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APPLICATION OF  
TECHNO-ECONOMIC  
INTELLIGENCE TO  
DEVELOPING COUNTRIES

GERARDO R. GARGIULO

BUENOS AIRES, OCTOBER 1991

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## APPLICATION OF TECHNO-ECONOMIC INTELLIGENCE TO DEVELOPING COUNTRIES

### 1. BACKGROUND

Since 1989 UNIDO sponsored several initiatives directed at:

- a) learning about techno-economic intelligence systems (INTELL) applied to industrial development;
- b) identifying subjects for international cooperation in INTELL;
- c) promoting the interest of entrepreneurs on INTELL and elaborate several project proposals.

The first report was a general presentation (Gargiulo and Martínez Vidal, 1989) and the second intended to be an application to the Argentinian agroindustry (Gargiulo, 1989).

From the early reports some conclusions were obtained regarding:

- a) the need to advance simultaneously in conceptualization and experimentation through pilot experiences.
- b) the need to elaborate guidelines for an INTELL methodology.
- c) the specialization of this service in narrow branches of activity in order to provide high value information.
- c) the identification of some subjects for international cooperation: the general INTELL that may be shared by enterprises and institutions of several countries; and the training needs of the developing nations.
- d) the description of the USDA Cooperators Programme that is used to promote exports and competitiveness.

In 1990 an activity was initiated by UNIDO to promote a project on the Development of a Technological and Economic Intelligence System with specific reference to the Agroindustry.

The activity had two parts: first, an analysis of the state of the art of INTELL and the structure, modes of operation of different systems and their potential applicability to the agroindustry. Second, a program for establishing an INTELL system for the agroindustry in Argentina, Costa Rica and Ecuador.

Two reports were submitted:

Cubillo, Julio: Part I (1990) and Part II (1991) and Gargiulo, Gerardo (1990).

The Cubillo report provides key elements for the conceptual advance of the UNIDO project, while the Gargiulo report consists of a detailed proposal for building up mechanisms in each country and promoting the international cooperation for the activity.

After the completion of the reports UNIDO has formulated a project and initiated the finance procurement.

Other activities were also carried out in 1991:

- a) promotion of the INTELL concept
- b) exploration of the application of INTELL to Uruguay biotechnology activity;
- c) identification of possible INTELL projects concept in the Bolivar Program and the Brazilian and Venezuelan industrial sectors.
- d) preparation of the detailed programme for an INTELL Demonstration Unit in Dairy products that will start to operate on January 1, 1992, as part of the UNIDO Demonstration Project. Funds have been granted for the local counterpart.

## **2. THE DEMONSTRATION PROJECT PROPOSAL**

### **2.1 DESIGN PARAMETERS**

The demonstration project is based on several interrelated concepts.

#### **2.1.1 Agroindustry Intelligence Needs**

The agroindustry environment is not as stable as it used to be and intelligence is needed to follow the changes in markets, technology and regulations, to discover the opportunities and to avoid the threats.

The main reason to use INTELL in agroindustry is to support competitiveness.

Competition in agribusiness used to be based in static comparative advantages, but dynamic competitive factors are more relevant to gain market shares in higher value products.

Opportunities are not there for ever. In agribusiness those who can adapt themselves quickly to satisfy the consumers wishes, and even anticipate them, will be the winners.

The leaders are those countries and enterprises who can react quickly. The production chain becomes a system, from seed to costumer, based on market signals.

International trade in food products used to be highly regulated:

International Dairy and Meat Agreements, subsidy, duties, sanitary and commercial barriers in the EEC, USA, Japan, and also among Latin American countries.

The Mercosur Integration Agreements (Argentina, Brazil, Paraguay and Uruguay), the increasing integration efforts in the Andean Group, the USA Initiatives on the Caribbean Basin and on the Americas are changing the business environment.

The Latin American firms, among them the agribusiness ones, need advanced information on the market, technology and regulation shifts, to adopt strategies to remain competitive.

Competitiveness is the result of public and private decisions. The former ones are mostly related to the macroeconomic framework, sectorial policy, taxes, utilities regulations and "rules of competition". The latter are in the domain of entrepreneurial dynamics: how to combine technology and managerial skills to increase the marketing capabilities and to lower the costs.

INTELL, conceived as the use of available sources to prepare high value added information on competition, markets, technology and policies, may provide knowledge on agribusiness for decision making according to the needs of the firms and government.

#### 2.1.2 Specific and general INTELL

INTELL products may be "specific" or "general". The first kind is developed for the use of one firm and it aims at obtaining competitive advantage from innovations or commercial operations. This kind of INTELL is not shared with potential competitors. It is used in strategic planning and also in operational planning.

General INTELL, like pre-competitive research, is a knowledge that is shared by the decision makers of a branch of activity and brings an overview of the present and forthcoming business conditions. This information is reserved and is used for: international negotiations, branch competitive capacity building, projects and markets preliminary evaluation and also as input to specific INTELL.

Both kinds of INTELL are complementary. As long as general INTELL may be shared, it becomes matter for international cooperation.

General INTELL is the principal ingredient of communication flows inside the branch network. International cooperation may be used to enhance its content and to provide a standard methodology.

The strategy suggested to UNIDO is to focus the initial efforts on general INTELL. Such approach can be expected to leave the following benefits:

a) each actor will have broader information on the business conditions which, in turn will stimulate further efforts to acquire specific INTELL for his own use;

b) weak institutions, such as the government agencies or small enterprises, will obtain a general framework that may be used to raise the quality of their decisions;

c) separate decisions of firms, government agencies, and specially those taken in academic institutions (human resources development) and R&D centres (decisions on research lines) will have the benefit of sharing the same overview, raising the coherence and complementarity among them.

d) information systems will have increased demand.

### 2.1.3 INTELL Network

An INTELL system has several actors: firms, government agencies, R&D groups, business promotion boards, academic institutions and also external connections: correspondents, experts, suppliers and customers.

All the actors have their own INTELL activity, most of them implicit. The information processed may be reserved for own use or shared with others, either open to general public or restricted to related firms and institutions.

A living INTELL system is a network of institutions and persons that perform several functions. Some of them are mostly engaged in information gathering, some are users and producers of INTELL, and some are gate keepers and brokers.

Among the factors that support and stimulate INTELL systems the most relevant ones seem to be:

a) the information infrastructure,

b) the activity of private institutions aimed at promoting medium-term business conditions (eg: boards, chambers, councils, etc),

c) the catalytic action of government agencies for promoting the development of networks.

#### 2.1.4 An Example of a Successful Network in Agribusiness

The U.S. Department of Agriculture Cooperators Program aims at developing a partnership between government and private sector to improve overseas marketing.

The government partner is the USDA's Foreign Agricultural Service (FAS). The private sector partners are the organizations, or "cooperators", that develop and implement programs to improve demand for agroindustrial products.

Cooperators are non profit commodity groups representing primary and industrial producers, trade and related associations. Their activity is generally not designed to make sales but to promote and achieve future market access. Their main activity is to provide elaborated information and INTELL. There are more than 200 cooperators in the USDA Program.

They normally promote either a single commodity or a group of related goods and provide leadership for the promotional programs. Their organizations have, generally, less than ten employees. They receive one third of the funds from the Government, one third from the affiliates and one third from other sources.

FAS provides assistance to entrepreneurs to cut through regulations, trade barriers and governmental rules that hamper sales.

The cooperators provide the private expertise and spirit of enterprise that is equally important to the successful marketing.

The partnership makes it possible for each to accomplish what neither could do alone.

One of the FAS Attache Service major functions is to work closely with the Cooperators in their information requirements and market development activity.

It seems possible to adapt the cooperators organization to the Latin American environment: small private non profit agencies acting with the help of the governments to promote sectoral development.

#### 2.1.5 Competitive Conditions

The macroeconomic policy has a great influence on the competitive conditions and on the demand of INTELL.



In Latin America from the '50s to the '80s most of the countries adopted the strategy of industrialization based on the domestic market. In such conditions the enterprises faced only domestic competition and the competitive advantages were obtained by making use of opportunities open by government regulations.

The information and the networks were developed to press for government regulations and larger subsidies. The INTELL was related to how to influence the agencies and government officers.

In the '80s. the Latin American countries adopted a macro policy directed to opening their economies and progressive international competitive conditions were established. This meant the progressive change to the international management style, characterized by an increasing use of INTELL and related networks.

The process of change from the closed economies to the open ones is not yet completed. In some countries it is highly advanced, but in others it is at the outset.

In the countries that are at the middle of the changes, the competitive context vary from activity to activity according to its specific speed of "internationalization".

In open economies private and public sectors share the objectives of promoting trade and competitiveness. They act jointly to overcome the constraints of foreign markets. Therefore they are active members of the same networks and demand the same INTELL.

## 2.2 DEMONSTRATION UNITS

To promote the use of INTELL, a Demonstration Unit (IDU) may be established to provide services and to induce other participants of the network to use and process INTELL.

The IDUs may be located at firm level, at branch level or at industry level. For demonstration purposes the best location seems to be at branch level: the results may be shown to the others and the benefits will be easy to monitor by entrepreneurs, chambers and industry federations, leading to interest for other units.

To initiate INTELL activity the IDU may be installed in one of the institutions that belong to an agribusiness branch and, at the same time, to its information network.

A small team may produce general INTELL products such as:

newsletter, inquiry service, reports, etc.

The size of the team will depend on the objectives, which will define the comprehensiveness of the tasks to be carried out.

The size of the IDU is not only a matter of efficient organization. It also depends on the commitment of the sponsors.

In the UNIDO Demonstration Project the host institutions must accept to support the Unit on a permanent basis, beyond the end of the project.

UNIDO will provide consultants, suscriptions and training to the staff of the Units.

The IDU start up may be seen as a sequence of four stages: installation, pilot operation, semi-autonomous operation and autonomous operation.

The Installation includes the physical settlement in an office and the beginning of some activity. One of the main tasks is to recruit and train the staff. Part of the training may be done in an initial meeting, but the larger part will be on-the-job.

Networking and relationship with the users must be done from the very beginning.

The Pilot Operation is aimed at providing systematic service in the form of a small number of INTELL products. A second training effort will be made at the end of this stage, to improve the operational methodclogy and to provide the team with an overview of the branch INTELL.

The semi-autonomous operation may last months and perhaps years. The targets to achieve are: to obtain a close relation with customers, to provide INTELL in a wide range of formats, and to obtain an income from the products provided. Prices of the services must cover some of the costs.

The last training phase for the Unit staff will be a permanent effort to reinforce links with high quality information sources. UNIDO will provide the opportunity to the team leader to attend an international event related to the branch.

The autonomous operation means the financial self-sustainment of the IDU. This will be attained by a combination of product sales, institutional support and special financing for definite purposes.

## 2.3 CONDITIONS FOR INTELL PROJECT IN THE COUNTRIES

To plan the INTELL project the participating countries were visited. The agroindustry branch selection was based on the capability to demonstrate INTELL: existence of institutions capable and willing to be host for the IDU, a business environment that needs INTELL services, and existence of information infrastructure.

### 2.3.1 Argentina

Branch selected: dairy products.

Main opportunity for the activity: to take advantage of Brazilian market under the Mercosur Integration agreements. Cooperation with Uruguayan dairy industry will allow better long term market organization.

Main threat: the need to invest in farm, industry and commercial activities to reestablish the competitive capacity. Uruguay dairy industry already has a permanent export capacity.

The Host Institution will be FUNESIL (Dairy Technical School Foundation) located at Villa María, Córdoba. It will be supported by COPAL (Food Industry Federation).

Information infrastructure: several government institutions will provide information and data inputs: INTA (Agricultural Technology Institute); INTI (Industrial Technology Institute), Universities, Government data basis, etc.

Users: enterprises (dairy farms and industries) chambers, boards, government agencies, food enterprises (other than dairy).

Promotional agencies: Secretary of Science and Technology and Ministry of Agriculture of Cordoba Province.

### 2.3.2 Costa Rica

Sector selected: fruits and vegetables, fresh and processed.

Main opportunities: the Caribbean Basin Initiative provides the access to the USA market.

Main constraints: low agricultural productivity, sanitary conditions, post harvest losses, lack of transport infrastructure, inadequate packing and quality control, lack of training at several levels (managers as well as workers). Lack of networks.

Host institutions: Exporters Chamber (CADEXCO) and the Agricultural and Agroindustry National Chamber (CNAA), with the support of the Costarican Food Industry Chamber (CACIA) and CINDE a private promotion institute.

Information infrastructure: The four host institutions elaborate data and form part of the local information infrastructure. Additional knowledge may be obtained from: Food Technology research Center (CITA); Technologic Institute of Costa Rica, Agricultural Interamerican Cooperation Institute, etc.

Users: Affiliates of CADEXCO, CNAA, CACIA, Government agencies, etc.

Promotional Agency: The Ministry of Science and Technology backed the project.

### 2.3.3 Ecuador

Branch selected: Shrimp

Main Opportunities: market development in Europe and Asia.

Main threats: the Guayas River pollution, problems in some process related to shrimp farming, need to develop new products, to increase productivity and input quality, etc.

Host Institution: Shrimp Exporters Ecuatorian Federation (FEDECAM), a private non profit organization that associates the shrimp exporters and is aimed at promoting the development of the activity.

Information Infrastructure: FEDECAM elaborates information on the industry and is related to the SITOD, Agricultural Ministry information and gathering system and to the RINTEC (Technical Information Network) operated by CENDES and agency of the Ministry of Industry. There are other public sources like the Politechnic University, DINATI (Industry Ministry) and also private, like: FEDEXPORT (Ecuadorian Export Federation), Industry Chamber of Guayaquil, etc.

Promotional Agencies: Industry, Trade and Integration Ministry, Foreign Relations Ministry.

## 2.4 REGIONAL PROJECT STRUCTURE

The support needed by the IDUs to start the INTELL demonstration

activity will be provided by a Regional Team.

It was proposed that the regional support would last 18 months. This period does not reflect the needs of the IDUs, but the possibilities seen by UNIDO at the time the report was elaborated. A more extended activity for the regional team seems to be necessary.

The regional team will support the IDUs , collaborating in the installation, providing contacts with the information sources and training the staff. Additionally it will coordinate the UNIDO assistance to the project and will report the results.

At the end of the project the three IDUs will be in semi-autonomous operation, the INTELL methodology will be ready to be transferred to other branches and countries, a regional incipient network of intelligence units will begin to materialize and a project appraisal report will be presented.

Several experts will be contacted and hired for the project to provide:

- methodological approach,
- knowledge and experience on intelligence,
- software assistance,
- food technology references (people, institutions, etc.)
- insights of the competition in dairy products, fruits and vegetables and shrimps

A Complete Project Proposal was provided including objectives, results, activities (schedule), job descriptions, inputs and budget for the regional team and for the three IDUs.

### 3. ACTIVITIES POST PROPOSAL SUBMISSION

After the proposal was submitted, the possibility to promote INTELL activities in Uruguay arose. Meanwhile, in Argentina, the IDU promotional institutions decided to go ahead according to their own program, hoping to receive the UNIDO assistance opportunely.

#### 3.1 URUGUAY

In February 1991 an exploration was made in Uruguay to establish an IDU related to Biotechnology.

In Uruguay there is a limited business environment for an INTELL

effort in biotechnology and the IDU will require permanent support from other sources. No self sustainment is seen unless the Unit may export some of its services.

The subjects of interest for this IDU are quite different from those registered in the Demonstration Project Proposal: greater interest in technology related subjects, while commercial information plays a complementary role. Also it was found that there was a greater need to upgrade the firm organization and commercial activities than in the agribusiness and food production.

Taking the role of hosts two institutions may establish an agreement: AUDEBIO (Uruguayan Biotechnology Enterprises Association) and CID (Innovation and Development Centre).

The Industry Ministry, through the DINAPYME (Small and Medium Enterprise National Direction) may support the IDU and the National Scientific and Technological Research Council (CONICYT), through the National Biotechnology Committee, can provide additional support.

### **3.1 IMPLEMENTING ARGENTINE IDU**

Argentinian institutions decided to begin with the local component of the INTELL project, while UNIDO was approving and obtaining the funds for it.

#### **3.2.1 COPAL Newsletter**

COPAL (Federation of Food Industries) decided to elaborate a Newsletter, including a Special Report in it devoted to competition analysis, especially related to Mercosur.

The newsletter started to be issued monthly last April. Some of the subjects included in the Special Report were: marketing challenges, competition in Mercosur, product diversification through biotechnology, etc.

At the beginning the Special Report tried to find its place in the information needs of the managers. This seems to have been obtained and the last four reports have been reproduced by chambers and firms and circulated through an increasing number of entrepreneurs.

#### **3.2.2 The Dairy Unit.**

The participation of Argentine in the Demonstration Project was pushed by the Economy Minister of Cordoba Province. He decided to stimulate the firms of the branch to establish and operate an IDU.

After the report was submitted The Government of Córdoba instructed the Secretary of Science and Technology (SS&T) to build up the local counterpart for the INTELL project.

Several meetings were organized by the SS&T with entrepreneurs and other agencies of the Government. Some of them at Cordoba city and some in Villa María at the heart of a dairy region.

The Provincial Association of Dairy Industries was invited to host the IDU. After considering the proposal for two months the Association indicated that it will not be possible for them to accomplish such task.

What really happens is that the Association is still organized according to the domestic market and feels unable to undertake the challenge to support an INTELL activity for raising external competitiveness, specially in the framework of the Mercosur Agreements.

Some of the enterprises of the Association and some experts that are in charge of the local technical school of dairy processing, decided to organize the IDU. They wrote a proposal asking the government for support. The funds will be granted in December 1991 and the IDU will start at the beginning of 1992.

#### **4. SOME LESSONS LEARNED THROUGH THE PROJECT DEVELOPMENT EFFORT**

##### **4.1. THE COMPETITIVE ENVIRONMENT.**

The INTELL activity is highly sensitive to the changes on the competitive environment settled by the macroeconomic conditions.

The opening of the economies, the integration agreements and the USA Initiatives promote business environmental changes that stimulate new entrepreneurial and institutional strategic plans.

Those plans are mostly related to market initiatives and investment projects that demand environmental information.

The need for INTELL in order to understand and identify opportunities and threats is perceived in several LA countries as a consequence of changing competitive conditions.

The need for permanent INTELL efforts for success in open economies seems evident in Chile and Costa Rica (the most open business environments of the Region) and also in the Shrimp industry in Ecuador (activity that belongs to the international economy, while almost the rest of the country is semi-open to the Andean Group and closed to the rest of the world).

#### 4.2 THE INSTITUTIONAL NETWORK

The opening of the economies has a positive impact on the demand for INTELL, but associated social changes, that affect the structure and behavior of several actors in the information networks, are slow and asymmetrical. Some inertial factors may delay the networking activities needed to obtain quality intelligence. Among those factors, the following are specially important:

a) The existence of conflicts among actors, mainly between the public and private sectors, that may block the flow of information and delay decisions.

Sometimes those situations are the remnant or residue of old conflicts that emerge in the industrialization through domestic market strategy.

b) The attempts to use information as a source of power (in the sense of domination) and not as a power to make better decisions.

Those entrepreneurs that have good information try to prevent the development of additional sources, including the INTELL efforts, as a way to maintain their control on the branch.

INTELL promotion needs also network promotion. Specially, the relations of the IDUs with the users.

#### 4.3 THE USERS

One of the most difficult tasks for the INTELL teams will be the definition of the user's requirements. This is not only a matter of analytical capability, but specially of the confidence the customers have on the IDU team.

The intelligence team must be acquainted not only with the problems of the industry, but also with the manager reserved concerns. Otherwise the entrepreneurs will not make their



requirements explicit.

One way of solving the problem is to ask the industry to provide the team leader and train him in intelligence methodology. This will be easier than to gain the confidence of the entrepreneurs in an INTELL specialist.

Another subject is to raise the capability to use INTELL. Training seems necessary, but not only related to information utilization, within the firm INTELL is not an isolated entity, but it forms part of the inputs to the managerial process.

Therefore training has to be directed to strategic management: competitive conditions, firm resources, aims and activities, strategic and tactical planning, etc. INTELL requirements will be the result of an increased capacity to use it.

## 5. SUMMARY

From UNIDO exploration of techno-economic intelligence a conceptual framework and two project proposals were obtained.

The INTELL promotion, as an instrument to increase competitiveness, found great interest in Latin American countries.

To transform "interest" to "activities" a maturing time by the host institution is needed. INTELL is related to specific competitive conditions (international environment) is focused on a sector and is linked to an information network guided by the requirements of the entrepreneurs.

Such transformation needs external support from agencies engaged in INTELL at national and international levels.

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