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**STUDY ON SPECIFIC ASPECTS RELATED TO THE PREPARATION
AND PROMOTION OF CAPITAL GOODS PROJECTS IN
DEVELOPING COUNTRIES ***

by

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- 5 DEC 1979

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I N D E X

	<u>Pages</u>
PRELIMINARY CONSIDERATIONS	1
SPECIFIC ASPECTS OF PROJECT PREPARATION	6
<i>Demand and prices</i>	6
<i>Production process</i>	13
<i>Production costs</i>	21
SPECIFIC ASPECTS RELATED TO PROMOTION	27
<i>Prefeasibility study</i>	29
<i>Request for the presentation of proposals</i>	30
<i>Offer evaluation and selection of the best proposal</i>	38
<i>Negotiations</i>	45
FINAL REMARKS	54

SPECIFIC ASPECTS RELATED TO THE PREPARATION AND PROMOTION OF CAPITAL GOODS PROJECTS IN DEVELOPING COUNTRIES

This presentation is based on the experience of the UNIDO/NAFINSA team working in Mexico, on that country's Capital Goods Project. In general there has been a growing concern on the part of developing countries in regard to the Capital Goods Industry; this is reflected in an ever-increasing trend toward promoting investments in Capital Goods by both the public and private sectors.

Since the elaboration of projects and preliminary investments studies for the sector show certain marked differences from similar activities in the area of consumer goods of infrastructure works, it may be useful to outline some of the aspects which, according to previous experience have been the most decisive factors in the success and benefits obtained from the promotion of Capital Goods Projects.

It is sincerely hoped that Public Sector officials and Private Investors in developing countries may find in this report some useful points of view to complement their own impressions and experiences in this field.

PRELIMINARY CONSIDERATIONS

Before undertaking an analysis of the specific problems found in the studies and promotion of capital goods projects, it is necessary to take into consideration the great technical and commercial heterogeneity of the products which differ in degree of complexity, in factors linked with their production and markets and, inevitably, in the projects and promotion which can be developed for them.

Such a wide variety of products makes it necessary to arrive at some kind of classification which will be useful for defining the typical problems involved in these kinds of projects. In general, it is necessary to be able to distinguish systematic differences in the preparation of feasibility studies and negotiations directed toward the formation of capital goods manufacturing enterprises.

Thus, in a preliminary stage of analysis, two classifications of capital goods production may be established. The first refers to products whose relative demand is comparable to that of common consumer goods and the second corresponds to heavy equipment manufactured only on request and under use specifications provided by the buyer. A typical case of the first category would be a 1 HP electric AC motor, and an example of the second class of goods would be a hydraulic turbine for generating electrical energy.

Naturally, between these two extremes there is a wide range of intermediate goods. Nevertheless, if an examination is made of the international supply of capital goods and current production systems and technologies, as well as demand volumes, certain differences can be classified and two major categories can be distinguished:

1. Mass produced goods with standard design factors
2. Custom-made goods manufactured according to user specifications.

The first group of goods may be called *Production-line Goods*,

and the second class *Made-to-Order Goods*. It must be remembered that these two categories will be useful for an extensive classification of capital Goods only if each particular case is analyzed and defined as pertaining to one of the categories through an approximation criterion.

The characteristics of *Production-line Goods* are similar to the most frequently observed aspects of consumer goods; to a larger or smaller extent, they are the following:

1. *Low added value in relation to sales price. This is due to international competition together with the high productivity of production-line equipment.*

It is commonly found that the value of raw materials represent around 70% of costs, such as the case of large mass production of small components.

2. *Low proportion of research and development costs in relation to total costs. In fact, given the size of mass production lines, the cost of design and production technology research corresponding proportionally to each product unit is around 2% of the sales price.*

3. *There is a wide range of buyers in an atomized market.*

4. *The majority of consumers are within the private sector of the economy.*

5. *Commercialization requires large and extensive distribution networks.*

6. *Sales are carried out on the basis of available stock.*
7. *Designs available are only standard alternatives from which the user must choose and adjust his needs.*
8. *Optimum plant size is sustained through access to large markets.*

A typical example of the characteristics outlined for the Production-line Goods would be bearings or electrical motors in powers under 10 HP.

In the case of the Made-to-order Goods, the following general characteristics may be observed:

1. *High added value in relation to sales prices.*

These kind of goods are manufactured one by one and thus involve a considerable amount of direct labour. Such labour is, moreover, quite costly in advanced countries as compared with developing countries.

Likewise, production equipment represents large investments and, given the relatively lower utilization of capacity compared to that of other industrial branches, an additional cost for these facilities exists.

2. *High proportion of technology costs in sales prices.*

For this kinds of equipment, each unit usually requires its own design or modifications of design of some similar unit. In addition, the cost of research and development related to the

determination of design factors or production processes, must be absorbed by a small number of sales units.

*3. There is a limited number of users, usually large enterprises or institutions.****

4. Generally, the majority of users are found in the public sector.

5. Sales are not carried out on the basis of inventory holding.

6. Markets numbers do not necessarily have to be large when it is considered that manufacturing is not carried out by production lines. When there is an adequate network of local basic process suppliers, these installations can be used for many product combinations and economical plant sizes can be sustained by the internal demand of any medium-sized country.

A typical example of this kind of equipment would be a boiler to produce 300 tons. of steam per-hour or a fractionation tower.

When Capital Goods programs are considered in developing countries, the term is almost always used to refer to goods belonging to the category of Made-to-order goods.

In the description of specific aspects related to the preparation and promotion of Capital Goods Projects that follow, it should be understood that this refers to all products that fall under the category of heavy equipment or made-to-order goods.

**** See paper of Mr. Alberto Bozzolo.*

SPECIFIC ASPECTS OF PROJECT PREPARATION

In general terms, the development of all aspects that make up the formulation or preparation of a heavy equipment or made-to-order equipment project, differs to a greater or lesser extent from the usual procedures utilized in the elaboration of consumer or intermediate goods production projects.

The following paragraphs will present a brief and simple outline of some systematic differences found in demand evaluation, price studies, production processes, their interrelation with plant capacity and degree of integration, and the structure of costs.

Demand and Prices

The most usual methods of demand evaluation in the case of consumer goods are generally statistical. For example, criteria may be established on the basis of sampling the user group, or hypotheses are established from correlations and historical growth rate projections. However, in the case of made-to-order equipment, the group of users is very limited and sometimes unique. Such small numbers do not present statistical regularities for trends or correlation of variables or other such analyses.

By way of illustration, the case may be considered of a project for the manufacture of equipment for the cement industry, in a country what habitually imports marginal quantities of cement because internal supply is slightly smaller than demand. Although it may be possible to predict cement consumption observing historical rates, the evolution of the

construction industry, forecast of the Gross National Products, etc., it would not always be possible to predict the demand for equipment for the installation of new cement plants. The decision to install a new cement plant depends on the availability of large financial resources, studies and estimates of limestone reserves, evaluation of complex project and, in short, a promotional activity which in turn depends on a series of factors whose simultaneous occurrence is not always possible to forecast with precision.

Thus, it can be seen that even knowing the deficits of cement supply in relation to demand, it is not possible to predict the progressive installation of new cement plants that may be needed. In terms of a recommended program of new plant installations, delays of up to five years may occur, in decisions or in the date of actual project implementation.

*For this reason, the estimate of equipment demand for the cement industry can only be based on an effective knowledge of approved plans for the expansion of existing plants as well as the installation of new plants or enterprises.****

An examination projects that have definitely been approved should be considered as a mechanism for evaluating the true requirements for equipment supply and the conditions under which such supply will be made.

The hypothetical example mentioned is analogous to many cases in projects for the manufacture of all heavy equipment, such as rolling mills for the steel or metallurgical industry; electrical energy generating equipment; large volume pumps; milling equipment for mining; blast furnaces

**** See paper of Mr. Alberto Bozzolo.*

for smelting iron; etc.

In view of the small number of users for these kinds of goods, it is not advisable to use expected demand rates as a guide for predicting new plant installations and their corresponding equipment needs.

Nevertheless, it is possible to know the plans of the users and, on the basis of that knowledge, estimate the real possibilities of demand and sale of the equipment required for the projects included in those plans.

Given the magnitude of the investments required by projects using heavy equipment, it is common to find that they are programmed over periods of up to 15 years. That period of time is enough for the maturity of heavy equipment manufacturing projects if the possible participation in future estimated demand guarantees minimum levels of economical operations.

An examination of large investment projects, whether industrial or infrastructure, enables a knowledge of the future demand for any kind of heavy equipment to be obtained in a fairly simple way.

*Information regarding the number of furnaces or mills required for a cement plant, the transformers for a power plant, the fractionation towers or reactors for a petrochemical plant, or the number of turbocompressors for a steel plant or oil fields forms part of the major specifications of the corresponding engineering projects, thus making their investigation relatively easy.****

Referring to the demand for heavy or made-to-order equipment which have relatively wider uses and a larger number of buyers, it is

**** See paper of Mr. Alberlo Bozzolo.*

possible to use a method similar to the one described above. In such cases, it would be necessary to classify the most typical user sectors, and for each of them, analyze a model plant. Then an evaluation can be made of the correlation between investment and the number of machines used. This factor could be subsequently applied to the total programmed investment of the sector.

An example of this would be the case of medium and large reduction gear boxes. Assuming that one of the typical user sectors would be the paper industry, an effort would have to be made to analyze a specific project for a typical paper plant and to relate the investment in such a plant with the number of reduction gear boxes needed.

Hence, if the global investment for this sector is known, a multiplier factor would be applied in order to estimate the total demand represented by this group of buyers. If it is also known that another typical user group is made up of non-ferrous metal rolling plants, the same procedure may be followed, and so on with each of the typical user sectors, until the total gives an acceptable volume of demand. Even though this demand figure would be lower than the true total since certain marginal users would not be considered, it would nevertheless be sufficient for the purposes of analyzing the feasibility of supporting at least the minimum economical size of a reduction gear box plant.

In dealing with sales prices, the usual situation in the case of consumer and intermediate goods is that price levels are clearly defined and relatively stable for both domestic and international markets. Made-to-order goods, on the other hand, show a great variability in price definitions. This is because it is often found that there is a high degree of under-utilization of facilities. Under such conditions, it can happen that equipment is offered at prices which cover only the variable or marginal cost of production plus a small margin. In these cases it will be seen the main objective pursued is that of maintaining a position in the market and sustaining, to a certain degree, the continuity of highly specialized labour.

This could be an explanation of the phenomenon of "dumping" prices which is present, with some frequency, in the capital goods market. The term "dumping" refers, course, to extreme cases of sales made with the sole purpose of covering direct variable costs plus a minimum margin. Thus, in some international tender for supplying heavy equipment, the price level of the minimum bids has been defined by the offers of manufacturers who at that moment have a low work load.

In order to arrive at a better understanding of the margins within which prices of heavy equipment supply may oscilate, it is useful to review the concept of average cost which establishes the point of reference for fixing the minimum sales prices under normal conditions.

Average cost per unit of equipment produced is a function of the production level of a factory and reaches its lowest value when the degree of utilization of installations is equal to or slightly above 100% of a nominal production level. Total costs are made up of the sum of variable and fixed costs; while variable costs are constant for each unit of production, the proportional part of fixed costs assigned to each unit increases as total production decreases. Thus, the average cost which defines competitiveness in terms of prices with an attractive profit margin is obtained at the nominal level of production. Nevertheless, if the level of production is below this nominal level, the producer accepts the fact that his fixed costs are inevitable and independent of whether or not an additional unit is produced. As a result, his situation improves if he can sell an additional unit at a price slightly higher than his variable or marginal production costs.

In the case of electrical energy turbogenerators, for example, it can be shown that the FOB prices in Europe have had domestic sales prices before taxes equal to 1.2 times the average costs at nominal production level and export prices equal to 0.65 times those same average costs. Such a variation of almost two times the costs between one extreme and the other is a result of the conditions of foreign competition in non-captive, unfavourable markets and a low utilization level in the installations. In the particular case of the turbogenerators, the cost structure at nominal production level is 40% fixed costs and

60% variable costs. This is what has made it possible to carry out sales at prices as low as 65% of the value of the average costs referred to before.

Looking at these facts from the point of view of a country that is an habitual buyer, it is possible to predict that on many occasions, this will receive supply offers at price levels lower than those which production would normally be able to sustain.

This is a fact that must be carefully analyzed by anyone who wishes to promote production project on the basis of the domestic demand of the country.

In this sense, any forecast of sales income should consider the possible loss of a percentage of the domestic market or modify the average level of prices by a statistical coefficient which would take into account a certain number of sales at lower price levels, if the project assumptions impose the concept of free competition.

When the study also includes some government sectors, the alternative of protecting the market against eventual price dumpings ought also to be considered, since the public sector often operates in this way even in industrialized countries. It should be kept in mind that true and reasonable competitive price levels under normal conditions are defined by the prices in effect in the domestic sales of the country of origin of traditional manufacturers.

Otherwise, it would be very difficult for a buyer country to offer a market for this type of projects if the enterprise interested in such proposals was obliged to compete with any international manufacturers who, at that moment might be selling at prices below average production costs.

It would be necessary, therefore, to consider the possible alternative benefits of carrying out future purchases at lower prices in foreign currency, or of maintaining internal supply, with savings in the balance of payments or other social benefits.

Production process

The particular way of approaching a study of production processes and the analyses of various technical aspects involved in them, show notable differences when dealing with capital goods projects.

In general, the differences are basically due to the fact that the volumes of demand associated with consumer goods permit the design of production line plants, and as a result, such installations are dedicated to one single specialized activity. Likewise the added value is independent of the technological alternative in the sense that the result of the total process of transformation, from inputs to finished product, remains the same.

In fact, inputs are raw materials plus a few standard-type

components that are always found in stock in the market. In other words, the project always has the same starting point. It must also be recognized that, as a result of mass production there are a large variety of basic production processes available but with restricted use ranges and, in every case, very specific applications for a given product. Plant capacity is also determined by a specific technological choice and thus presents an antecedent for other project designs.

In the case of heavy equipment, the situation is very different, since manufacturing is not a production-line activity. Moreover, with few exceptions, the products in question pertain to the area of heavy metalworking. It can also be observed that the machinery usually used in production is the standard type and thus has numerous applications in the manufacture of other kinds of equipment. It is also noteworthy that basic production processes are reduced to a minimum with variations related only to the size ranges of equipment to be manufactured. The variety of processes is basically reduced to: plate marking-out and oxygen cutting, plate rolling and forming, casting, forging, welding, machining and heat treatment.

Thus, the manufacture of any unit of heavy equipment could be imagined as a combination of the above mentioned processes in which one or several of them may participate. Following this line of thought, it is possible to conclude that there is no rigid correspondence between a

plant originally designed for producing a certain capital goods, and the exclusive production of those goods. In fact, in a plant originally designed for manufacturing power plant for example, other kinds of equipment can also easily be produced, such as boilers, cement industry equipment, milling machinery for mining, pressure vessels, rolling mills, etc.

The fact that each of the manufacturing machines is a standard universal-type machine implies that plants can be used for a great variety of work and produce a broad range of products.

Nevertheless, there are some exceptions for certain kinds of components that form part of the heavy equipment, which do not follow the rule of being produced by such versatile machines. Two examples of such products would be gears and turbine blades. In any event, such components do not make up more than 10 or 15% of equipment value and there is often the alternative of acquiring them from specialized manufacturers, as is the case with gears.

In industrialized countries, plants for producing heavy equipment have varying degrees of dependence on third parties, according to the group of products they manufacture, their production volumes and the components that are common to their products. Another way of stating it would be that they have different degrees of integration of self-sufficiency according to the types and volumes of products they manufacture.

*For instance, castings and forgings are generally bought from specialized third parties, especially in the case of very large heavy pieces. The existence of specialized third party manufacturers can be included in the category of service or process infrastructure which is interrelated or horizontally coordinated with the equipment producing plants. Apart from casting and forging plants, there are manufacturers who produce parts in shaped plate, others who offer machining services, etc.**/*

As proof of these characteristics, various industrial plants may be examined which, producing different combinations of products, have as a common factor, the production of one specific kind of equipment. These plants differ from one another in such aspects as: degree of dependency on other plants; total production volume; the proportion in which various kinds of machinery in their installations are combined, etc. In short, it can be stated that there is no prototype plant for any specific heavy machinery.

This situation naturally makes it necessary for a project designer to find a different method for the design and conception of the plant project than the methods usually used for production-line plants.

As a starting point, the analysis may consider the production volume which, according to demand studies, may be expected to be sold. This would constitute a preliminary definition of plant capacity. Later

***/ See Paper of Mr. George Robinson.*

it would be necessary to know the parts or major components which make up the equipment considered in the project.

For each kind of major component, an analysis must be made of the sequence of processes needed to manufacture it. At the same time, the machinery for each of such operations must be identified along with the necessary machine hours. This would provide an approximate first definition of the group of machines and total time of use for each, in the manufacture of the part being considered.

An examination of high-cost equipment reveals some machines that have a low coefficient of utilization. This situation stimulates various alternatives to be analyzed.

*One possibility is that, if the general coefficient of utilization is satisfactory, such a situation may be considered acceptable. On the other hand, the possibility of turning to a third party's services may be analyzed in order to avoid investing in very expensive equipment which may not be fully utilized.** The option of producing another product that would require the use of machine-time of the under-utilized equipment can be examined, and finally, the possibility of selling the services of the under-utilized machines could also be considered. Naturally, the last two options would require a market study of the complementary products or services to be offered.*

*** See paper of Mr. George Robinson.*

*Of all the options mentioned, probably the most practical is that of not installing costly equipment that would be under-utilized, in the plant.***

The consequence of this choice is a decrease in the degree of integration in the plant, with subsequent imports or a greater inter-relation with the rest of the Capital Goods sector in the country. In any event, it can be kept in mind that the alternative of importing a part or component can be temporary and that other users of the same part or process may eventually create market conditions favourable to the later development of national supply for such items. In this sense, the project planner should not forget that among several possible solutions, one may have greater multiplier effects than others, within the Capital Goods sector of the country.

As a complementary consideration to all of the above, it must be added that it is necessary to apply the same analytical system to various equipment design technologies or conceptions, since it is always possible that one of them may provide more advantageous conditions in terms of usage times of the various production machines. For this reason though plants of international manufacturers do not offer possibilities of using standard patterns or integral conceptions, is it important to obtain information regarding specific technical data through direct visits to such plants.

*** See paper of Mr. George Robinson.*

In the majority of the aspects analyzed so far, national integration has played a role in one way or another. The quantitative meaning or interpretation that this concept generally holds is related to the percentage of savings in foreign exchange provided by the project, contrasted with the alternative of simply keeping the import practice.

Since savings in foreign exchange increase to the extent that the largest possible number of components for the equipment are also locally produced, the industrial installations for the project will vary according to the degree of integration desired.

Nevertheless, it is necessary to take into account the fact that there is always the alternative of achieving part of the integration through subcontracting or buying components from other national producers. In this case it is necessary to distinguish between in-plant integration and integration provided by other manufacturers.

Thus, the industrial concept of the plant may be modified somewhat if the possible increases in national integration are covered by buying or subcontracting components or services from other national manufacturers.

The determination of an adequate degree of in-plant integration for a given production volume, depends, as was stated before, on those components whose processing times imply a good coefficient of utilization

of the machines used to manufacture them.

Other components, or some process of a component, that require a machine whose total use would result in under-utilization, are the elements that should define the part of national integration which would be covered by turning to other manufacturers.

*In effect, a decision of this kind represents horizontal linkage within the Capital Goods Sector.***

In spite of the economy that individually and globally results from this kind of orientation, those who elaborate projects and even investors themselves, as well as the enterprises that grant licenses, are often reluctant to accept the option of horizontal linkage in the project. In fact, the solutions proposed are often more oriented toward importing critical components, with additional benefits for the enterprise that provides the technology.

Although it is less frequent, sometimes a decision is made to include new products lines to be manufactured so as to obtain greater work loads for under-utilized equipment. Although this alternative does not lead to horizontal linkage within the sector, at least it enables manufacturers to attain good integration levels in economic terms.

It can be concluded that as far as project preparation methodologies are concerned, there seems to be a more accentuated

*** See paper of Mr. George Robinson.*

process of feed-back among the stages of the studies than in the case of common goods.

The product which is the initial motive of the project, the degree of in-plant integration, the degree of national integration, volumes of production and possible complementary products, all put into motion a repetitive sequence of analyses, before arriving at the final definition of each of the aspects mentioned.

Production Costs.

The added production costs, compared with the raw material value, are greater in the heavy equipment industry than in the production of other type of goods. Therefore it seems interesting to determine which of the basic aspects gives rise to these differences. Let us see, as an example, what happen with the costs in relation with salaries. In the case we are analyzing it can be seen that the size and weight of parts and components requires skilled workers who have to handle high value and complex operation machines. As a result, the costs included in the heavy components implies higher economic risks in case of failure. This is why every operator must be highly specialized, with great ability in his performance; each operator therefore must be very responsible and furthermore, more personnel are required as the components are tailored, one by one. As a consequence, heavy equipment manufacture needs offers higher wage levels and also uses a higher proportion of costs as

salaries, as compared with the costs of raw material consumption.

As for the production equipment, it has been said that the machines involved in this process are normally of a great cost. For this reason, the costs of equipment depreciation are also higher. Also, because of the characteristics of the work load, the equipment is not used continuously, so there are idle times, making it even more costly if we consider the greater value of the machinery.

Likewise, the material handling systems required to move and position big and heavy parts, constitute an important amount within the fixed assets investment. So, the corresponding depreciation cost is heavier in the cost structure of the heavy equipment production than in the consumption goods production.

A revision of the production cost derived from technology aspects shows also important differences. Every company which is proprietor of its own technology must have a research and development complex. Furthermore the research costs must be distributed among a very small number of produced unities. Also, it is necessary to consider that capital goods made to order often require special designs different from standard alternatives offered in catalogs. For this reason, it is necessary that another department exists; one dedicated to the design of special equipment or to adaptations from other more similar to standard alternatives. To illustrate the consequences of this, it can be pointed

out that a specific company found that in its turbogenerator production division, the design and research departments, jointly, made up for 18% of the total cost. For this reason, companies in developing countries which must operate with technical assistance and technology transference agreements, pays higher fees than those paid in the case of intermediate or consumption goods industry.

Quality control is another aspect which establishes important differences in the cost factors.

In the equipment manufactured to order, the quality control is not based on sampling.

Every "raw material" or components received and every part manufactured is subject to a rigorous quality control.

Assembled and finished equipment is also submitted to an exhaustive and careful inspection. Besides the time and specialized personnel necessary for these controls, it must be taken into consideration that facilities and equipment for quality control are extremely sophisticated and this implies a very high investment value. Here is found again another additional depreciation cost higher than in the consumer or intermediate goods manufacture case.

Therefore it is possible to conclude that the most of the costs analyzed are mainly fixed costs. An exception is perhaps the technical assistance fees, agreed upon as percent of sales, by companies that do not have or are in the process of forming their own technological

heritage. Labour must also be considered as a fixed cost. In effect a company must be ready to attain a 100% production capacity as soon as the market situation requires it. Under these circumstances, it is good to bear in mind that this specialized personnel, with their long training can not be dismissed and then rehired whenever the production levels so require.

Whoever analyze a project of this kind must pay special attention to the fact that the fixed costs at all production levels are a higher proportion of the total cost than in the production-line goods cases. This situation prevails in the domestic price fixation by international manufacturers in their home countries. In this sense, not only the higher cost have an influence, but also the fact that the sales average will be substantially lower than the normal production capacity. According with this, one way to lower the break even point, is to increase the sales price, in relatively protected markets. If a project is evaluated on the basis of constantly selling the full capacity of production under ideal conditions, the economic yield will be extremely attractive.

One way to see how far the higher proportion of fixed costs influence the heavy equipment production and the expectancy of a lower average facilities use, is to compare the raw material and total costs in both type of cases.

To do this comparison it is enough to observe that in the

metal-mechanical area, for instance, the consumption or intermediate products price goes from 1 to 8 dls. per kilo.

With the same raw material unitary price, the sales price of the heavy equipment goes from 4 to 40 dls. per kilo.

However, it is necessary to keep in mind that the different extent of dependence from outside in relation to the reception of parts and component delivered from other suppliers may change in each case the proportion between fixed costs and variable costs.

In effect if a company, instead of having its own facilities and personnel in order to manufacture parts and components of the equipment, buys it from another, such company is replacing fixed cost related to labour and depreciation, for variable costs.

As a consequence, the costs due to the plant processes decreases for that company, while the total purchase value increases.

Since it is true that in the heavy equipment manufacture, the added production costs to the raw material value are higher than in other goods type, it must be understood that this situation is not limited to the inner cost aspect of one specific company. In fact from the raw material up to the finished product there are several steps which can be distributed among different manufacturers, with the consequent distribution of the added value. So it might be concluded that in view of the difference in

practices among heavy equipment manufacturers, it is not possible to give standard cost structures. To sum up, the increased value from raw materials up to the total production cost, is a characteristic which allows us to see systematic differences in the made to order equipment and production-line goods cases. By and large it is possible to establish as a general fact that in the heavy equipment productions costs, the fixed costs are a higher proportion of the total costs, than in other types of industries.

In the typical costs structure of a turbogenerator manufacturer, with a normal degree of dependence in components supplies from other manufacturers (i.e. forge, foundry, gears, etc.) the fixed costs goes approximately as high as the 40% of the total cost. In the production of great series of articles, 40% of total cost is one of the highest figures attained by fixed costs, at normal production levels.

Items such as screws, small bearings and joint seals are an example of production-line goods which presents fixed cost less than 40% of the total.

The following table shows the cost structure in the manufacture of three heavy equipments with two different integration levels in each factory.

The proportion of cost shown for the higher integration cases corresponds to real companies.

The cases of lower integration belong to project presented by technology offeres for the first or second year of operation.

Costs structure

<i>Equipment</i>	<i>Turbogenerators</i>		<i>Shears and press breaker</i>		<i>Machine - Tools</i>	
<i>Plant Integration</i>	15%	60%	40%	75%	25%	45%
<i>Fixed cost</i>	24%	46%	39%	70%	35%	63%
<i>Variable cost</i>	76%	54%	61%	30%	65%	37%
<i>Total cost</i>	100%	100%	100%	100%	100%	100%

SPECIFIC ASPECTS RELATED TO PROMOTION

To work out a prefeasibility study may be, perhaps, the first step for the promotion of a project, specially when it refers to a Capital Goods case. Before initiating the first contacts with possible international manufacturers who may offer technical assistance, it is necessary to have a reference frame in which the project can be focused. Matters such as demand, estimates of market participation, preliminary idea of facilities, integration degree expected, approximate investment amounts, and rentability figures, all are extremely important to arouse the interest of investors and credit institutions and in order to establish norms under which the technical assistance and possible investments can be requested.

However, in the particular case of the Capital Goods, product identification requires special care, as the application ranges and their combination with other complementary products can make the project plan change completely and the needed technology suppliers may be other than those originally chosen. For instance, if the subject deals with steam turbines from 5 MW to 60 MW, it is possible to arrive at the conclusion that the project can be carried out in conjunction with the production of electrogenerators within the same range. Differing from the above, for the case of turbines from 0.5 MW to 2 MW, where the complementary products may be pumps and compressors. Consequently, the possible licensors are not the same for each case.

The various steps corresponding to: Request for technical assistance propositions, their selection, and the necessary negotiations are strongly dependent among themselves and determined in many aspects by the principles defined in the feasibility preliminary study. This link is so tight that often during the negotiation stages it may be necessary to remake the initial study for instance because the possible products combination may be different according with the technological scope of the different international manufacturers interested. In the following pages references will be made to the different stages needed to develop a promotion. The order in which they will be analyzed is the one that seems more natural in its sequence, but the project may be the product of the cyclic repetitions of the stages, more than once. The

steps to be analysed, are: The initial prefeasibility study; the request for offers of technical assistance; the selection of the best offer and the final negotiations.

Finally, it is necessary to add that the scheme to be presented presupposes that the principal promotor of the project is an industrial development institution of the public sector. However, the same sequence of analysis and actions is recommended in the case of promotion by a private sector institution, or both.

Prefeasibility Study

As was said before, from the point of view of the interest the project may arouse among the investors, the credit institutions and the public sector institutions tied to this industrial sector, the prefeasibility study presents the technical and economical figures and necessary information for the consideration and analysis to be realized by those who must make the initial decisions.

When making the study preparation, it is possible to distinguish that it has its starting point in the identification of the product whose manufacture could be economically feasible. After the demand estimations it is advisable to visit the different international manufacturers, in order to have the first contacts with the possible technology suppliers. Also, this is the best way to investigate the technical background, such as the identification of production equipment, the processes needed, the

useful time of each of the machines required to manufacture each components, etc.

Of the same importance is to know the possible products to complement the main production, according with the policies of each company. If the preliminary study results in a non-economic yield on the investment, it still becomes necessary to study alternatives that improve the results. Therefore a knowledge of the possible complementary products may be useful.

After arriving at the best alternative, as the concept of the project, factory integration degree, national integration, economic figures, etc., the prefeasibility study delivers two kinds of information required in the following steps of promotion. One refers to investments and economic yield figures and the other to the technical conception of the project and allows the setting of basis needed to request the technical assistance proposals, with or without participation in investments.

It is of general practice that the furnisher of technical assistance is asked to become a partner in the company which is going to implement the project. Here in after, this assumption will be adopted.

Request for the Presentation of Proposals.

According with data and general information obtained in the prefeasibility study, it is possible to define the basis for the formulation of invitations

to the international manufacturers more fitting to the project, asking them to present offers for technical assistance, technology transference and a partnership in the investment for the new company.

Manufactures whose normal production line includes the product combinations chosen on the study, are the most adequate for the project.

As for the basis for the presentation of proposals, it might be said that the first condition to be covered is to obtain the uniformity of each offer according the concept of the project and secondly to have comparable propositions.

Hence, starting from the antecedents of the prefeasibility study, the purpose of the project must be clearly established; and conditions of legal order and the general policies of the promoting institution, also have to be expressed.

According with the above mentioned purposes, the basis must define in the first place everything that will have the status of condition. In the following lines, a brief comment of the main issues, is made:

- 1. Description of the equipment to be produced, indicating for each of them range and the more important users sectors of the country .*

A knockledge of who are the most important users is a practical way in order to give some idea about the client

specifications.

2. *Expected production volume for each type of equipment.*

The plant capacity must be in accordance with the preestablished volume of production for each equipment.

3. *The minimum plant integration degree, desired in the normal production period.*

The visits paid to international manufacturers and the prefeasibility study made, must give an idea of the integration degree that can be attained, according with the machinery cost, and its usage percentage, etc. On this bases, a conservative integration degree will be established, and this will be proposed as a minimum goal.

4. *Minimum national integration degree desired for the normal production period.*

As explained before, this integration concept is different because it takes into consideration the factory integration and also the components manufacture by local suppliers. As in the previous case, a conservative minimum must be defined in relation to the study.

The arrangement accepted by the technology supplier in connection to the above mentioned concept is tied to an additional effort to develop local suppliers by means of an adequate technical assistance directed towards purchase proceedings.

5. *Shape and scope of technical assistance and technology transference.*

By the very nature of these type of products, it must be clearly defined that the objective is to reach the technical ability in order to make the equipment designs requested by the customers with the new company's own personnel and not always use the drawings given by the licensor.

This design ability implies the transference of the most important part of the technological knowledge of the license.

It must also be stated that the technical assistance related to production shall consider no limitation for the number of trainees and their training period.

This matter must be open to the new company desires according their needs. The same applies to the number and time that the licensor technicians and experts shall spend in the new company, so they can take charge of critical responsibilities during the initial phases of production.

This condition is very important for the learning curve and for the fulfillment of the integration program. It must be kept in mind that a faster learning curve allows higher production and sales in the first period, using the same facilities.

6. *Form and concepts related to the licensor fees payment.*

It is advisable to define from the beginning, that these fees have to be specified as the right of access and use of the technological knowledge and does not include any direct assistance cost.

Only if the new company absorbs the direct costs, is it possible to avoid the limitations in the number of technicians who have to receive training or who shall be put at the disposal of the new enterprise, by the licensor.

7. *Trade mark use.*

If so desired, the proposal bases must establish that the new enterprise has the right to use the licensor trade marks.

8. *Participation in the capital stock of the new company.*

As a basic condition to be satisfied on the proposal bases, maximum and minimum participation percentages must be defined. Also, it must be pointed out the proportion between the stock and the investments, and how the stock participation will be paid.

After defining the desired conditions, it is essential to specify the information that the proposal must contain and also the form of presentation. The manufacturers will deliver their industrial concept of the project and the necessary figures, so with the addition of local cost factors, the prefeasibility study can be completed according to each

proposal.

The essential information that the proposal must contain, is as follows:

- 1. For every equipment and in each category, the average export price FOB from the home country of the manufacturer, must be established. Here in after, this price will be mentioned as reference price.**
- 2. For every equipment, a complete description of its principal parts and components, must be given.**
- 3. The following data will be requested, for each component:
Percentage that each component price bears in relation with the reference price weight and basic raw material; and if it is manufactured in factory or purchased from another supplier as a normal policy of the manufacturer in his home country.**
- 4. Indication of the process time required in each machines, by each component (when they are manufactured in the licenser factory).**
- 5. Components proposed by the manufacturer to be produced in the new factory (Yearly program).**
- 6. Components proposed to be purchased from local suppliers.**
- 7. Description and estimated price of the major machinery and of the complementary facilities proposed for the new company.**

8. *Useful time coefficient for the basic machinery (It can be obtained from the data in par. 4).*
9. *General lay-out and description of building types proposed for the new factory.*
10. *New company's proposed organization and detail of qualified personnel needed, by categories.*
11. *Raw material estimated consumption for the manufacture of components to be made in the new factory.*
12. *Cost factor estimate for the general or minor materials consumption and complementary services expenses in the new company.*
13. *Learning and integration curves estimate.*
14. *Expenses estimate for imported components.*
15. *Expenses estimate for technical assistance direct costs.*
16. *Licensor fees payment estimate.*

If information is provided in this way, comparison of the different offers will be easy to make and besides, it is possible to complete based on the cost factors existing in the country, the feasibility study resulting from each one of those offers. Also, it is possible to evaluate immediately plant factory and national integration.

It is also easier to calculate the useful machine time and to analyze their improvement possibilities; either by means of the increase

*of plant factory integration or by the elimination of some machines, increasing the horizontal association with the rest of national manufacturers.***

Previous experiences show that if the technical information related to the offer is not requested in a similar detailed description as mentioned above, the international manufacturer delivers proposals which not always permit a deep analysis of the industrial concept proposed for the project, and does not make it easy to compare it with the other proposals.

There is also complementary information which must be requested. For example, it may be useful to know the market percentage participation in other areas in which the manufacturer operates and limiting restrictions for possible exports.

It is also important to know if the licensor is willing to facilitate and wish the possible exports to other countries.

Accordingly, the following questions must be asked:

- 1. Countries in which the manufacturer has granted licenses and in which he has commercial areas already granted.*
- 2. Proposed countries to export to, possible amounts and nature of the obligations which the licensor would assume.*
- 3. Sales made to the country in which the project proposes to establish the factory.*

*** See paper of Mr. George Robinson.*

Other questions, important to the project future, are a matter for negotiations and shall be discussed only with the manufacturers who have submitted the best proposals. This point will be explained in the negotiation part of this paper.

Offer evaluation and selection of the best proposal.

The criteria for the evaluation of offers and selection are different if it comes to measure the advantages for the public sector or for a private investor.

Nevertheless, in this type of projects, the public sector is always present; either because it is the investor, or because one of their institutions must grant or approve credits or simply because must authorize the new company operations.

So, the selection system has always to measure the benefits for the national economy derived from the project.

On the other hand, it is necessary to recognize that the subjects of interest derived from a project are not always the same for the governments of different countries.

However, accepting that the Capital Goods sector growth satisfies one of the purposes of the adopted national development strategy, we will suppose that, as a minimum, the project shall have positive effects upon the balance of payments and will be connected with the rest

of the sector so as to make easy its growth and to be and advancement towards technological independence. Complementing this last purpose, the project must imply the generation of employment for qualified personnel. In relation with this last matter, it is important to bear in mind that by means of an increased demand for specialized workers, and high level technicians and engineers, advantageous conditions are developed in order to foster the formation and growth of human resources needed to obtain the technological independence.

As for the aspects which arouse the private investors interest, it can be supposed that both the internal return rate and investment figures are the common factor in the majority of the cases.

After the previous considerations it will be presented, in the first place, an evaluation system that measures quantitatively those benefits for the private investor and secondly those for the public sector. Some comments will be made afterwards, related with those factors whose direct or indirect benefits can not be measured numerically.

This evaluation system consists of only six indexes related to the economic returns of the project, according to each offer and with its effect on the qualified jobs generation and on the balance of payment. Generally speaking, it is easier to use a small number of indexes, attempting that these indexes show the global effects, over the principal purposes.

The proposed indexes, are:

- 1. Investment value*
- 2. Internal return rate for the investment*
- 3. Stock Capital*
- 4. Internal return rate for stock capital*
- 5. Employment generation.*
- 6. Importations substitutions index.*

The first four do not need explanations in their definition or in their meaning or interpretation, because they are universally used in economics and in business administration. As for the employment generation, it can be seen that a practical way to measure the number of persons in qualified posts of high level, is the total number of jobs generated by the project, considering that aside from a very small minority of jobs of secondary or general importance, all jobs require a very high especialization to be fulfilled.

As for the last index, it is good to give its mathematical definition and, afterwards, explain its meaning.

The computation or definition of this index is the result of the following mathematical operations:

- 1. Estimate the expenses in foreign currency, corresponding to the purchase of imported machinery and equipment for*

every year of project duration.

2. *Estimate of expenses in foreign currency, corresponding to the payments of licensor fees and technical assistance costs, for every year.*
3. *Estimate of expenses in foreign currency, corresponding to the importation of parts and components to be included in the equipment to be manufactured, for every year.*
4. *Estimate of alternate value for importing equipment matter of the project, as a result of the difference between the learning production curve and the factory production capacity for each of the first years.*
5. *Estimate of total expenses in foreign currency for the four last paragraphs, for every year.*
6. *Estimate of present value of the yearly expenses in foreign currency for the last paragraph. The discount rate to be used must be the average cost of international credits.*
7. *Estimate of expenses in foreign currency that may exist as a result of the import of the equipment, matter of the project, in case this project will not be implemented.*

The number of equipments that will be estimated as alternative imports, will be in accordance with the full factory capacity.

8. *Estimate of present value of alternative imports, calculated as shown in paragraph 7.*

9. Estimate of the quotient between the present value of foreign currency expenses caused by the project and the present value of the alternative imports, calculated as shown in paragraphs 6 and 8.
10. Deduct from the unit, the quotient calculated in paragraph 9.

The last result obtained in paragraph 10, is the importation substitution index. Its mathematical expression, is:

$$I_s = 1 - \frac{\sum_{j=1}^n \frac{E_j}{(1+i)^j}}{\sum_{j=1}^n \frac{I_j}{(1+i)^j}}$$

Where:

I_s = Import substitution index

E_j = Foreign currency expenses for the year "j", according with paragraph 5.

I_j = Alternate imports in year "j", according with par. 7.

i = Discount rate according with the average cost of international credit.

n = Number of years of project duration.

It can be observed that the import substitutions index definition is tantamount to a coefficient of a national global integration at

its present value and in which all the partial factors participate. Really the national integration referred to the percentage of equipment parts manufactured in the country; the costs and fees for technology; the rate to reach the maximum level of integration; the learning curve proposed which demands the import of equipment while the normal production is not obtained; the higher or lower investment figure according with the machinery used time coefficient and also with the higher or lower horizontal integration with the rest of the sector, are reflected in the way they have influence over the country's balance of payments.

It may be also mentioned that a lesser horizontal interlinking has an affect which is very interesting to the private investor as is the higher investment and a lower internal return rate.

To sum up, it is possible to assume that the quantitative evaluation of the different offers, according with their implied result on the project, can be made by means of the examination of the six suggested pointers.

These pointers show, briefly, the economic yield of the project according with each proposal and its corresponding effect upon the balance of payment and the job generation capacity.

Regarding the evaluation and selection based upon non quantitative factors, it is very hard to establish general rules to design a

procedure for the successive elements in order to eliminate the less convenient proposals, due to the great number of factors that can show up or that may become interesting. Besides, the factors that make a proposal more or less attractive are not always subject to numerical computations as compared with the different characteristics included in another offer.

For this reason, some of these criteria will be mentioned only as an example, on the understanding that their use can help to choose between two proposals equivalent from the point of view of the foreign currency savings and the economical yield.

In this context it is important to consider the commercial participations of each manufacturer in the country and to evaluate the sales volume done with the main users and their experience related to the equipment, matter of the project.

It is also interesting to study the scope of the manufacturer's technological knowledge in regard to other lines of products.

It is necessary, equally, to know the experience that the different companies presenting offers, have had in previous associations and technical assistance agreements in other countries.

If an interest to export is one project's important goals it must be taken into consideration the commitments already acquired by

each manufacturer in other countries, because these can be limiting factors. In the same sense, if near countries exist, that are of easy access for export, the prestige and commercial participation of each manufacturer must be considered carefully.

Negotiations

After finishing the proposal evaluation and qualification process, it is necessary to start negotiations with the manufacturer who presented the best offer, and at the same time, to keep contact with the next best. The chosen manufacturer will be advised that he has obtained the first option for beginning the final discussions, but other manufacturers are trying to improve their proposals at the same time. This strategy offers the advantage of allowing parallel negotiations, side by side, with two or three international corporations making it possible, in so doing, to obtain information on the real limit to which these type of companies may go in any one of the critical items of the agreement during the negotiations. Furthermore, it is the best insurance against a possible standstill in the discussions with the first selected company. To carry on these parallel conversations it is important to establish from the very beginning that there are no formal commitments on the part of the promoting organization as to the date of the final decision.

In this respect, it is good to maintain the flexibility needed for each tenderer to carry his proposal to the limit, of any advantages that

they can offer. Previous experiences show that some time better proposals have been obtained from a manufacturer who did not offer the best alternative in the first evaluation.

In general, it is very hard to separate schematically the evaluation stage from the negotiations stage. The proposal evaluating system continues being applied as far as the conversations with the proposers modify some figures given in their initial offer.

However, there are some concepts which go somewhat away from the statement included in the proposal bases and there are left to be discussed in the final stage of the negotiations. Nevertheless, these matters are important for the company's future operations, their reflection on the balance of payments and on the internal return rate are not of the quantitative kind. This is the case, for instance, of the responsibility accepted by the licensor, regarding eventual claims of third parts by infringement by the use of processes supposedly protected by other manufacturer's patents.

As for the negotiations theme, a description will follow based on previous experiences, of the relevant points and the reasons the manufacturers have for fixing their policies.

In the first place, the learning or production curves must be accelerated because they can have direct influence on the balance of

payments and the internal return rate of the investments, based on the higher production obtained, increasing sales and diminishing imports.

According to guide line proposal statement, the manufacturer accepts, that the training and presence in the new company of his technicians have no numerical limitation.

Of course, an accelerated production curve demands, from the start, a more complex organization and more assistance. Even though the time reduction in the learning curve permits the better use coefficient of the facilities, the manufacturer may oppose it because the personnel available for training and assistance is limited in quantity. Nobody has surplus qualified personnel. This is the background which determines the discussion flexibility.

The reduction in the time for attaining maximum integration level, both local and national, help in the improvement of the balance of payments. For the licensor it is better not to accelerate such integration, because beside the need of human resources for technical assistance being reduced, it makes the investment program longer and he may sell imported parts and components in higher quantities for longer periods. The representative of the public sector must keep in mind the real reason why the licensor does not like to reduce the time for the integration to attain the desired level.

For the technical assistance and technology transference scope and content, it is essential to add to the requirements established in the proposal request, that the technology level must be the same for design and production, as used by the manufacturer at all times, including modifications without additional fee charge.

It is also important to establish explicitly exclusive manufacture in the whole country and the exclusive products commercialization too. Sometimes, when this condition is not clearly established, the manufacturer has commercially competition with his licensee.

There are two eventual situations that must be prevented related with technical assistance and technology transference. One refers to possible claims for patent rights infringement on an specific process. In this case, processes that can infringe third party rights are a matter in which it is very difficult to distinguish how the rights protected by a patent can be differentiated. For this reason it is hard to avoid that parties interested in creating problems will not be able to initiate claims and legal actions for patent rights infringement. However, as a principle, it is necessary to demand that the licensor accepts the responsibility deriving from the patent right infringement claims since the processes which are the subject of technical assistance are supposed to be his property.

The other situation that may eventually come from the use of technology transference is related to the economic harm caused by damages to the equipment components and facilities, as a consequence of an erroneous information.

In general, the manufacturer is opposed to accepting legal responsibilities because his license fees are out of proportion with the risks. Nevertheless, it is convenient to insist that the manufacturer accepts the responsibilities for economic damage. Anyway, it is useful to keep in mind that an occurrence of this kind of situations is very unlikely.

If according with the general economic policies of the country, a special emphasis on exports is desired, there is a need to establish agreements so the manufacturer's intentions in this matter are put into concrete terms. Starting with the fact that exports can not be quantitative commitments, the manufacturer must grant the right for the new company to have the first priority in the equipments supply corresponding to any possible sale made by the licensor organization in a geographic zone previously agreeded. It is understood that as a compensation, the new company will not be free to export to any other country without some kind of restrictions.

In relation to commercialization and export, it is better that the manufacturer grant the new company the use of his trademark.

Other important aspects which have to be included in the agreements is the components prices and the corresponding adjustment system. In some cases, when the agreement does not include this aspect, the company has had to suffer unilateral increases in the price, so much out of proportion that the operations were in a great danger of failure.

So it is of the utmost importance to fix the reference price level of the equipment, and according to the percentage of the whole equipment represented by each part, so that any component value is clearly known. Also, this reference price must be in accordance with the normal export prices and not with domestic prices in the manufacturer's home country. The modifications due to inflationary effects must be fixed by an adjustment formula based on cost indexes of labour and metal with official validity in the country of origin.

However, in the validity of these considerations, in the global agreement it is necessary to consider that the discussion about the license fees is not an entirely isolated fact in relation with this definition of the components price, as will be seen later.

In connection with the license fee, the manufacturer for instance will argue the product complexity, the experience transferred in

in the product design, the research and development costs, etc.

On the other side, the obsolescence of the product global concept, the technology maturity and other factors will be analyzed.

Suming up, both the license fee and the parts and components value are foreign currency payments, made to the same person. So in the comparative analysis of the proposals and in measuring the advantages obtained through negotiations, present value calculations must be done, resulting from the forecast of the joint payments for the components purchase and the license fees.

Finally, it has to be mentioned as a relevant item, some aspect involved with the technical assistance during the instalation and assembly period of the factory. It is necessary that the manufacturer gives assistance in the purchase of machinery and in the selection of the best offers and that he will be present at the equipment reception, but under no circumstances should a turned key contract will be accepted.

In this type of systems, additional cost of the facilities may increase up to 20% over the direct acquisition value. When the licensor produces also some of the machinery to be installed, he can only be accepted as a supplier, only if his offer is a competitive one and under the same system of participation.

Once the successive negotiations are finished, the last data will be available and so with this it is possible to present the best proposals according to the most advantageous final position of each, as feasibility studies. Among these, using normal evaluation techniques and adding the foreign currency substitution index, the most convenient may be selected.

The feasibility study selected by this way is the best document of information concerning the process followed and could be used as a planning tool for the company to be established.

In general, it is essential to consider that it is very possible that the best offer, selected after the final evaluation following the last negotiations, may come from the manufacturer whose presence in the national market is not significant. Conversely, the least convenient offer may come from the manufacturer with the best commercial presence.

The situation regarding the possibilities of future commercialization of the product of the project, could be modified if the Government decides to apply a policy directed to the effective protection of domestically produced Capital Goods, within a reasonable price level. To convert this policy into a real incentive, it must not be only a protective tariff. The alternative of import must be absolute denied and subject only the exception that the national manufacture surpasses a preestablished price level.

In a situation as the one described or some other similar, guaranties will exist that allow the project promoters to select the best offer, regardless of the manufacturers previous commercial presence.

In this way and as another convenience the promoting group will have their negotiating capacity strenghtened, in relation with manufacturers which have higher sales in the country.

FINAL REMARKS

Generally speaking, the preceding considerations have had as basic purpose to show the most important differences that the preparation and promotion of Capital Goods projects have in relation to the procedures used in the case of the consumption or intermediate goods.

Nevertheless, it is necessary to bear in mind that a specific project identification has a more clear sense if it is possible to see the relation that ties it to the whole sector.

In this context, to know the offer and demand of the more relevant Capital Goods, the existence of an integral concept of development in this field, the security and incentives implementation on the part of the public sector and, in short, the knowledge and security that other projects are under way or at least have been already approved, allows an increased chance of successful manufacture of specific goods and optimizes the coordination degree that the project may have with others./*

Having in mind this last goal and as a synthesis reflection it will be useful to do an inventory of the more important considerations previously outlined, in relation to the Capital Goods project promotion.

To begin with, it is interesting to point out that without the information and concept formation delivered by a prefeasibility study, it is difficult to arrive, to an adequate conception of the project, considering

**/ see paper of Mr. Fernando Fajnzylber.*

the country's needs. That will allow the basic definition, upon which the technical assistance and association proposals can be requested. Later, as a tool for the evaluation of offers and the negotiation progress, the feasibility study again becomes a useful way to handle and analyze the subject.

Secondly, it can be pointed out that often we must face the fact that the selected offer belongs to the manufacturer who has had less commercial presence in the country and that some inconvenience may rise from the manufacturer with the higher commercialization level. If this is the case, only an adequate and effective set of laws, protecting the domestic production of capital goods, could permit the selection of the best offer, regardless of the previous commercial presence.

Thirdly, it is important to point out that in every of made to order equipment case that technological transfer is needed, the negotiations must include the commitment of the licensor to supply sufficient information and training, in order to enable the manufacturer to design the projected product. In this sense it is necessary to consider that each equipment, requires special design or, at least, modification of similar designs, and in this ability lies the turning point of the technological knowledge which is needed to be transferred.

In this connection, it can also be mentioned that the employment generation capacity in manufacture of this type of Capital Goods, is one of the most adequate tools to create human resources

toward technological independence, as many of these jobs demand highly qualified personnel. Particularly, the field of design demands a multidisciplinary combination of specialities at the highest engineering level.

Fourthly, it is important to consider the linkage of the project with the rest of the sector. To the extent that this characteristic is more significant it will produce more multiplicative effects in creating markets for other common components.

At the same time, applying this strategy, the investment can be diminished for every new company and if this criterion prevails in all projects, the whole sector will be benefited.

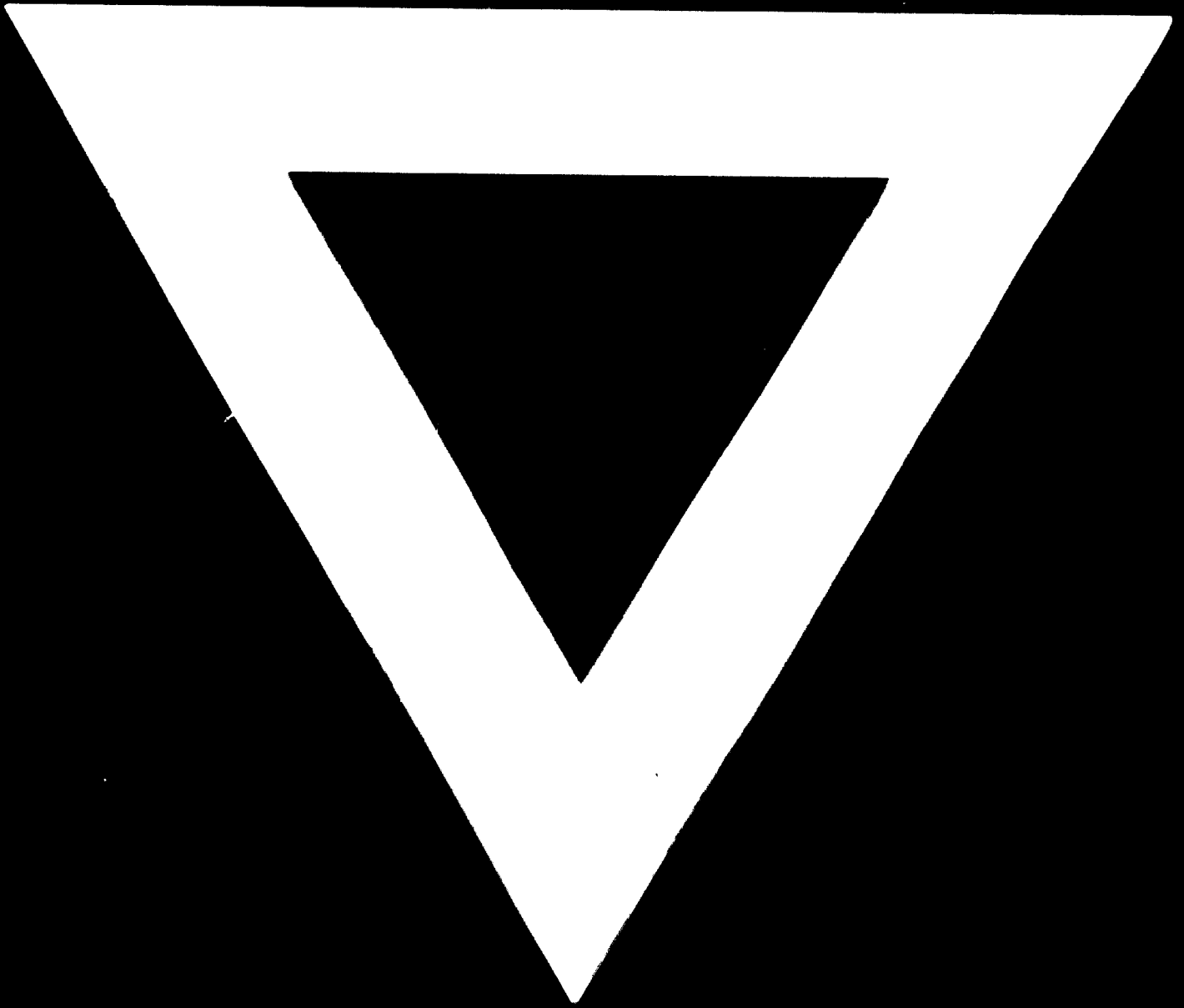
Finally, it can be said, as was pointed out in the initial ^{part} of this paper, that the fundamental intention has been to show the particular aspects in the feasibility studies for Capital Goods projects, and the role it plays in the different stages of promotion.

The source of these considerations is experience picked up directly from this type of project promotion. That may be its validity, because most of the ideas considered are logically previsible but without the essential verification would not have the same value.

For all this, it is expected that those who have to face this type of project and its promotion without the necessary previous experience in the Capital Goods fields, may find in these lines some points of view that may service as additional tool of analysis.



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