Transferring Technology in Spain

Doing business with the national companies, especially the case of the National Institute of Industry (INI)

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The Spanish State participates in the capital of a large number of companies, in a wide range of economic sectors, which make up the overall group of Spain's public companies. Within this collectivity, those belonging to the National Institute of Industry (INI) are by far the most important group. Nevertheless, outside of this group there are several other public companies of great importance, such as the national railroad company (RENFE) and the oil products distributor (CAMPSA). This paper is limited to the consideration of INI, independent of the possibility of some of the concepts included herein being applicable to other public companies.

INI is an autonomous body of the Administration of the State, which operates like a holding company, managing the state participation in a group of companies operating as corporations.

Since its creation in 1941, the composition of the group has varied continually, both through the creation of new companies as well as by the purchase or sale of shares of stock in others. Presently, INI participates directly in 71 companies and indirectly, through these, in a further 234 companies. The percentage of this participation varies greatly, from being the sole stockholder in 21 companies, the majority stockholder in 32, half-owner in 2 and minority stockholder in 16.

These companies operate in a wide variety of sectors: energy in all of its facets, shipbuilding, automotive industry, military industries, mining, metallurgy, foods, chemicals, aeronautics, and data processing and services.

Criteria

The criteria used to justify the presence of INI in each sector are highly diversified and have been and are conditioned to the changing circumstances. Thus, for example, reasons of service to the public, subsidizing of private initiative, active or catalyzing presence in a sector, complementing existing industries or providing freer competition, have been used at different times in order to justify INI participation in a certain sector.

Some quantified data can give an idea of the magnitude of the INI group. The net assets amount to 740,000 million pesetas. Real investment in 1978 reached 140,000 million pesetas. Considering its important presence in basic sectors of industry, the multiplying effect of the funds provided by the state to INI in 1978 have been estimated at approximately 15 times the initial amount. The gross added value generated in 1977 was on the order of 325,000 million pesetas, representing 4% of the gross national product.

Madrid LES International Conference

The total number of directly employed staff is close to 250,000 persons, representing 7% of the industrial work force.

Invoicing in 1977 reached 775,000 million pesetas, with 100,000 million corresponding to exports.

Insofar as the sizes of the companies, it can be said that 40 have over 500 employees, 34 more than 1,000 and 7 have over 10,000. When estimating size through investment, the 10 largest companies accumulate 75% of the total investment.

The INI Group ranks among the 20 top European companies, and some of its companies -- ENPETROL, ENSIDESA, IBERIA, etc. — occupy relevant positions in the European sectoral lists.

HISTORICAL BACKGROUND

Having briefly described the group, and in order to provide a better understanding of its present situation and its position with respect to technology, it is appropriate to give a brief background of the history of the group, with special attention to the vicissitudes of a technical nature.

Spain's economy since the Civil War has undergone a diverse series of stages and in these stages INI occasionally has been an instrument of the administration, a reflection of the situation, active or passive subject, protagonist of certain milestones, etc. All of this should be taken into account, since on settling down it has given rise to the present situation in which attitudes and positions of different origins are superimposed.

The first stage, from 1941 to 1959, is characterized by *international isolation*, which provoked an economy of an autarchical nature, with all of its consequent defects. Nevertheless, this is a stage in which the search for one's own solutions to one's own particular prob-

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lems originates, thus bringing about a heavy demand for local technology. During this era, in spite of the many economical difficulties, some valuable research and technological teams were created. They later continued to provide significant services both in the generation as well as the assimilation of technology. INI and its companies played an important role in this stage as active agents in the creation of domestic technology. An important point in this regard is the effort made in the development of local raw materials, both minerals as well as energy elements.

The second stage, between 1959 and 1973, is characterized by the opening up of our economy toward the adoption of the Western economic model, within a current of a more liberal attitude. The adoption of this model brought with it the incorporation of technologies adequate to the raw materials and processes contrasted internationally; these technologies, in a large number of cases, have to be acquired outside the country. In effect, the inertia of a process strongly promoting development and the possibility of having access to the necessary technology at a convenient price led to our businessmen having recourse to this form of supply, leaving the development of their own technology on a secondary plane.

React

The INI companies, immersed in an economic atmosphere following such patterns, reacted in a similar manner and also had recourse to the purchasing of technology. Nevertheless, the existence in some of them of teams formed in the previous stage and the persistence of the mentality encouraged at that time, favored both the continuation of some domestic development activities as well as a better assimilation of technology acquired.

The third stage, from 1973 to the present, is marked by the world economic *crisis* which in our country has entered in resonance with the political and social transformations which had been taking place since 1975. The crisis caused by the rise in cost of raw materials, basically the energy ones, has led to a hardening process of markets revealing some of the contradictions contained in the previous model and fundamentally the lack of a technological sector on the level of the industrial development reached.

Faced with the present crisis, companies are largely aware of the need to strengthen their own technology. However, the economic difficulties along with social problems affecting them are delaying the taking of a stand adequate for emerging from this situation. INI, aware of this need, maintains an attitude of giving incentive to its companies, insofar as the establishment of a solid technological area suited to their needs. As will be shown later, in this initiative, INI has undertaken different types of action (promotion of the sale of technology, direct requests for investigation, training of research specialists, etc.), in which it has become a pioneer, since other bodies and entities have followed its example a *posteriori*.

The consequences which can be drawn from this brief historical outline are that the demand for local technology has been strongest in the eras in which the economy has encountered serious difficulties, while in the development stage, it was more effective, on a short-term basis, to have recourse to the importation of foreign technology.

Another consequence is the superimposing of different mentalities, some tending to domestic development and other to the incorporation of foreign solutions, both of which coexist at the present time and provoke opposite alternatives when faced with the making of technological decisions.

The final consequence, perhaps the most important one in view of this future, is that of the existence of teams built up over the years and of a basic know-how which could be the best support on which to base local technological development.

INI TECHNOLOGICAL SYSTEM

In accordance with the general data provided on INI, this group turns out to be an important source of demand for technology and, as can be deduced from the historical background given, the use of technology has been focused in very different manners. At present, in the totality of the different types of technology used by INI, it is possible to easily recognize the subgroup made up by the technology *generated* by the companies themselves, that formed by technology acquired outside the country and later *assimilated* and even that made up by technology which has not undergone this assimilation process and could be called "rented."

It is appropriate to point out that in the comparison of the companies of INI with respect to the other national companies, whether on an overall level or on a sectoral level, the percentages of research effort are generally favorable to the INI companies. This is a result, both of the existence of these basic teams referred to earlier as well as of the smaller participation of foreign capital in these companies, such participation, as shown in studies related to this subject, being one of the factors opposing local investigation.

The technology generation subsystem can be considered as having two tendencies. One is on a company level, which could be called divisional. Another corporative type is on a group level. Divisional research corresponds to the initiatives developed by individual companies in their own strategies, and in this, INI participated in a manner similar to that of any other company activity, being subject to the general standards of control and included, explicitly and with its own personality, in the Strategic Planning System of the Group.

Areas of Interest

On a corporate level, INI has established area of primary interest (energy, foods, transportation, etc.) in which the development of research projects is fostered, particularly those of a multicompany nature. This promotion is supported by specific financing through the "Fund for the Promotion of Research," which is of the nature of a loan, except in those cases in which no economic results sufficient for supporting its return are had. Presently the fund in considering 28 projects of different scopes, some of which are cofinanced by the companies and other entities. It is fitting to point out that the objective of the projects aided by the fund are suggested by INI, on a corporative level, which means that this is the first case in which a research financing fund in Spain is assigned on the initiative of the financing entity and does not take a passive position waiting for requests for aid to arrive on their own.

The technology *acquisition subsystem* is of considerable importance in the INI Group and presents some characteristics worthy of note. In principle, the high degree of diversification reached in the sources of technological supply should be emphasized. The multiple industrial and economic relations of the group have made it possible to have recourse to those sources which, on each occasion, have been considered to be most adequate. The result is that of the total number of technology transfer contracts signed over the last four years by these companies, only 26.5% come from the United States, while this country is the largest in export potential in the world. Behind the United States on the list are Germany (22.1%), France (22.1%) and Italy (8.9%). The total number of contracts from the European Common Market countries reaches 60%.

Insofar as the control of technology acquisition, the direct responsibility for the selection of the source and the transaction itself corresponds to the companies, which have the obligation of keeping INI informed of the negotiations. INI, on a corporative level, reserves the right to intervene in those cases for which it considers intervention necessary, providing assistance whenever the company requests it, in order to reinforce its bargaining power. The main emphasis insofar as the corporative participation of INI is placed on the information concerning possible alternative sources in order to attempt to clear up the generally non-transparent market of technology. This action does not interfere with nor duplicate the action taken by the Ministry of Industry and Energy regarding the controlling of technology purchases by Spanish firms, in accordance with current legal regulations.

Lower Level

The technology *assignment subsystem* is on a level of development clearly below that which corresponds to the importance of a group such as INI. Throughout the years of INI's existence, the INI companies have been accumulating different types of technology, both from their own generation as well as from assimilation and substitution of acquired technology. However, the same as occurs with the rest of the country in general, the eminently purchasing attitude adopted by our companies makes it difficult for them to accept the opposite role. The change of mentality involved is revealing itself as a barrier, which, although not impossible to surmount, is requiring a very considerable period of acceptance.

INI detected this need and for the purpose of promoting this attitude favorable to the sale of technology, it prepared its Catalog of Technology, the first of its kind in Spain. The experience obtained through its preparation and subsequent utilization points up the difficulties mentioned earlier. The difficulties have arisen both in the localization and determination of the potentially transferable technology as well as in the eventual materialization of the concrete transfer operations.

The catalog contains over 300 technological items grouped under nine subject sections. It is important to point out that four types of technology are included, according to their supports and adequate channels for transfer. In accordance with this, a distinction is made among the technology suitable for licensing, that corresponding to operating experience in a broad sense, that transferable as technical assistance, that concerning services of engineering, studies, research, etc. and, finally, the training courses which are given great importance, considering the high specific gravity training has when faced with a real transfer of technology.

The distribution of the catalog throughout the world has been effected in an irregular manner, as in some countries its intensity has been greater because an INI exhibit was held in them, all of which resulted in a greater extension of the contacts made. This has been the case with Mexico, Colombia, and Argentina. Nevertheless, the largest number of inquires come from the United States (23.1%), which once again reveals that country's privileged position in the world technology market. It is significant to point out that 9.7% of the inquiries come from Spain itself, showing the defective, if not nonexistent, information on such subjects which countries like ours suffer.

Technology Events

Another form of promotion of local technology being used by INI is its presence in fairs and technology events, once again for the purpose of expanding the diffusion of information in order to complement and contrast the direct channels of transfer which each company can establish through its usual contacts.

The role of INI on a corporative level in these transactions for technology transfers is thus basically that of a promoter. While the responsibility is borne by the company and, as the case may be, on the company's request, INI may also join in the negotiations, particularly in those cases in which the transaction requires the collaboration of more than one company. This tends to occur when the joint presence of a processes and an engineering firm is needed. In addition, it must be noted that not all of the contacts are established through the catalog, but many companies carry out their own activities in this field, as a result of their different influences in other countries through, particularly, their trade relations.

In the light of the experience acquired, it can be assured that there is no valid standard in order to discern a *priori* which type of country could be interested in a certain kind of technology, since the fact that there are clear differences among the average technological levels of the various countries does not preclude the possibility that in each country very significant differences in level can coexist, thus demanding both more sophisticated as well as very basic kinds of technology. For this reason, in view of the polemic between developed technology and intermediate technology types, it appears more logical to speak of adequate technology, a term which implicitly includes the consideration of the level of development of the recipient and the satisfying of the specific needs for which the technology is required.

In this regard there is also a need to refer to the adequate channels for the transfer, a point which is highly sensitive in our country and is particularly felt by INI, on starting from a nondominant negotiating position. This occurs with the countries which are classically offerers of technology. The determination of these adequate channels involves consideration of factors such as the mentality, the degree of development, language, etc. of the transferor and the recipient, which have proven to be indispensable for materializing an authentic transfer, through which the recipient will be in a position to continue in an autonomous manner, without finding his hands tied for progressive development. To sum up, both the determination of the technology as well as the adequate channels should lead to a fairer type of transactions being demanded by the world technology transfer market.

Particular Position

In this world market, INI and in general, Spain, occupies a definite particular position, on account of several aspects. On the one hand, our incorporation in the group of developed countries is still recent, and thus, our experience, with all of its positive and negative points, appears to be suitable for being taken advantage of by other countries following the same process at the present time. The manner in which our technology supply was obtained and its evolution in the course of time are certainly worthy of consideration by such countries. Besides, Spain's geopolitical position is also peculiar because of its double connection, on the one hand with Europe, to culminate in our joining the Common Market, and on the other, with Latin America with whose countries our links of mentality, language, culture, etc. favor exchanges in both directions, thus facilitating them enormously.

If this is joined to the multiple relations with other countries in other areas (Eastern Europe, North Africa, Middle East, etc.) it is easy to understand the complexity which this progressive integration in areas exceeding national bounds introduces in Spanish technology transfer, and in the case of INI in particular.

Finally, it is necessary to point out that more important than the classic transfer operations based on a transferor-recipient relationship, where perhaps better results are being obtained and where they can be expected in the near future are the cooperation transactions, where even though technological differences exist between the two parties in cooperation, the final exploitation of the results of such transactions appear to be fairer and more satisfactory for both parties.