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**THE TECHNOLOGY GATEWAY ORGANIZATION:
A MECHANISM FOR THE PROMOTION OF
TECHNOLOGICAL DEVELOPMENT AND INDUSTRIAL
COMPETITIVENESS FOR DEVELOPING COUNTRIES**

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I. INTRODUCTION

The global technological and business environment is undergoing drastic changes that have serious implications for developing countries. Rapid advances in technology are changing the patterns of manufacturing and competition. New sources of technological development are emerging and the world is shifting towards a technological "multipolarity." Manufacturing is becoming more internationalized, and newly industrialized nations are adopting complex sourcing, production, marketing and R&D strategies to optimize their competitive positions in the global marketplace.

The nature of competition has shifted from a predominant dependence on "comparative" advantage in terms of labor and raw materials to a stronger focus on "competitive" advantage defined in terms of productivity, value added and technology. The emerging technological "marketplace," characterized by increasing transactions in technology (licenses, joint-ventures, etc.) and the growth of technology "brokering" activities (technology fairs, technology matchmakers, technology sourcing specialists, etc.) is opening up new opportunities for developing country firms seeking to acquire or upgrade technologies.

There are changes as well in the shift of market demand towards more specialized and focused market needs, and a greater emphasis on flexibility and responsiveness to market signals. In addition, markets are both opening up as a result of liberalization processes in developing countries, and tightening as a result of

"regional" groupings and increased competition in international markets.¹

Furthermore, there is an increasing emphasis on the importance of "soft" technologies to manufacturing productivity. Firms around the world are beginning to appreciate the value of applying the concepts of total quality management (TQM), just in time (JIT), concurrent engineering etc. for their overall performance. By and large, these new management techniques² are scale independent and relatively easy to master and as such are a potential source of productivity gains for LDC firms.

All these changes are encapsulated within what is referred to as the new "techno-economic" paradigm (Perez 1989). This paradigm is seen as replacing the "fordist" model, based on large scale manufacturing and economies of scale, with one based on economies of scope, flexible manufacturing, greater customer responsiveness, closer supplier relations, and greater attention to quality.

¹ For detailed discussions of these major trends in the global economy, see Ernst & O'Connor (1989) and Perez (1989).

² See Hoffman (1989) for a review of these new techniques and their implications for developing country firms. In contrast to the traditional focus on "hard" technology, Hoffman argues that in many cases, LDC firms can benefit significantly, and more cost effectively, by the proper adoption of some of these new practices. There is scattered evidence now available that LDC firms can indeed benefit from the adoption of these practices.

II. IMPLICATIONS FOR DEVELOPING COUNTRIES

For developing countries, the implications of these changes are complex and serious. To compete, they must undertake a series of steps:

- 1) They will have to improve the process of technological development in their industries so as to make them more productive and competitive. This is particularly true for countries that have undertaken policies to liberalize their economies and privatize public sector corporations. In order to survive and succeed in the more open and hence more competitive environment being created, local firms need to upgrade their technological capabilities through internal technology development, improved sourcing of foreign technologies, adaptation, joint-ventures, and other means.
- 2) Developing countries must develop their international business strategies and increase their participation in global markets on the basis of their competitive advantages. This requires more systematic and sophisticated marketing, market "intelligence" and market access. Their firms need to be able to define "niches" and windows of opportunity, enter into cooperative arrangements with firms in other countries, and deliver quality goods or services on time and at the right price.

- 3) Firms in developing countries must improve the quality of their manufacturing processes and their products to be competitive. Inefficient modes of operation that were affordable under more protective environments need to be rectified. New management techniques and other measures are needed to improve productivity.
- 4) Developing country governments must adopt innovative policies and institutional mechanisms to create conditions which foster productivity and make firms more competitive.

Clearly, these are not easy tasks. Even though there is a proliferation of new product and process technologies, it is difficult to keep abreast of relevant developments and sources. As technology becomes more complex, it is difficult to assess the relative merits of each without some basic resident expertise. Gaining access to sources, and to the resources needed to adapt and modify these technologies to local conditions is also a problem. Furthermore, negotiating technology licenses is a complex process requiring legal, marketing and technical expertise often not easily available to LDC firms.

Similarly, developing a more sophisticated approach to marketing requires networks, contacts, various forms of expertise and resources that such firms typically do not have or cannot afford. It is costly to conduct market studies, to make frequent marketing trips overseas, and to find foreign distributors and collaborators.

Furthermore, local technological capabilities and resources are often inadequate to meet industry needs. Even where large local R&D systems have been established, these are typically not in tune with the needs of industry and lack a "demand driven" approach. The value of these R&D capabilities to local firms is questionable.

In other areas, such as quality control and management, local capabilities are generally weak, if not altogether absent. The culture and infrastructure of support service organizations and consulting firms in these "soft" areas, which are taken for granted in the U.S., rarely exist in developing countries. Where they do exist, they are generally priced out of the range of most small and mid-sized firms. This situation is compounded by a general lack of experience with, and subsequent distrust of, consultants.

Clearly, there is a gap between the needs of firms in developing countries with respect to their technological capabilities and business development efforts, and the institutional and infrastructural context in which they exist. Their institutions were often set up to meet other priorities, or are based on a different view of the role of science and technology in economic development. They tend to be bureaucratic, non-market-driven and not responsive to industry because they are normally subsidized by the state. Similarly, the protectionist policies that many countries pursued in the past have insulated local firms from the competitive pressures that would have generated technological innovation, increased productivity, more

sophisticated marketing, and more aggressive movement into international business.

III. THE TECHNOLOGY GATEWAY

In response to this emerging need, the concept of a "technology gateway" mechanism is proposed.³ In its simplest sense, a "gateway" is a mechanism that fills the need for effective technology development and related services to local firms, based upon their needs, with the objective of enhancing their productivity and market performance. The gateway concept is described in general terms here. The specific form in which it is articulated will depend on the country context.

The gateway mechanism may be one or several organizations that are able to provide a set of services to local industry:

A. Services of the Gateway

1. Technology Sourcing & Intelligence

Assistance to firms with respect to monitoring technological trends on a global basis for competitive or opportunistic purposes; identifying and assessing

³ The concept of a "gateway" was first proposed by a consultant to the USAID mission in Tunisia. Subsequently, the mission has undertaken a project to support technology gateway organizations in Tunisia, at the initiative of Mr. Peter Delp, Science and Technology Officer at the mission. The author was a consultant on this project and many of the ideas discussed in this paper are based on that experience. The purpose of this paper is to attempt to generalize the relevance of this concept to other LDCs.

potential sources of technologies; helping them select and acquire specific technologies; and, providing assistance in the technology transfer process, including adaptation, set-up and troubleshooting or "debugging."

2. Technology Adaptation & Development

The design and development of special equipment, systems, or processes to meet the specific technical needs of an individual firm, including testing, calibration and adaptation of existing equipment.

3. Technology Management Services

Diagnostic services, technology needs audits, technology strategy formulation, technology assets planning and training in the management of technology.

4. Productivity Enhancement and Quality Control

Services aimed at improving the overall productivity of the firm through such techniques as JIT, TQM, Quality Audits, etc.

5. Market Intelligence and Access

A range of services to help firms market more effectively domestically and abroad, including market studies, market monitoring, assistance in gaining access to markets and to partners, assistance in developing a marketing strategy and plan, training in marketing, etc.

6. Technology Information Services

These would encompass a range of promotional and information dissemination efforts, including "digests"

of recent developments in specific areas of technology, organization of technology "fairs," technology "missions" overseas to meet with potential partner firms and study new developments in technology in various countries, and technology "alerts" which highlight specific new technological opportunities in different sectors. These activities would necessarily be sector specific.

7. Policy Level Activities

In addition to firm level efforts, the gateway mechanism could also contribute to the policy analysis and formulation process by carrying out policy studies and organizing policy workshops on subjects it recognizes as important.

These services can be categorized into whether they are single or multi-client, sector specific or industry wide. The needs form a basis for identifying the types of organizations that could successfully fulfill a gateway role.

These services are depicted in Figure 1.

Figure 1

MATRIX OF GATEWAY SERVICES

	GENERAL	SECTOR SPECIFIC
MULTI- CLIENT	Policy studies	Technology Information Services
	Policy workshops	- Digests - Missions - Fairs - Alerts
SINGLE CLIENT	Technology management and strategy (diagnostics management, audits)	Problem Solving- firm specific diagnostic services
	Technology sourcing and intelligence	Technology adaptation and development
	Market intelligence and access	
	Production, enhancement and quality control	

Clearly, it will be difficult to find any one organization that can perform all these functions. However, different parts of the matrix of services shown in Figure 1 could be performed by different organizations. For example, sector specific services could be carried out by a management consulting firm, market intelligence and access could be provided by a marketing firm, policy studies could be undertaken by a university, etc.

Furthermore, the country context will be important in determining the specific organizational forms that the gateway takes. The important elements of this context include the local physical and technical infrastructure, level of involvement of the state in industrial development, the quality and strength of private organizations (especially consulting firms), the size of the economy, and most important, the extent to which the environment supports business development⁴. Thus in large countries such as Brazil and India, a number of sector specific, and perhaps region specific gateways may be needed. In smaller economies, a single organization may be adequate.

⁴ The importance of the country context in designing trade and investment programs for developing countries is described in some depth by Harvey Wallender and Clifton Barton, "Characteristics of Trade and Investment Programs", mimeo, IMCC, Washington D.C. 1990. Many of their arguments apply to the gateway concept as well. Just as they argue that in unfavorable contexts, trade and investment programs will not work, regardless of the funding provided, gateway mechanisms will also depend for their success on the general supportiveness of the environment.

B. Desired Characteristics of Gateway Organizations

Based upon the range of services that a gateway mechanism should provide, and the objectives of this approach to technology development, i.e., productivity enhancement at the enterprise level, export orientation, etc., it is possible to describe the desired characteristics of organizations that could fulfill gateway roles.

First, the track record and reputation of the organization, with respect to technological achievements, financial success and legitimacy within the business community, would be an essential criterion. The nature of the gateway function is such that it would be critical that the provider be perceived as a stable and reputable entity which has the appropriate experience in technology adaptation and development and a good standing within the business community. A "newcomer" organization would have to develop such trust and confidence before it could be an effective and acceptable provider of services.

The demonstrated and visible technological competence of the organization is a second important requirement. Proven in-house expertise in the relevant technological fields, resident skills and equipment, access to external expertise when needed, and access to international centers of excellence in technology are all desirable traits. In addition, an ability to diagnose technological problems, assess technologies in business terms and the wherewithal for the commercialization of technology are also important.

A private sector and demand driven approach is of critical importance. The gateway function will be best served by an organization already dependent on revenues and fees from client firms and is successful in this regard. Public sector organizations typically are not as responsive to market demands, though there may be some exceptions. An ideal organization would, however, be one with a strong market and customer focus. This would ensure that the services provided are in response to real, rather than perceived, needs of firms. Also needed is good access to private firms.

Another important requirement for a gateway organization is a global orientation with respect to markets and technology. This includes having good international networks with sources of information and expertise in relevant technological areas. It must have linkages with important organizations in different markets, including government agencies and private firms, management with a "global" outlook and international experience, and a recognized reputation in international technology and business circles. The importance of having good world class researchers on the staff is a given.

Finally, the structure of the organization needs to be flexible and responsive if it is to be able to effectively deliver good services. A minimal bureaucracy and the ability to respond quickly to market demands is of vital importance. Relatively flat, decentralized structures with open communications flows tend to be best suited to this purpose.

These "criteria" can be used as a basis not only for the identification of gateways, but for their redesign as well. Additional desired traits such as quality management, and the ability to undertake policy level analyses are also important.

Admittedly, it would be difficult to find an organization that meets all these requirements, but they do serve as a template or frame of reference for the assessment of potential candidates.

IV. ASSESSING THE DEMAND

Though on a conceptual level, the idea of a gateway may seem worthwhile, there is a need to assess the potential demand for its services in a specific country. This demand will be influenced by a number of factors, for example:

- level of protectionism in the economy,
- technological sophistication of firms,
- cost of the services,
- sector-specific considerations,
- level of domestic competition,
- export orientation of sector/country,
- prior experience with technology development organizations,
- availability of managerial & technical skills.

The most effective method for assessing such demand is through a survey of firms in different sectors. Figure 2 provides a checklist of typical questions that must be answered. This survey,

in combination with more general firm level data (Figure 3) will provide an adequate understanding of both the level and nature of demand for gateway services.

Figure 2

DEMAND ASSESSMENT QUESTIONNAIRE

1. What are your major technological needs at present?
 - equipment
 - spare parts
 - technology (know-how)
 - skills
 - service and maintenance
 - other
2. What business goals will this technology satisfy?
 - new products
 - improved quality
 - exports
 - reduced costs
 - larger volumes
 - customer relations
 - new markets
3. What are your major market-related needs?
 - better information about markets
 - improved access to markets
 - better marketing channels and distribution
 - improved product quality
 - reduced costs
4. How do you normally identify the sources for technology?
 - personal contacts
 - literature
 - trade shows
 - research institutes
 - universities
 - consultants
 - sales calls by equipment manufacturer
5. What factors do you consider in selecting a specific technology?
 - cost
 - after sales service
 - reputation of supplier
 - quality of equipment
 - compatibility with existing equipment
 - ease of use
 - level of training needed
 - cost of spare parts and maintenance

6. How do you normally identify new product opportunities or new market opportunities?

- informal assessment
- market studies
- competitor actions
- customer feedback
- other

7. Which needs do you feel can be satisfied by a gateway organization, as described, most effectively?

- assist in sourcing technology
- market intelligence and access
- assist in improving existing equipment
- quality control and management
- market plan development
- developing customized equipment
- trouble shooting
- assisting in making overseas contacts

Would you be willing to share in the costs of these services?

8. What are the most important attributes of the gateway, from your perspective?

- track record and reputation
- technology credentials and resources
- quality of staff and management
- accessible by your firm on a regular basis
- financial independence
- other

9. Please give two or three examples of specific projects that you have a need for and that you believe could be carried out by a gateway.

Figure 3

SURVEY OF FIRMS

1. CORPORATE PROFILE

- Ownership
- Employees
- Sales (Annual)
- Products (Range of Products)

2. MARKET POSITION

- Market share
- Major competitors
- Distribution networks/channels
- % of sales for exports

3. TECHNOLOGY

- Type of equipment
- Age of equipment
- Source of equipment

4. PRODUCTION

- Throughput (volume per hour or day of product)
- Number of shifts
- Raw materials
- Percentage waste/scrap
- Down time of equipment

5. QUALITY

- Product image among consumers
- Number of defective parts produced
- Average inventory
- Equipment failure frequency
- Quality of raw materials and other inputs
- Number of customer returns

6. HUMAN RESOURCES

- Management/employee ratio
- Skills profile

7. POTENTIAL DEMAND FOR GATEWAY SERVICES

- Use of technical consultants
- Use of marketing consultants
- Use of management consultants
(see questionnaire)

V. PRIVATE CONSULTING FIRMS AS GATEWAYS

There are a number of organizations that could serve as gateways. These include:

- Governmental organizations
- Private local firms which specialize in engineering or management consultancy, or individual consultants
- Parastatals and not for profit organizations, university based units, manufacturers associations, associations of exporters etc.
- Foreign private organizations with operations in the country, e.g. banks, big six consulting firms, trading companies

Based on the criteria for selection of gateways, one grouping that would appear to be suitable are private consulting organizations. The major problem here is that in developing countries generally do not have the capabilities to provide many of the services described. Local firms tend not to be used to working with consultants, the fee structures tend to be high and the consulting firms themselves do not give much emphasis to the possibilities of developing country markets.

In effect, the expressed demand for such services may be moderate at best in many LDCs. This is only to be expected. Most firms in LDCs are unaware of how far they are from "best practice" norms in advanced countries with regard to their technology, manufacturing processes, quality control and management. Plants are out of date or poorly organized, and inadequate attention is given

to customer needs and satisfaction, quality assurance etc. As Keesing and Singer⁵ note, this is true in many developing countries. This gap, however, represents an opportunity, but the ability to exploit this opportunity requires specialized skills that are normally and most effectively provided by specialized consulting firms. In an example from India, they describe an engineering firm that was informed by a foreign consultant that he could guarantee within a year, **a 50% increase in output from existing plant and equipment with no new investment.**

"In another enterprise with insufficient output to meet domestic demand and with only limited exports, a consultant zeroed in on the 20-25% rejection rate in the foundry which served as the first stage in the production process. With the consultant's help, the rate was reduced to 5-6%. This resulted in a large savings in materials, and translated to a 20% increase in final output, leading to a drastic reduction in the unit costs of production, making exports more competitive. Now the firm is meeting all its domestic demand and exporting half its output, compared to 3% two years earlier.⁶ Keesing and Singer conclude that **"when a developing country has been cut off for years from international 'best practice', the returns from outside consultancy assistance will be dramatic."**

(p. 10)

⁵ Donald Keesing and Andrew Singer, "How to Provide High Impact Assistance to Manufactured Exports from Developing Countries", World Bank, mimeo, 1989

⁶ Keesing and Singer, p. 10. These examples are based upon World bank experiences with the Productivity Fund and Export Marketing Fund, which were set up in India in 1986 under a World Bank export development loan. The cost to the productivity fund of the consultant for the foundry was less than \$25,000.

The dilemma is that while such results are possible, they are not clearly apparent to the average LDC firm. This is what translates into a poor apparent demand for consulting services. One way around this situation is to stimulate the availability of these services by providing support for business development to local consulting firms, so that they can become effective providers of productivity enhancing services. The demonstration effect on other firms as their first clients realize dramatic benefits will then change the demand picture. In this regard, Keesing and Singer, again drawing on World Bank experiences in several countries, conclude that the major problem lies in the difficulties in developing this "supply" of services. Since there is no apparent demand, local firms do not enter into this market or invest in developing such capacities, and foreign firms are similarly uninterested. They stay with the more traditional consulting practice areas - cost accounting, audit, tax etc. As such, local firms tend to rely on their buyers and customers for advice regarding technology, markets etc. However, most buyers shun suppliers that need too much assistance and training. While this learning from customers and buyers has some value, in the long run, it has a tendency to "lock in" the supplier to that buyer, his technology and his terms. Advice from independent consulting firms can complement and enhance this learning and in the long run be more beneficial to the local firm.

Keesing and Singer make several recommendations with regard to the promotion of manufactured exports from developing countries, which are relevant here.

- "Concentrate on overcoming weaknesses in supply, largely by providing consulting assistance to promising firms in adapting and improving their supply capabilities in product groups with strong export prospects
- Foster a plurality of predominantly private sector service suppliers, including branches of foreign and transnational firms, as the main method of creating a full array of services in support of export expansion. The aim is to expand exports rapidly by quickly achieving high quality services to exporters, reflecting the best advice and know-how internationally available, offered in an environment of vigorous competition, so as to make the service suppliers highly responsive to buyers' needs
- Recommend that publicly funded service organizations charge for services. We also recommend fostering private competitors in the same services."

With regard to information services, they argue against the viability of centralized databanks of suppliers, buyers, export opportunities etc. This has not proven to be effective generally in developing countries. Mainly this is because of the nature of information typically required, which needs to be focused, detailed and firm-specific, and generally accompanied by some recommendations about the best choices. A publicly funded body or

a membership organization is structurally incapable of performing this type of information service. Instead, Keesing and Singer recommend the "encouragement of a vigorous competitive market in which private commercial transactions predominate."

VI. IDENTIFYING GATEWAY ORGANIZATIONS

The general criteria and desired characteristics of a gateway have been described earlier. Though idealized, it can be used to rank potential gateway organizations, and equally important, these criteria can be used to diagnose organizations in terms of their "gaps" or weaknesses in relation to gateway needs. This in turn can be used to negotiate organizational and programmatic changes with management in order for the organization to be a more effective gateway.

The establishment of gateway organizations should begin with in-depth discussions with government and industry representatives after a description of the overall concept. This should be followed by meetings with potential gateway top management to discuss their interest and to study their operations and capabilities. A final selection should be made on the following bases:

- agreement of key government and private organizations over the selected candidates,
- evaluation in terms of the criteria that have been described,

- willingness of the organization to undertake these activities,
- positive assessment of demand for gateway services,
- agreement by top management of potential gateways to undertake needed organizational changes.

VII. IMPLICATIONS FOR AID SUPPORT

The gateway concept is being experimentally attempted by the USAID mission in Tunisia. If it can be shown to be a useful mechanism to promote technology development and productivity enhancement in developing countries, it is clearly an area where AID could consider providing support.

The goal is to provide support such that the demand driven approach and ultimate objective of self-sustainability of the organization is not undermined. A gateway, to be effective, must move swiftly towards a self-sustaining position based on revenues and fees generated by clients.

As such, the donor (e.g., USAID), can consider two possible options, or a combination of them. The first is to provide a one-time support grant to selected organizations to develop their gateway capabilities and cover start-up costs. This could cover a three-to-five year period, at which point self-sustainability should be expected.

The second option is to structure the support in the form of a "matching" grant that can be drawn upon by firms interested in receiving gateway services. The fees received by the gateway would be a combination of the "cost sharing" portion from firms and a certain proportion from the "matching" grant.

Other issues do arise, however, in this latter scenario. The most important is the possible need for new equipment and staff to fulfil the gateway function. A small amount of grant money for this purpose may be required.

VIII. RATIONALE FOR USAID SUPPORT OF GATEWAYS

Given that there is a need for the promotion of private consulting services for export development, what is the justification for support by USAID? Clearly, in some senses, USAID support for private profit-making enterprises constitutes a form of subsidy. The question is whether this can be justified in economic and operational terms.

It is important to understand that many developing countries are in a process of transition towards a free market economy. As such, they are characterized by weak and non-competitive firms and the need to develop certain industrial sectors which have not been able to develop because of prior protectionist policies, etc.

Supporting gateway activities will contribute to the development of certain "infant" industries, particularly in the consulting sector, as well as in other sectors with export

potential. In so doing, it will have a positive impact on technological development, acquisition and transfer and to an overall learning process of value to the whole economy. The learning effects will be particularly important. As "pioneer" firms adopt new technologies and practices and achieve export success, other firms will see this success and begin to take actions for themselves. Also, personnel who have acquired experience in leading firms often will leave and work for other firms, and bring their knowledge and learning to these firms.

A more dynamic export sector also has effects on the domestic economy in terms of greater awareness of quality, importance of technology etc. Further, there are spillover effects as a result of the development of a service sector industry, which can then be of value to other parts of the economy apart from the export oriented sector.

Keesing and Singer note that an important justification for the support of some services is that, "they tend to be inadequately valued by potential exporters, and turn out to have benefits far exceeding what users are at first ready to pay. Thus, for example, the **ex post** benefits from the services of first-rate management or technical consultants tend to be much larger than is recognized **ex ante**. ...subsidies to the use of these services may be essential to teach exporters their value, and persuade them to use them" (p. 23)

Indeed, this is generally true in developing countries. The value of consulting is not fully appreciated, and in fact,

consulting firms are often viewed with some distrust and suspicion. On the other hand, good consulting does lead to significant benefits in terms of productivity, profitability and export performance and the demonstration effects of such results in pioneer firms can lead to a wider appreciation of the value of consulting throughout the economy.

IX. CONCLUSION

This paper has attempted to provide an initial case for a new organizational mechanism to promote technology development in developing countries. It draws upon the experiences of the USAID mission in Tunisia and attempts to outline the basic criteria and design requirements for gateway organizations, and their implications for the type of support that AID and other donor agencies can provide. These concepts are being further developed and comments on this paper are welcomed.

REFERENCES

1. Ernst, Dieter and O'Connor
Technology and Global Competition: The Challenge for Newly Industrializing Countries, OECD Development Center, Paris, 1989.
2. Perez, Carlota (1989)
Technology and Global Competition: The Challenge for Newly Industrializing Countries, OECD Development Center, Paris, 1989.
3. Hoffman, Kurt
Technological Advance and Organizational Innovation in the Engineering Industry, World Bank Industry Series Paper, No. 4, March 1989.
4. Wallender, Harvey and Barton, Clifton
"Characteristics of Trade and Investment Programs," mimeo, IMCC, Washington, D.C. 1990
5. Keesing, Donald and Singer, Andrew
"How to Provide High Impact Assistance to Manufactured Exports from Developing Countries," World Bank, mimeo, 1989.