest in taking advantage of a program if it were to come about, he did believe that it could alleviate many of the obstacles described above. In the first place, by interesting smaller U.S. firms in becoming technology suppliers, a venture would take place between more compatible companies. A second principal function would be technical assessment of a contract to insure that all potential trouble spots were covered. Third, general match-making and follow-up services are needed. Finally, a program could be very useful by helping to overcome the language barrier. The interviewee did not feel that there was any significant information gap that needed to be filled.

With respect to structuring a transfer program, it should be linked to a combination of: governments, development banks, and private business. The government, however, should stay out of the actual operation of the program.

7. Electronic Equipment (Brazil)

a. Products and Technology

This company manufactures a wide range of electronic equipment including electronic office equipment, radio receivers and transmitters, navigation equipment, and electronic control systems. The government is the most important market for them which has led to large fluctuations in their sales. Furthermore, government policy is responsible for a major slump which has seen the work force decline from 600 to about 300. (This will be looked at in greater detail below.)

The fundamental know-how comes from the knowledge of the founder-engineers, improvisation and copying. Besides this, a fair amount of technology has been purchased.

b. Experience with Technology Transfers

On balance, its experience with technology transfers has not been very good. The most disastrous was with a type of T.V. monitor. The company purchased the necessary technology from a French firm and spent four months getting the deal approved by INPI (the agency charged with approving all technology contracts). Once approved, CR\$12 million were invested in tooling, only to have the government prohibit the domestic sale of the equipment, allegedly because of pressure from multinationals in the same market.

One contract with a U.S. firm resulted in the purchase of technology for a new product. The association was developed through visits to the U.S. firm during which it was seen that the two firms were compatible. The deal included know-how as well as equipment.

Another attempt to purchase technology in the United States was unsuccessful because the price was too high.

A French firm demanded a huge down-payment for their technology. Not only was the price too high, but it is illegal for a Brazilian to pay a down-payment for technology. A number of bids for joint ventures were lost to other Brazilian companies.

c. Obstacles

A number of major obstacles to transferring technology are evident from the company's experience and can be summarized as follows:

- Getting a technology contract approved is extremely time consuming, expensive, and frustrating, and largely depends on influence.
- Government regulations can be very unreasonable.

- Doing business with a large foreign firm can be difficult and very much like dealing with a bureaucracy. The interests of the small company tend to be ignored.
- Foreign companies selling technology are interested in getting the full value as quickly as possible and want no further obligations. The price demanded is often out of proportion to the technology offered.

d. Requirements

In order for technology transfers to be successful and attractive, the following conditions must be met:

- There must be confidence and trust on both sides;
- The legal and bureaucratic straitjackets that make it impossible to deal with a foreign firm must be eliminated; and
- Firms must be able to secure working capital for making foreign deals.

e. Technology Transfer Program

The interviewee thought that a transfer stimulating program would be a good idea. However, it should be as independent of the government as possible. The most important service it could provide would be financial support or loan guarantees.

8. Specialty Chemicals (Brazil)

a. Products and Technology

The company is a new company producing mostly pine resin compounds, synthetic resins, and activated charcoal. It is also attempting to enter the phenol substitute market, particularly polyurethane, but still knows very little about it. Its products are sold to manufacturers of paints, rubber, varnishes, anti-corrosives, epoxies, etc.

Perhaps the most interesting aspect of the firm is that it is determined to pioneer new products. The principal one is the resin from the southern Brazilian pine. The company feels that this kind of pine resin could have a tremendous potential once more applications are discovered. The company has a modest R&D program, partially supported by the government, of which it is very proud. For its conventional resins, the company uses standard and well-known technology.

The firm is in great need of foreign technology and know-how and the need is probably greater than the interviewees admitted.

b. Mechanisms for Acquiring Technology and Potential Obstacles

The company would prefer a joint venture as a way of acquiring technology and know-how. A long-term relationship would be essential. The company would be interested in a joint venture with any producer of synthetic resins or a firm with the technological resources for developing the needed know-how. The interviewees stated that they would be flexible on the level of foreign participation. A 50-50 partnership would be acceptable, or possibly a 49-49-1 division in which a neutral party would cast the deciding vote. The firm could offer their knowledge of distribution and marketing networks as an inducement to U.S. firms.

A licensing agreement or other form of purchasing technology were not looked at favorably. First of all, a long-term relationship is needed to develop the technology. Second, purchased technology, in areas such as this one, can rapidly become obsolete. A continuing relationship would allow the firm to keep abreast of all technological innovations.

The interviewees emphatically argued that there are no significant obstacles to transferring technology or forming a joint venture. The secret to overcoming problems is the ability to communicate and they felt that there was no reason for not communicating.

c. Technology Transfer Program

The need for some kind of program for assisting in the transferring of technology was clearly seen. Its principal function should be that of identifying potential partners for joint ventures. Once contact between two firms is established, matchmaking services and a follow-up on the negotiation process should be offered.

With regard to structure, the program should not be associated or dependent only on the U.S. Government. The program might become financially independent if it were to get a small participation in the joint venture established. This would compensate it for services rendered, as well as giving it a vested interest in the success of the venture and in providing quality services.

The company is interested in learning of interested U.S. firms that could provide the necessary technological inputs. They would also like to be kept informed of the results of the study.

9. Locks and Auto Parts (Mexico)

a. Products and Technology

This 25-year-old, medium-sized firm (by Mexican standards) specializes in the manufacture of locks, a few auto parts, and an assortment of other products. Although it produces a wide assortment of fine-looking locks (including car anti-theft, door handles and locks, combination locks, etc.), it has been slowly diversifying into selected auto parts because the Mexicanization of the industry provides a protected market. Furthermore, the auto companies order a fixed quantity over a year period, giving the firm a stable market. Other products now manufactured include various rear-view mirrors, reflectors, window cranks, bicycle pedals and gears, hand-held water sprinklers, and gas valves.

b. Experience with Technology Transfers

For the most part, the firm has developed its own technology and even holds a number of patents for anti-theft auto locks they have developed. They are very proud of their ability to do their own engineering and work out problems. In the case of some products such as valves, rear view mirrors, and reflectors, they unabashedly copied U.S. products. For some products, the firm would receive permission from a U.S. company to manufacture a similar product in return for purchasing the latter's machinery. Otherwise, they have had no experience with technology transfers.

c. Interest in Technology Transfers

The interviewee expressed great interest in diversification into more complex and higher quality products. This would be done through acquisition of foreign technology if it proved to be cheaper and more practical than the internal development of the technology. He indicated that he did not care what the product was as long as it was somewhat related to their present skills and capabilities. It would also have to share the characteristics of the present line: somewhat specialized products that can be produced in limited volume.

The interviewee thought that it would be preferable to deal with small or medium U.S. companies because they are more compatible and accessible. The MNC's, on the other hand, tend to be too aggressive and dominant, even if they do have a recognized name and extensive experience in their favor.

The type of mechanism would depend on the situation. A licensing agreement would be preferred if all that is needed is a limited term transfer and little further commitment by the supplier. The licensor would have to have a well-known and established name to make the purchase worthwhile since otherwise it might be more economical to copy and

develop their own technology. Another important concern would be the time frame involved. The licensor could not expect to receive payments for more than 5-10 years, and less if the technology had only short-term usefulness and was likely to become obsolete.

A joint venture would be considered if the project called for a large investment and if a serious commitment was desired from the technology supplier. It was believed that only through a joint venture would the L.A. firm be taken seriously. The most important condition would be that the contract include a plan and timetable for eventual withdrawal by the foreign firm, in tune with the overall Mexican desire for national integration and nationalization.

Otherwise, no problems were foreseen. Dealing and negotiating with foreigners and coping with bureaucracy were singled out as overrated problems.

10. Specialty Chemicals and Finishes (Mexico)

a. Products and Technology

This small, but very interesting manufacturer of specialty products has largely concentrated on the area of epoxy resins, acrylics, and polyesters. They produce kits for electronic and telecommunications cables, including various types of encasings, splices, transformers, telephonic resins and plastelyne. Adhesives and other specialty resins are also important. The firm is now putting increasing emphasis on becoming an "engineering consultant" developing specialty products for clients.

The success of the firm seems to be attributable to the owner and founder who is an exceptionally energetic and intelligent man. He is completely up to date with the latest scientific developments and methodology in his areas of interest and is constantly seeking new knowledge and fields to work in.

All of the company's technology is its own. It has never bought technology or taken part in a joint venture of licensing agreement. R&D receives the equivalent of 10-20% of sales. Not only have they developed their own technology, but they feel it is of superior quality. For evidence of this the respondent pointed out that they are not protected by tariffs, they compete within Mexico with MNC's, and their products have proven to be of very high quality in actual use. He believes that no one can match the company's epoxy resin encasings and splices for cables, and that both the technology and product are exportable.

The firm has never bought technology because they either felt that they could easily develop it themselves; or because patents and trademarks do little good in the industry without the necessary know-how which cannot be purchased. Other technology transfer agreements have not been undertaken because the interviewee felt that he would have no negotiating leverage or anything to offer until he developed his own technology. Otherwise, no impediments to transferring or receiving technology are perceived.

The best indication of the unusualness of the firm is that it is in the process of setting up a factory in France. The only remaining barrier is finding the right local person to manage the company.

b. Interest in Technology Transfer Arrangement

The interviewee is very interested in looking into possible technology transfers for two reasons: he is anxious to get into new, more sophisticated fields, and he feels his firm now has something to offer in return. Specifically, he would like to export the epoxy resin for telephone cables. He is flexible about what could be received in return.

When queried about potential problems and preferred mechanisms, the interviewee replied that there were no insurmountable problems of any kind, and that he was completely flexible as to how a transfer arrangement could be structured. The only condition was that there be personal communication between himself and the president of the U.S. firm. He wanted to deal with an individual rather than with a firm.

The respondent would be interested in any technology or product area related to his field of expertise as well as cryogenics (particularly liquid helium or applications of cryogenics in the petrochemical industry) and super-conductors which would be purchased for application locally.

11. Electronics Firm (Mexico)

a. Products and Technology

This is the only large wholly Mexican-owned electronics firm, having been bought out from a MNC by a very powerful financial group from Monterrey.

The main product line is black and white televisions of which the firm is the largest producer in Mexico and, according to the respondent, the most prestigious. The firm has diversified into a large number of other electronic appliances and components but all in a small way. Apparently, the financial backers attach high priority to electronics and push the firm into new projects. There are 40 such projects now under way.

b. Experience with Technology Transfers

The firm is proud of having developed its own technology even though this has involved copying and taking bits and pieces of technology from elsewhere. It is usually possible to take a final product produced abroad and copy its assembly, possibly making a few minor changes to avoid litigation. In fact, by modifying the product to suit local conditions, the company has an advantage over a competitor who purchases technology and must manufacture the product according to foreign specifications.

The company has been able to support an R&D program aimed at experimenting with variations of copied technology to make it best fit the local market. This is another advantage of being associated with the financial group.

Whereas a final product is usually simple to copy, manufacturing the components is considered to require much more know-how. Many of these are imported but usually from various suppliers. The firm resists efforts by suppliers to sell complete packages. It is felt that this would: lead to technological dependence; involve payments for unnecessary technology; put the company in a position of having to pay royalties; and result in an inferior and more expensive product for the local market. The major problem with using diverse suppliers is that they tend to not supply know-how along with components.

The same philosophy holds for the purchase of know-how for the manufacture of components.

The firm has a number of channels for receiving technical know-how and information. Suppliers of hardware also provide software and new applications for their products, particularly when the supplier does not manufacture the finished product. Another mechanism is the rapid diffusion of information in the electronics industry. Third, the firm

works closely with INFOTEC, the Mexican technological information agency. The firm can ask them to identify and evaluate new suppliers of technology and plug into a computerized archive. Furthermore, the agency has set up a technical library in the firm which is getting increasing use. Finally, the technical director actively searches for new opportunities in Japan, Europe and the United States.

Joint ventures and licensing agreements have not been necessary in the company's experience, except for very limited cases as mentioned above. The various technology purchases have been successful because of the negotiating support and leverage provided by the financial group and the information support provided by INFOTEC.

c. Perceived Obstacles

The interviewee stressed that his company perceived a number of potential obstacles but that it was in a position to avoid them. Negotiating strength allowed the company to avoid technological packages and hence dependence. It also insured that the firm was not taken advantage of and that contracts were in its best interest. The power of the group nullified potential legal and bureaucratic problems. Its sophistication and use of INFOTEC guaranteed an adequate flow of information.

The respondent conceded that his company was in a unique position and that the average small or medium Mexican firm faced a number of problems when involved in a technology transfer agreement. First of all, it lacks the capital and financial support which would give it a strong position in an association or which would allow it to cover the costs of looking for appropriate partners. Secondly, it lacks adequate information, although INFOTEC does give it the means to acquire it. Thirdly, the firm's lack of resources means it needs a complete technical package and thus tends to remain dependent. The lack of negotiating experience and strength is a great problem because of the control provided by the need to get contracts approved.

The interviewee did see a problem in the use of small and medium U.S. firms as suppliers of technology. They do not know how to transfer technology. These firms either do not realize that they must provide technical support and not just patents, designs, and machinery, or they lack the resources and time to do so. Furthermore, the U.S. firms often do not understand the need to modify the product to local conditions or to more fully integrate local production due to legal requirements. When the local partners attempt to do so, serious tensions imperil the agreement. This shortcoming on the part of the U.S. firms is not an intentional attempt to take advantage of the Latin American firm, but is rather the result of a lack of experience and knowledge. Hence, they too could benefit from information and technical support.

d. Future Interest in Technology Transfers

The firm is always actively looking for new information and opportunities. First, it wants to anticipate developments in the electronic industry with the help of market and technology forecasts. It would like to develop components for coming technology in order to be able to supply the entire Mexican industry, taking advantage of nationalization policy, and the lack of foresight and innovative ability of other Mexican firms.

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Arthur D Little Inc

12. Automotive Parts Manufacturer (Mexico)

a. Products and Technology

The interviewee is the owner and president of three businesses: a factory for specialty automotive parts, particularly aluminum and "magnesium" type; a machine shop producing specialty tools and parts for industry; and a service station specializing in tune-ups and other work. All have been very profitable. He is also a high official of the National Federation of Chambers of Industry (CONCAMIN).

The interviewee maintains a cynical attitude towards the Mexican economy, doing business in Mexico, and the State Department's interest in stimulating technology transfers. On doing business in Mexico, he believes that the lack of a mass market and the tampering of the government with the economy dictate a need to enter small volume, uncompetitive and distorted markets. High duties are placed, for example, on specialty machine shop items. Because this is an uncompetitive area in Mexico protected by tariffs, a real killing can be made producing only a small volume despite high costs and inefficiencies. Given the instability of government policy, it is essential that a project recoup its investment in a year or two.

Discussion about technology transfers was made very difficult by the interviewee's initial assessment. He wondered why the State Department wanted to get involved and why the United States was so concerned about its image abroad since it did no good anyway. The most effective solution was laissez-faire; to operate strictly on a survival of the fittest principal.

b. Interest in Technology Transfers

Although most of the conversation consisted of the interviewee expounding his philosophy, it became quite evident that, on the practical level, his thoughts might be different. Several times he mentioned that he would appreciate information on U.S. firms interested in technology transfer arrangements. He did set several conditions: First, the U.S. company had to be in an area which would be highly remunerative, i.e., certain automotive parts about to be prohibited for import and specialty machine tooling and parts. Mass consumption, large volume products, and long-term investments should be avoided. Second, he preferred medium to small U.S. firms even though they tended to have negative attitudes towards Latin America. The executives of large corporations were even worse in their attitudes, cared very little about small projects in Latin America, and forced the Latin American manager to deal with the company bureaucracy. The respondent wants to deal with the top on an equal basis. Otherwise, he would be completely flexible as to the mechanism and arrangement adopted.

13. Technology Division, Paints, Chemicals and Other Products (Venezuela)

a. Products and Technology

This is a small, new and very unusual division of a major corporation in Venezuela. The major company is a huge paint manufacturer. The group covers a wide range of other activities in companies of differing sizes.

The division was established to provide the group with needed technology through various mechanisms. One would be its own R&D program. Another mechanism would be to act as a technology broker, helping an affiliate locate an appropriate foreign technology supplier and then to assist in the actual transfer process. Finally, the firm could form joint ventures to develop specified products.

b. Experience with Technology Transfers

Taken as a group, the corporation has had extensive experience with technology transfers. For the most part, it has been licensing arrangements for the use of a trademark, patent, or recipe. The major divisions, being very large companies, have had no difficulty acquiring their technology. They have the necessary money, experience, and influence to negotiate successfully with foreign firms. They also have technical resources so that extended technical assistance or joint ventures are not necessary. Most importantly, they have the resources to develop much of their own technology.

The smaller companies have had more difficulties. They do not have the resources to do much on their own in terms of R&D, searching for and negotiating with technology suppliers, or dealing with other constraints. Because of their small size, few U.S. companies are interested in doing business with them. One small affiliate seeking technology went to the largest and best-known U.S. firm in the business. The U.S. firm did not find it worthwhile to deal with such a small enterprise even when offered 40% of the company's stock. Only as part of the corporation could the small company acquire the technology.

c. Perceived Obstacles

As already noted, the corporation, as a whole, has had no difficulty acquiring technology. However, some problems are anticipated in the long run: internal legislation may become a major impediment; and developed countries are expected to utilize their technological superiority as a bargaining weapon in their efforts to acquire petroleum. Despite the size of the corporation, it is felt that size difference is a problem when dealing with multinationals.

d. Interest in Technology Transfers and Conditions

Three mechanisms for transferring technology were identified: licensing, joint venture, and turn-key. The interest in each depends on the specific case. Joint ventures are useful only when long-term assistance in developing a specific product is needed. Licensing agreements and one-time purchases are called for in all cases where technology is not likely to change much. Turn-key contracts are made only when all the technology for a plant must come from one supplier and where this is likely to be the most efficient and cheapest mode of operation.

No technology transfer arrangements should be made until it is clearly determined that the technology is appropriate, particularly with respect to its technology intensity. Furthermore, any contract must allow for the firm to develop a similar technology or to further refine a technology. Given the high cost of acquiring foreign technology, and the expectation of even higher prices and other constraints, the group would like to develop as much of its own technology as possible.

e. Transfer Program

Technology can be successfully transferred with or without the help of an outside institution. A new type of support program is not necessary. Government and bureaucratic agencies do little good, receive little respect and serious consideration by the business community, and are a waste of time and money. The example of CONICIT, the Venezuelan agency charged with assisting companies in developing or acquiring technology, was cited. A program might only be positive if it was private and sought to sell its brokerage and information services for a finder's fee, commission, or participation in a joint venture.

14. Telecommunications and Electronic Equipment (Venezuela)

a. Products and Technology

This is an unusual company in that it is an exporter of technology and because its president is determined to evolve an ideal model for technology transfers and for joint ventures in developing countries.

The company is in telecommunications and electronics. Management decided to develop on its own rather than through joint ventures. It felt that R&D in the United States was controlled by a small number of multinationals. A small Latin American company in an, as yet, undeveloped market would have nothing to offer when bargaining with a MNC and would end up being very much dominated and taken advantage of. On the other hand, most small U.S. firms would have little to offer technologically and would be burdened by their lack of knowledge of the local situation.

The firm's approach has been to take the fundamental technology which is freely available and supplement it with small amounts of purchased technology. The firm's technical personnel have taken this technological nucleus, adapted it to Venezuelan needs, and are now working on their own more sophisticated products.

The principal product manufactured is a standard private telephone exchange. Most of the components, particularly semi-conductors, are imported and the company assembles, tests, markets, and services the equipment. Electronic equipment has been developed for testing individual electronic cards as well as the entire exchange system. The R&D department is in the final stages of developing a new computer-operated testing device which would do all the testing in one step. It expects to sell the testing equipment abroad. Also being worked on for eventual production is micro-processing equipment. Other products developed and produced include car radios and various electronic gadgets.

b. Experience with Technology Transfers

As noted above, this firm has had no long-term arrangements with U.S. firms. One attempt to form a joint venture with a U.S. firm in Venezuela fell through after six months of negotiations. Software has been purchased but only when it costs less than developing it from scratch, or when development of the technology would, in fact, be "reinventing the wheel". The interviewee feels that it often costs more to purchase technology which is usually overpriced and that must then be adapted for use in local systems.

The interviewee's conception of the electronics and telecommunications fields have led him to believe that a company must have a multinational dimension, sophisticated R&D, and economies of scale in order to survive.

The firm has come up with a creative response to the need for a multinational dimension and economies of scale in R&D. It is trying to develop what might best be called a multinational cooperative. The idea is that each partner contributes to developing a common technology and all results are shared. No one company dominates the venture and all remain autonomous. The resulting "multinational" provides the necessary large-scale resources for R&D as well as a sufficiently large regional market.

The actual situation has been somewhat different from this ideal picture. Besides the Venezuelan firm, there are participating companies in Mexico, Argentina, and Peru and others are in the negotiating process in Brazil, Colombia, and Ecuador. The interviewee went to all these countries to find a suitable participant which was often difficult. He would then invest in the firm and sell them know-how and equipment. The Venezuelan firm would also help modify their processes and equipment to suit local conditions. In return, the other firms agreed to dedicate themselves to R&D and inform the other participants of any results. Furthermore, they pay for any technology and equipment provided and the company gets a share of the profits in return for its investment.

c. Obstacles to Technology Transfers

The interviewee was more interested in talking of the advantage of his scheme than possible problems. However, some did emerge as he discussed his personal experience in getting the cooperative under way. Most important, was the difficulty of finding a suitable partner. Since there were usually no companies in the telecommunications field, he had to find interested entrepreneurs in other fields. Much guesswork was involved when evaluating the potential or ability of an individual or practically non-existent firm. Despite some help from CONICIT, the National Technology Institute, the process was time-consuming and difficult.

Bureaucracy and legal constraints were seen as a major headache although they could be dealt with. It was felt that the amount of time and effort spent on paperwork was absurd and unnecessary. The Andean Pact had eased the situation in those nations.

The problem in dealing with MNC's has already been noted.

d. Transfer Program

The interviewee felt strongly that his concept of a multinational cooperative as a mechanism for transferring technology could be institutionalized even though he conceded that the venture was the result of his personal initiative and enthusiasm. How the concept could be institutionalized was not explained.

The interviewee is interested in going into Private Automatic Exchange Systems. He feels it would take too long to develop the necessary know-how and would like a medium-sized U.S. firm with the technology to join his group. The U.S. firm would invest only its technology in return for a share of the cooperative venture and the local management and marketing expertise needed to enter the Latin American market.

15. Frozen Foods Manufacturer (Venezuela)

a. Products and Technology

This is a pioneer firm in frozen foods and dinners in Venezuela. In the five years of its existence, the company has experimented with a number of different products. As of now, it has not hit on a real winner in this new and very difficult market.

After a number of total failures, two main products were introduced with only limited success: lasagna and beef stew.

The management realized that there were two principal problems. In the first place, the concept of frozen dinners was not yet accepted, and second, the frozen products were being poorly presented in the market place.

Its strategy for overcoming these problems was only partially successful because of the limited market. In order to get the most out of the small market, the firm diversified into new frozen products: Cheese soufflés, strawberries, string beans, and potato puffs. None has been particularly successful. Emphasis is now being placed on institutional customers and exports to Caribbean islands.

Other problems have been experienced as well. The sad state of agriculture makes acquiring raw materials difficult and expensive. Given the cost-price squeeze in agriculture and skyrocketing land values, backward integration would be uneconomical. The lack of quality personnel and low productivity are also blamed on government policies.

b. Technology and Experience with Technology Transfers

Almost all of the company's technology is acquired from the United States since it is the only area where the frozen food industry is well developed and because it is well situated for supplying Venezuela. The firm has a number of mechanisms for acquiring technology. The most basic is available literature. When a new product is being considered, the management writes a number of U.S. companies for advice on what machinery to utilize. Most U.S. companies are willing to provide the information free of charge. The most appropriate machinery is purchased, with the supplier also providing know-how and spare parts. Finally, the company is a member of the U.S. association of frozen foods manufacturers. Besides receiving valuable information on technological trends and innovations, the president regularly attends association meetings.

c. Obstacles to Technology Transfers

The major problem identified was port congestion in Venezuela. It takes so long for goods to be unloaded, processed through customs, and transported up to Caracas that it makes importing machinery, parts, or

materials very expensive and difficult. Dealing with government regulations is a similar problem.

While an information gap does not exist for the firm, it is a constraint for most other firms on both sides. For Venezuelan firms, it is usually a matter of identifying technology suppliers, but in the United States, businessmen tend to know nothing about Venezuela and other Latin American countries. The lack of information and understanding can lead to a failure to communicate and the collapse of negotiations.

d. Interest in Technology Transfers

Management would be interested in a joint venture for the production of frozen orange pulp and juice. Not only is it the only frozen product in great demand in Venezuela, but bright export opportunities in Europe are seen. Although the company would want to retain majority control (and would have to, by law), a joint venture is seen as attractive as a way of insuring that the partner had a vested interest in the success of the venture.

The interviewees are unusual in that they would welcome multinationals in frozen foods to compete with them in the Venezuelan market. The MNC's would have the means for creating a market for frozen foods as well as for developing the infrastructure needed for properly marketing the products.

e. Technonology Transfer Program

The firm's president felt that it would be a mistake to create any kind of new program, bureaucracy, or agency. Too many unsuccessful government programs have already been tried, including Venezuela's CONICIT, a technical information and support organization.

Existing institutions can provide the needed services. The most important need is for publicity campaigns and dissemination of information on both sides. In Venezuela the function could be supplied by FEDECAMARAS (the powerful private business lobby), the American-Venezuelan Chamber of Commerce, and commercial attachés.

A mechanism for improving the quality of technology transfers would be for the World Bank and the Inter-American Development Bank to place more specific conditions on business development loans. At the present time, lump sum loans and credits are made to local development banks to be distributed for the purchase of equipment in any way the local bank sees fit. Instead, general stipulations should be made requiring technical assistance and know-how to be included in any arrangement made using Bank funds.

16. Bakery (Dominican Republic)

a. Products and Technology

Besides being president of the bakery, the interviewee also owns a small gold mining and smelting operation and is a member of the Dominican Monetary Board (the equivalent of the Federal Reserve Board).

The outfit is a large bakery by Dominican standards but small compared to U.S. bakeries. It produces an assortment of breads, rolls and cookies using a semiautomated assembly line. The interviewee thought his firm's technology was comparable to that of small community and specialized bakeries in the United States.

b. Experience with Technology Transfers

The firm has never had either a licensing agreement or a joint venture since they do not seem appropriate. The market involved is too small; the food industry does not require much technology or know-how, particularly a bakery; most U.S. technology would be too capital- and technology-intensive; the dimensions of a venture would be too small for it to be worthwhile to a U.S. firm. The respondent does actively search for new technology by attending trade fairs and conferences and writing for all available literature when looking for new equipment.

The less-automated technology he seeks can only be found by scouring neighborhood bakeries in the United States and the small companies that still produce equipment, or by going to other Latin American countries or Europe.

Since the respondent does not feel his company is suited for a technology transfer arrangement except for the mechanisms he already utilizes, and because he is so aware of the sources of the technology he seeks, the present interview program is not very relevant to his case. However, he did have some general remarks to make on the subject.

There is no question that Dominican businesses are in dire need of technology and know-how. Not only do they need it for the present, but lacking an R&D program, they need a long-lasting transfer arrangement to keep from falling further behind. Small and medium companies also require orientation and advice in selecting and locating appropriate technology.

17. Vegetable Oils, Soaps, Animal Feeds Manufacturer (Dominican Republic)

a. Products and Technology

Originally a soap manufacturer, the firm has expanded into a significant and sophisticated enterprise including detergents, animal feeds and vegetable oils concerns. They are presently establishing a new detergent plant and are looking into the possibility of a joint venture in food products.

b. Experience with Technology Transfers

The company has experienced no difficulty securing all the technology they need through various mechanisms. Their suppliers of raw materials and equipment provide advice on applications, processes, and procedure. In the case of the detergent plant being built, the supplier of raw materials is providing extensive technical support including a permanent on-site technician. The firm is also a member of the U.S. Oil Chemists Association and the Soap Manufacturers Association. Representatives are sent to conferences and conventions, and all appropriate literature is carefully examined. The Soybean Council has provided extensive technical support. Finally, the company regularly sends its personnel abroad either to universities or to work in U.S. plants.

The company prefers to purchase technology outright rather than acquire it through licenses and royalty payments. Consultants are hired to provide any needed technical support or know-how.

They are also interested in joint ventures as a means of diversifying. A bid to become the local partner of a U.S. firm was lost at the last minute to another firm, apparently because of a lack of a well-defined policy regarding contracts. The firm is very interested in trying again for joint ventures. Given the limited markets in the Dominican Republic, a company must diversify and/or export in order to grow and a joint venture is expected to help accomplish this. A joint venture in processed foods using domestic raw materials with export potential and substantial local demand would be preferred.

c. Technology Transfers for Small- and Medium-Sized Firms

While the firm has had no problems acquiring technology, the interviewee indicated that there was a serious problem at the national level. Small and medium companies, which constitute the majority in the Dominican Republic, clearly suffer from a lack of technology, an inability to acquire it, and from unsatisfactory results when they do engage in technology transfers. The small companies lack information on sources of technology and the ability to properly analyze alternatives. When technology is purchased, these firms do not have

the technical support or know-how to properly implement it. Usually when a small firm does purchase technology, too much is paid for the little received, a problem that is particularly acute when no support accompanies the purchase of equipment or patents. Small and medium companies in the Dominican Republic could very much use a program which would either refer them to appropriate consulting and technical services or which could perform these functions itself.

Technology transfers involving small- and medium-sized Dominican Republic firms now do not usually result well for U.S. firms either. United States companies look for a substantial payment and returns for their technology but these rarely materialize. The ventures involved are simply too small. The solution to the problem for both sides would be for the U.S. firm to reinvest most of the profits and royalties back into the venture. This way, the U.S. firms would have a vested interest in the success and expansion of the venture and, if successful, would get more out of it as well. Hence, both sides would benefit from this type of a joint venture.

C. FOLLOW-UP INTERVIEWS WITH U.S. FIRMS

1. Home Entertainment Electronics Firm

When first interviewed this firm was quite negative in its assessment of the possibility of a Latin American venture. Not only did they believe that much of their technology was not transferable and had limited markets but also that they could not afford to make the necessary effort.

In the follow-up interview, a Mexican electronics firm was described. The interviewee was immediately interested in the company and saw definite possibilities for future ventures. He asked for more information on the firm. If it confirms his firm's interest, they would establish contact with the Mexicans to explore what type of cooperative venture could be set up.

During the follow-up, none of the firm's first-round fears were mentioned. The respondent indicated that the greatest problem was identifying a market opportunity and a suitable partner. Once overcome, the firm could proceed with negotiations and possibly a venture.

2. Dehydrated Egg and Meat Producer

This respondent had never really considered a venture in Latin America because he assumed there were no adequate markets, stable supplies of raw materials, or suitable partners.

A number of large integrated poultry operations were identified in Brazil (although these were not interviewed) which indicated the existence of both adequate supplies of raw materials and suitable partners. Furthermore, the interviewee thought that there might be a market for his products in Brazil. If this could be determined, the firm would be very much interested in a venture in Brazil and would establish contact with the identified partners.

3. Specialty Chemicals Firm

In the first interview, the respondent manifested skepticism about the existence of markets which would justify local manufacturing of his firm's product. He was also concerned about finding a suitable partner and particularly one with technology to offer in return.

A Mexican specialty chemicals firm was interviewed and found to have a similar product line. Furthermore, its products were of high quality and the firm had developed its own technology. The Mexican firm was willing to trade its technology for technologies in new product areas as well as to set up a joint venture.

The U.S. respondent found the Mexican company interesting and indicated his firm would follow up the opportunity since it met his firm's

criteria. He indicated that he was not in a position to assess the opportunity himself since it was not in his area of expertise but he would bring it to the attention of the corresponding division in his firm.

4. Irrigation System Equipment Manufacturer

The policy established by this firm in the first round of interviews was that, based on experience in the firm, licensees were more trouble than they were worth. Joint ventures were not particularly favored either. Instead, technical support and consulting contracts were seen as an attractive way of transferring technology.

A Mexican firm producing locks, auto parts, and hand-held sprayers, and seeking to diversify was interviewed and identified in a follow-up interview with this U.S. firm.

The U.S. interviewee indicated that his firm would contact the Mexicans, even though the latter's product line was not totally compatible with his own. Furthermore, he indicated a willingness to consider a venture despite the pre-existing negative experience in licensing and doubts about joint ventures.

The firm would not give this opportunity high priority, however, because of persistent concerns about Mexico's regulations. However, it is not happy with its current licensee there and is interested in a replacement. The major new condition, now seen for the first time in light of the newly-identified potential Mexican partner/licensee, would be export potential--which would create the volume needed to make a venture profitable.

5. Electronic Supervisory Systems Manufacturer

A Brazilian electronics firm was interested in acquiring technical information in this area and sought help in identifying potential suppliers. A brief search for S/MSF's turned up only this U.S. firm (which had previously been interviewed in the first round of U.S. interviews in this study).

The contact at the firm indicated that they are interested in a venture in both Mexico and Brazil. Their interest is due to a desire to retain these markets, given protective tariffs and competitors setting up local operations. Their only problems in getting a venture underway have been identifying suitable partners and successfully negotiating a contract. They have themselves found a possibility in Brazil and are currently negotiating with them.

The respondent was interested in the Brazilian firm described above and him. He would be interested in more information on the firm in order to establish immediate contact. The thinking is that it would be worthwhile to look into two opportunities in order to be more assured of a successful outcome.

6. Naval Stores and Organic Chemicals Producer

The firm, not interviewed in the first U.S. round, was identified in response to the specific interest of a Brazilian firm in a joint venture to manufacture pine resins and related products. The U.S. company is a small subsidiary of a corporation which exceeds the size limit for this study. The firm was interviewed anyway because there are apparently no independent small companies in this industry.

The respondent was interested in the possibility of a joint venture with the Brazilians, even though the firm had never actively pursued a Latin American venture before. Important markets are anticipated in Brazil as well as in the United States. Most importantly, Brazil would have the raw materials which are scarce in the United States. The firm would be interested in initiating a contact immediately.

7. Frozen Dinners Producer

After a Venezuelan firm in the frozen food business had been interviewed, this U.S. company was identified and approached in the follow-up U.S. interview program. It is not presently involved in Latin America but would consider a business venture with the Venezuelan firm. The major concern is what the potential benefits might be in a venture. A joint venture is preferred but other mechanisms would be acceptable as long as they were profitable.

8 and 9. Frozen Orange Juice Processors

These two enterprises were selected as possible counterparts for the Venezuelan firm which is particularly interested in expanding into frozen orange juice. The reaction of both interviewees is identical and represents the only two strongly negative responses in the follow-up interviews.

Both argued that they would have nothing to do with technology transfers which would develop competition for their exports in foreign markets. They believe that U.S. companies should focus their technology and efforts on the domestic economy, generating employment and utilizing local raw materials. Only finished products should be exported.

10. Telecommunications Equipment

This firm, interviewed only in the follow-up U.S. round, manufactures a private automatic exchange system similar to that which interests a Venezuelan company. The U.S. company has never considered the Latin American market for no reason except that other areas (particularly Europe and the Middle East) appeared more accessible. It was limited in the number of regions which it could consider because of a manpower shortage.

The interviewee indicated that his firm would be very interested in looking into the possibility of a Latin American venture, particularly with the identification of a specific firm and the information about it that he received in this interview.

The main condition is that the venture have access to LAFTA and other regional markets. Of special interest is whether they would have preferential tariff treatment in Brazil and Mexico when based in Venezuela, as compared to importing from the United States. Another concern would be whether government regulations regarding foreign investments in the telecommunications sector would permit them to enter the local market. They are very eager to receive as much information as possible, but lack the resources for extensive studies of their own. The firm would enter into immediate contact with the Venezuelans if the information proves to be positive.

APPENDIX III

SUMMARY OF POLICY AND REGULATION AFFECTING TECHNOLOGY

TRANSFERS AND RELATED FOREIGN INVESTMENT:

BRAZIL, DOMINICAN REPUBLIC, MEXICO AND VENEZUELA

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A. BRAZIL

Among the four countries considered in this study, Brazil has placed the greatest emphasis on technology, its role in development, and the need for a strong technological base. Its basic policy regarding technology was put forth in the Second Basic Plan for Scientific and Technological Development which provides guidelines and means for developing indigenous technology as well as for acquiring it from foreign sources.

The Brazilian Government carefully regulates technology transfers for several stated reasons: (1) ready-made technological packages are not in the best interest of Brazil since they create a technological dependence; (2) steps must be taken to insure that the technology is effectively transferred; and (3) technology imports are thought to be one of the major components of the balance-of-payments deficits.

The regulatory policy seeks to insure that:

- A reasonable price is paid for technology;
- The quality of the technology is guaranteed;
- The technology is appropriate for Brazil;
- Imported technology is compatible with technology already in Brazil;
- Proper dissemination and application of the technology is provided for; and
- Efforts to end technological dependence are not hindered.

Two vehicles for implementing policy have been established: regulatory agencies; and providing firms with the resources to properly select, adapt, and utilize foreign technology. Only the former has a major impact on the flow of technology at this stage.

The National Industrial Property Institute (INPI) has been entrusted with the role of registering patents and trademarks and approving licensing and technical assistance agreements. In order to be approved, a licensing or technical assistance contract must comply with government priorities, the technology must be of proven quality and unattainable in Brazil; and import substitution must be promoted. INPI will not approve a technology "package". INPI also insists that no restrictions be placed on the use of the technology with respect to volume, price, marketing, publicity and exports of the final product. The Brazilian firm must be able to modify the technology and then be the proprietor of the improvements. The foreign contractor cannot stipulate the source of raw materials and components.

Royalties and fees depend on the degree of quality, innovation and complexity of the technology, subsequent supply of information, the reputation of the supplier, and the sector involved. Remunerations are calculated as a percentage of total sales and are limited to 3-5%. The total value must be estimated in the contract.

INPI has been criticized for inefficient processing of applications and long delays, particularly in cases not considered high priority by the government. The staff appears to be overworked, underpaid and often poorly trained. Many U. S. companies feel INPI's regulations are too harsh to warrant seeking a licensing agreement or patent permit.

The Council for Industrial Development is a high-level committee that also plays a large part in regulating technology transfers. Its function is to determine the eligibility of new investment proposals for a broad range of fiscal incentives. It is interested in the priority and viability of the proposal, the investor's capacity to carry it out, and the suitability of the technology for regional or sectoral development. CDI works closely with INPI in evaluating technology. The fiscal incentives are so important that CDI has, in effect, the power to control almost all domestic and foreign investment. Because of the energy crisis, inflation, and the balance-of-payments, the Council has been strict in granting incentives and drives a hard bargain.

Sectoral priority is given in the following order: capital goods, basic metals, chemicals, metallic products, non-metallic products, automotive industries, consumer goods (food, furniture, printing), and consumer goods (clothing and shoes).

The criteria used by CDI include:

- Will the investment produce import substitutes?
- Will it contribute to exports?
- Will decentralization be promoted?
- Is the debt-equity ratio adequately balanced?
- Will it increase the use of local inputs?

The Department of Supervision and Registration of Foreign Capital (FIRCE) works in cooperation with INPI to regulate payments for royalties, licenses, and technical assistance. The Bank of Brazil, through its Foreign Commerce Board, helps regulate technology transfers by controlling all export/import transactions.

B. DOMINICAN REPUBLIC

Dominican policy regarding technology transfers and foreign investments is now in a state of flux. A comprehensive regulatory package is

being prepared and is expected to become law in the near future. It is thought that the proposed law will require that all foreign investment be approved and registered. Priority areas which will benefit from incentives are those with export potential or import-substituting industries. Foreign investment will not be allowed in industries already developed. Mixed companies are encouraged.

Technology transfer agreements would also have to be approved and payments regulated. At the present time, the only control is the Central Bank's ability to withhold foreign exchange.

C. MEXICO

In the last eight years, the Mexican Government has emphasized the need to control the transfer, adaptation, and utilization of technology. Like Brazil, it seeks both to develop a national technology capability and improve the terms of technology transfers. The latter is accomplished by screening technology transfer contracts for restrictive and disadvantageous clauses, by trying to reorient demand towards more appropriate technologies, and improving the bargaining position of the Mexican firm. The screening process is handled by the National Registry for the Transfer of Technology and the Foreign Investment Registry. The National Council for Science and Technology (CONACYT) is charged with the overall formulation and implementation of scientific and technological policy. A partially autonomous division, INFOTEC, provides firms with technological information and extension services.

The principal law relating to technology transfers is the Law Governing the Registry for the Transfer of Technology and the Use and Exploitation of Patents and Trademarks. Under its stipulations a contract will not be approved if:

- The technology is available in Mexico;
- The price bears no relation to the technology, or if it presents too great a burden for the national economy;
- There is a clause permitting the supplier to intervene in the administration of the purchases;
- The purchaser must turn improvements over to the supplier or if there are limits on R&D by the former;
- All purchases of tools, raw materials, and equipment must be made from the one supplier;
- There are any stipulations or limits on exports, use of complementary technology, volume, or price;
- The finished good must be sold to the supplier:

- Personnel indicated by the supplier must be used;
- There is an agreement concerning exclusive sale or representation in Mexico;
- The term of the contract exceeds ten years; and
- Disputes are to be submitted to international tribunals.

These regulations were amplified by a 1976 law designed to reform the national industrial property system, entitled the Law Governing Patents, Trademarks and Trade Names. It reduces the term of enforcement of patents from 15 to 10 years, eliminates patentability in some areas, and clarifies the use of trademarks.

Foreign investment is regulated by the 1974 Law to Promote and Regulate Foreign Investment. The law allows foreigners to be minority partners only and reserves some sectors exclusively for the state or for Mexican investors. Petroleum, basic petrochemicals, electricity, railway, and telegraph are reserved for the Government, while radio, television, transportation, forestry, and gas distribution are exclusively for Mexicans. In other industries, foreigners are usually allowed a 49% participation but may never control management.

Overall, the implementation of regulatory policies appears to have been more flexible and pragmatic than in Brazil.

D. VENEZUELA

Venezuelan policy regarding technology transfers and foreign investment is determined by Decision 24 of the Andean Common Market. Degrees 62 and 63 in 1974, Venezuela adopted a very strict interpretation, but this has been toned down somewhat since, with Degrees 2033 and 2442. The Superintendency of Foreign Investment (SIEI) was established to implement the regulations.

Regulation 63 authorizes SIEI to approve investments that are consistent with the country's development goals. The government is interested in projects that incorporate needed technology, manufacture products for use (or will use within a reasonable period) local value added of at least 30%, generate significant employment, or those that locate in economically depressed regions.

New companies must have 51% local ownership and this must be achieved within 15 years. While it was prohibited for foreign investors to have even minority ownership of a wholly national company, this has been amended to allow foreigners a 20% share. New foreign investment is forbidden in the financial sector. Other areas off limits to foreign investors are communications, professional services (such as consulting) and most basic resource industries (except in mixed ventures with the state).

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All contracts for "intangible technology" (trademarks, patents, knowhow, technical services, etc.) must be approved by SIEX. A contract will not be approved if it contains clauses:

- Requiring the licensee to acquire new materials and equipment from the licensor or the use of specified personnel;
- Granting licensor the right to fix prices;
- Establishing limits on volume and exports;
- Prohibiting the use of competitive technology;
- Establishing an option to purchase in favor of the licensor;
- Obligating licensee to turn over any improvements;
- Requiring payment for technology not used;
- Prohibiting use of technology and trademarks after the expiration of the contract;
- Imposing a specified system of quality control if SIEX disapproves;
- Submitting controversies to non-Venezuelan tribunals; and
- That appear too restrictive to SIEX.

The contracts are not to have a term of more than five years. Of crucial importance is that SIEX sees the agreements as a sale of technology with installments paid over five years rather than as a license. Hence, it is felt that the licensee owns the technology when the contract expires. Another important consideration is that the supplier must guarantee patents and technology.

Remittance of profits is limited to 14% (to go to 20% soon) of registered foreign investment, but there are no restrictions on repatriation of capital. Royalties for technical agreements can be claimed only if broken down into component parts of patents, trademarks, etc. A rate of 5% of net sales is considered a normal royalty. Royalties are prohibited between a subsidiary and the parent company. The return on foreign investment in Venezuela averages about 15%.

In order to get a contract approved, a 12-page form must be filled out by the local firm. The staff is very small so few forms are reviewed every month. The most restrictive element is that failure to act within 60 days, which is the norm, is equivalent to rejection.

APPENDIX IV

AGENDA
of
UN CONFERENCE ON SCIENCE AND TECHNOLOGY
FOR DEVELOPMENT (UNCSTD)*

1. Science and technology for development:
 - (a) The choice and transfer of technology for development;
 - (b) Elimination of obstacles to the better utilization of knowledge and capabilities in science and technology for the development of all countries, particularly for their use in developing countries;
 - (c) Methods of integrating science and technology in economical and social development;
 - (d) New science and technology for overcoming obstacles to development.
2. Institutional arrangements and new forms of international cooperation in the application of science and technology:
 - (a) The building up and expansion of institutional systems in developing countries for science and technology;
 - (b) Research and development in the industrialized countries in regard to problems of importance to developing countries;
 - (c) Mechanisms for the exchange of scientific and technological information and experience significant to development;
 - (d) The strengthening of international cooperation among all countries and the design of concrete new forms of international cooperation in the fields of science and technology for development;
 - (e) The promotion of cooperation among developing countries and the role of developed countries in such cooperation.
3. Utilization of the existing United Nations system and other international organizations to implement the objectives set out above in a coordinated and integrated manner.
4. Science and technology and the future:

Debate on the basis of the report of a panel of experts to be convened on this subject.

* Proposed by Economic and Social Council and approved by UN General Assembly on December 21, 1976.

APPENDIX V

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