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D03043

# *Data uncertainty in the evaluation of export industry projects*

by Momčilo V. Pejović\*

The aim of every investment is to produce economic benefits in some form. The type and volume of these benefits are set and are detailed in documents that serve as a basis for making investment decisions. This documentation is intended to be a realistic presentation of the benefits the investor should expect from the investment.

Sometimes the investor has a wish to invest but no definite investment project in mind. In such cases the documentation is used not only for the appraisal of the type and volume of the expected benefits, but also for the selection of the most favourable project.

The actual benefits achieved by a project can be appraised only after the project is finished and production is yielding concrete results. Experience has shown that substantial differences exist frequently between the expected and the actual benefits. Unfortunately, the differences have usually been in the direction of lower returns than anticipated. There are several reasons for these discrepancies, some being purely subjective in nature. Both the investor and those who have helped him in making his decision (designing and consulting engineers, economists, financial analysts and other experts) may have inaccurately appraised the benefits (effects) to be obtained from the investment. In other cases the poor results are outside the direct influence of the investor himself.

Errors of any kind may reduce anticipated benefits. Sizable errors may jeopardize the very existence of the project, wiping out the expected benefits or even making the project show losses. Errors occur frequently. Their effects, however, are particularly serious for export-oriented industry. Export-oriented industry is established on the assumption that the whole or the greater part of the output will be exported. This means that the sale of the products in foreign markets will depend exclu-

sively on the competitiveness of the product with respect to price and quality. Errors relating to price and quality, as well as errors made in the course of construction in respect of other factors, create great difficulties in the operation of new projects and in some serious cases paralyse production altogether. The situation is all the more critical in developing countries, where the effect of errors may retard the entire planned economic development.

The object of this article is therefore:

- (a) To explore the difficulties that arise in evaluating industrial projects, and in particular export-oriented projects, mainly as a result of the inaccuracy of data on which the evaluation is based;
- (b) To point out possible errors in the assessment of individual factors that are necessary to provide a clear picture of the project, as well as to appraise the significance of individual errors and their order of magnitude;
- (c) To indicate the consequences of inaccurate data;
- (d) To suggest measures for overcoming defects in projects and for eliminating errors.

## **BASIC CONSIDERATIONS ON THE RELIABILITY OF DATA NEEDED FOR EVALUATION OF INDUSTRIAL PROJECTS**

Everyone concerned with evaluating industrial projects (investors, financiers or government bodies) should have at his disposal sufficient economic and technical documentation to obtain a clear picture of the project under consideration. In this respect it is necessary first to consider the available data on some basic factors without which a project cannot be carried out. These data relate mainly to the raw material basis and to power, water, transport and labour.

Other factors that must be analysed are those that help to establish the economic justification and feasibility of the project; these are the factors determining the volume

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of benefits that the new project should bring. Here, project evaluation involves an examination of the cost estimate of the project, of raw material prices, of the sale price, market possibilities, financial analysis etc.

The economic and technical documentation that serves as a basis for the evaluation of an industrial project is referred to by different names in each country. But irrespective of its nomenclature, the documentation should provide as realistic a picture of the industrial project as possible. In this article the term investment programme will be used to denote this type of documentation. It is preceded by feasibility studies and is followed by engineers' designs.

#### *Raw material basis*

Special attention should be paid in the investment programme to the raw material basis; detailed explanations and proofs must be provided as to the sources of raw materials for the project. On the one hand, it is necessary to check the statements on raw materials made in the investment programme and, on the other hand, to establish independently of these statements whether the required quantities of raw materials are actually available and for what period of time.

To ensure that the raw material basis has been secured, it is necessary to establish precisely what kinds of raw materials and what annual quantities are required for the planned production process. For this purpose it is necessary to ascertain the exact productive capacity of the future project and the number of shifts planned. It must be determined whether the raw materials can be acquired on the domestic market or will have to be imported. In addition, one should carefully investigate whether domestically produced materials will meet the requirements of envisaged production.

Raw material for manufacturing industries, including machine-building, metalworking, shipbuilding and the production of electrical equipment and accessories, are mainly the products of iron and steel and non-ferrous metallurgy. If the investment programme is oriented towards the use of domestic metallurgy products, it is important to check whether the domestic sources of supply (both existing works and works under construction) have surpluses over and above the requirements of the existing manufacturing industries.

For food processing and other branches of the processing industry, the sources of raw material supply should be determined with a high degree of precision. Only surpluses of agricultural produce available with a considerable margin of safety may be accepted as the raw material basis for this industry. The determination of surpluses for industrial processing is very complicated, and utmost caution must be exercised.

If the raw material is to be supplied from abroad, this should be stated in the investment programme, with the country from which it is to be imported specified,

if possible. If because of the foreign-exchange situation or the desire to develop economic relations with a particular country the import of raw materials of inferior quality is proposed, it should be established in advance whether the processing of such inferior raw materials in the plant will be possible.

It is risky to build a factory relying on imported raw materials if the possibilities of obtaining these raw materials from abroad have not been accurately appraised or if the supply has not been assured for an extended period. If due care is not taken, such a factory may have to work at reduced capacity or even to cease to operate. Difficulties may arise for many reasons. The raw materials in question may be in short supply in the world market owing to increased demand. Thus, the first objective of an analysis of the possibilities of importing raw materials should be to estimate the movement of demand and supply of the raw materials in question for a future period.

The foreign-exchange situation must also be carefully investigated. It can happen that even though a raw material is actually available in the world markets, it cannot be purchased because of a shortage of the required foreign currency.

Development of an export-oriented industry on the basis of imported raw materials is a rational undertaking only when well-qualified, cheap labour is available, or when there are close integrational relationships between firms in the primary producing country and firms in the country importing the raw material.

#### *Power, water, transport and labour*

Sources of energy sometimes play an important role in the selection of location. It is necessary to determine what kind of energy is to be used and whether a sufficient supply can be made available. For large-scale projects consuming great quantities of electric power (for example, electrolytic plants for production of aluminium), it may be necessary to build new hydroelectric stations. In such cases, it should be verified that the necessary resources are available for this purpose. One must also check whether the transmission of energy to the project has been provided for (i.e. whether there are transmission lines and transformer stations, pipelines for the transport of natural gas etc.).

Water is an important factor; depending on the nature of the technological process, it may even be the decisive factor in the choice of a project's location. The following points must be determined: whether water is available in sufficient quantities; whether the characteristics of the water to be used meet the requirements of the planned technological processes; and whether provision has been made for the disposal of waste water.

Transport facilities often play a decisive role in the choice of location. The term "transport" in this context covers both the incoming conveying of raw material

supplies and the outgoing shipment of finished products. Transport analysis should include an investigation of: (a) the category of transport (railway, waterway, road) and (b) adequacy of transport facilities.

The following points should be checked as regards labour: whether the total numbers and structure of labour foreseen are adequate to assure full production within the planned framework; what has been undertaken to train labour for the execution of the planned operations; and what additional training will be needed.

#### *Other important factors*

The estimated cost of the project must be arrived at on the basis of reliable data and documentation. For construction works documentation includes the bill of quantities and cost estimates, while for equipment complete engineering or other equivalent technological information should be provided. In addition, it should be evident from the documentation whether all construction materials and construction labour can be obtained in the domestic market or must be imported. In the latter case, it is important to ascertain whether these imports can be maintained on the basis of established channels or whether special provision has to be made in order to assure the supply required. Similarly, it is necessary to establish whether the equipment is to be imported or supplied by domestic producers. The efficiency of the domestic machine-building industry presents a special problem; the domestic industry often participates in the execution of a project although there are reasonable doubts whether it can do so satisfactorily.

Special attention should be paid in the preparation of the programme to the presentation of raw material prices and other costs. In view of the variable character of prices, it should be clearly indicated for what year they have been taken and by what safety factor they have been adjusted. A similar procedure should be followed to obtain selling prices that are as realistic as possible.

### CAUSES OF MISCALCULATIONS

#### *General considerations*

The kind of documentation required for the evaluation of a project and the points to be scrutinized with particular care when the validity of proofs and forecasting is being appraised have been mentioned above. The following section considers cases in which the actual results fall short of what was foreseen in the programme documentation. Such shortcomings may become apparent immediately after the new works have begun to operate, or they may emerge only later.

A faulty evaluation of the raw material basis may cause great difficulties for the new works. Shortfalls in raw materials may arise for several reasons, some of which are:

- (a) The raw material basis has been overestimated, i. e. it is impossible to obtain the required quantities of raw materials from the source foreseen in the project and it is necessary to find additional sources;
- (b) The construction of the works that were to provide the raw material has been delayed and it has become necessary to find, on a temporary basis, another source of raw material supply;
- (c) Raw material prices are higher than the level foreseen;
- (d) The quality of raw materials supplied is below the standards foreseen.

All these distortions in the raw material basis cause a considerable increase in production costs in addition to interruptions in production. Frequently, additional investment outlays are needed to cope with these unforeseen costs.

One category of miscalculations originates from errors in the estimated cost of the project. Any increase in the estimated cost of the project means additional investment outlays, which, in turn, result in an increase in the cost of production. Another group of miscalculations is connected with downward trends in selling prices, which may also introduce substantial distortions of the expected results. In fact, all faulty calculations, no matter in which field they occur, influence each other. All these errors are of a subjective nature; that is to say, they can be avoided or at least minimized if care is taken in the initial analysis.

#### *Cases in which the results fall below expectations*

All the cases where the results achieved fall below expectations may be classified according to the subjective causes that lie at the root of miscalculations. Generally speaking, miscalculations are due to unrealistic evaluations of capital expenditure, input costs and expected market demand and growth, and the selling prices of produced goods.

The project must be examined critically. All statements and data that serve as a basis for the calculation must be checked. The main task of the expert to whom the evaluation of the project has been entrusted is to establish whether the data are realistic. If project evaluation is reduced to a mere verification of figures, it will be worthless and will give rise to undesirable results.

#### *Inaccurate calculations of capital expenditure*

The level of investment outlays affects the profitability of a project. The problem of obtaining additional capital, if it is found during the construction of the project that more funds will be required than had originally been estimated, often leads to substantial and costly delays in project implementation. Consequently, one of the primary tasks in the evaluation of industrial

projects is to establish whether the estimated capital cost of the project is realistic. A few characteristic points in this field may thus be mentioned.

The required investment outlays are often estimated lower than would be realistic either because of a wish to show high profitability for the project or because of omissions in the calculations. Yet planning outlays lower than those actually necessary impairs the normal course of construction and results in losses to the investor and to the community as a whole.

The evaluation of the level of investment in fixed assets may be carried out in two ways:

- (a) By checking whether the value of construction works and of the domestic equipment has been calculated on the basis of current market prices and whether the value of the imported equipment has been computed on the basis of world market prices; previous experience and documentation for earlier projects (for example, invoices for past purchases of identical or similar equipment) may serve as a basis for this purpose;
- (b) By determining the estimated cost of investment per unit of new productive capacity and comparing this figure with the average parameter established for the group of industries to which the investment project belongs; considerable divergences in either direction indicate that the causes for these divergences should be investigated.

Besides appraising the total volume of needed investment outlays, it is also necessary to analyse their structure and to compare it with the structure of similar projects already in operation. Quite often such an analysis reveals a lack of sufficient balance among the individual structural elements.

Evaluation of the level of investment in working capital can also be carried out by two methods: either by detailed checking of every phase of the utilization of working capital or by applying general parameters. In the course of its transformation, the working capital passes through successive phases (stock of raw materials, work in progress, stocks of finished goods before marketing, period of collection of proceeds for goods sold). The days that the capital stays in each phase may be called the "tied days". A detailed phase-by-phase analysis consists of the determination of the number of tied days for every individual phase. This can be established on the basis of earlier experience and of data from similar enterprises.

When the total volume of working capital has been established, the general coefficient of circulation is calculated (i. e. how many times the working capital will circulate in the course of one year). The coefficient should be compared with corresponding coefficients for similar enterprises. Substantial divergences in either direction indicate that something is wrong and that the

calculations should be rechecked and possibly the basic data reviewed.

The appraisal of the reality of the planned productive capacity, which is an analysis of a technological nature, consists in checking whether the planned productive capacities can be realized by input of the estimated amount of capital. This is, in fact, the counterpart of what has been said in the preceding section. It often happens that even though the capital expenditure appears to be realistic, it is actually inadequate in terms of the planned productive capacity. Either the planned capacity can yield a higher measure of output than that foreseen in the project (which means that the productive capacity has remained undisclosed) or the planned capital investment is not sufficient for the realization of the planned volume of production.

It is important to evaluate the reality of the planned productive capacity not only from the point of view of the capital expenditure required, but also from the point of view of the raw material basis and market; for it may easily happen that raw materials will not be available for the surplus productive capacity and as a result a disruption of the production rhythm of existing enterprises may occur. The marketing of production surpluses (over and above the planned level) may also cause serious trouble.

The determination of the date of completion is also important. If the project is not completed on time, adverse consequences are bound to occur. The prolongation of the construction period will mean an increase in capital expenditure because of the increase in the number of interest payments in the course of construction. The prices of building materials may also rise.

To evaluate the accuracy of the programmed construction period, the following factors must be considered: the degree of completion of the technical documentation; the time required for the civil engineering works; the usual time needed for the manufacture of the equipment; and the quality of the management.

There are a number of difficulties inherent in the finding of additional capital if the estimated cost of the project proves to be too low. Construction should ordinarily be started only if all the needed investment capital has been assured.

The position of the investor will be very embarrassing if the planned finance is insufficient to complete the project because the costs were considerably underestimated. He may be forced to find additional capital immediately, and this may be difficult. Usually the search for additional capital causes a substantial slowdown of construction work, which, in turn, increases the costs.

Some of the factors that cause expenditure to rise above estimated cost are described briefly below.

*Poor quality of investment documentation.* The documentation has been prepared carelessly and does not allow

adequately for unforeseen circumstances arising in the course of construction. Either the bill of quantities data or the prices taken as a basis for the calculations were unrealistic. Thus the foreseen limits may be exceeded for both fixed assets and working capital. Additionally essential elements such as sewage-disposal units may not have been taken into account in the plans.

*Increase in the size of the plant.* The documentation has been prepared in a satisfactory manner, but in the course of construction the investor decides to increase the size of the plant either because he wants to expand the project or to introduce changes in the original concept. (For example, he decides to purchase a different type of equipment, of better quality than that foreseen in the investment documentation, and this is reflected in a changed volume of construction work.)

*Rises in price.* Rises in the price of construction work (services) and of equipment frequently occur, caused by increases in the price of building materials and components and by rises in wage rates. Thus, it can happen that, in spite of well-prepared documentation based on prices that were realistic at the time the documentation was being prepared, the actual cost will still differ from the estimated cost. This is quite usual when construction requires a rather long period of time. As a result the planned amount of working capital may prove to be insufficient to cover the needs of current production. The amount is estimated when the documentation is being prepared, but the actual utilization of working capital begins just before the new industry starts operation. Insufficiency of working capital prevents a smooth operation of the new industry and does not permit it to work at full capacity. This decreases the profitability of the industry.

#### *Miscalculations in the cost of raw materials and other similar expenses*

Production costs comprise the price of the raw materials, energy, water etc., transport costs for raw materials and expenditures for labour. It is not easy to estimate in advance the level of production costs, yet a miscalculation of these costs may completely distort the calculation of the profitability of future production.

The occurrence of higher production costs than those estimated in the project documentation is usually caused by:

- (a) Errors in the application of the norm for raw materials and labour, resulting either from unrealistic norms or, if the norms are correct, from neglecting to take into account specific local conditions (for example, the influence of local atmospheric conditions on the working capability of labour).
- (b) Unrealistic prices of the basic and auxiliary raw materials. It is not easy to determine what the prices will be after the project has gone into

operation. It must be stressed that if the industry is export-oriented, the domestic price of raw materials cannot exceed the level of their price in the world market; otherwise the production costs of the new industry will be too high for it to compete in foreign markets.

- (c) Increase in production costs owing to other circumstances. It may happen that prices have been estimated accurately, but an error has occurred in some other aspect of the evaluation. For example, it may prove impossible to obtain raw materials from the planned source. Securing them from another source may cause transport costs to rise or the quality of the raw material to be below standard. This point is elaborated in a later section.

A miscalculation of the costs of inputs has particularly disastrous consequences for export-oriented industries: either the profit does not reach the planned level or the industry becomes incapable of competing in the world market.

#### *Difficulties in estimating market prices*

It is difficult to estimate whether a selling price is realistic, that is, whether it will be possible to sell a given product at that price by the time the industry goes into operation. This is especially true for new export-oriented industries.

Two kinds of analysis are needed here. First, it is necessary to compare the prices accepted in the project documentation with the prices in both the domestic and world markets at the time the evaluation of the project is being made. Second, an evaluation of the level of future prices must also be made.

Such an analysis is absolutely obligatory for export-oriented industries. The most important question is how to determine the world price. A certain number of products are quoted in world commodity exchanges, and quotation lists are obtainable without much difficulty. It is comparatively easy to obtain data about goods whose prices are published in trade journals (e. g. aluminium prices in New York and London); these quotations may be taken to represent world prices. For many kinds of goods, particularly those that are custom made, there are no readily available world prices. The prices of such products may be obtained by making use of some of the following: price lists of individual world firms; quotations of suppliers at the time when the goods were imported; information on prices by importing enterprises; and invoiced prices by exporters or by the manufacturer (acting as his own exporter).

It is even more difficult to estimate the prices that will prevail in the world market in the future. The trends of price movements must be taken into account. The data on the movement of prices in the last few years can be used tentatively, but the construction of big production

capacities in the world and, in particular, in the area where it is intended to market the products, should be borne in mind.

#### *Measures for avoiding deficiencies in project evaluation*

Attempts should be made to avoid all errors in estimating the cost of investment that results from superficial and poorly prepared economic and technical documentation. Thus, the preparation of this documentation should be entrusted to qualified personnel. If such personnel is not available at home, the documentation should be procured from abroad from reliable world firms, provided that the firms have a thorough knowledge of the market conditions in the country of the investor.

Changes in the project during the construction period should be kept to a minimum. It is better to prolong the period of preliminary studies and to make all pertinent analyses so that the construction can be carried out speedily according to plan.

Errors in establishing the cost of the project resulting from higher prices and contingencies can be eliminated by adding a certain amount as a reserve to the project's established cost, computed on the basis of current prices. Calculation of the reserve is difficult. Experience shows that the amount of reserves ranges from 10 to 30 per cent of the estimated cost of the project established on the basis of prices prevailing at the time of the project preparation (assuming that the construction is started immediately). Naturally, this amount will depend on the type of project, duration of construction, stability of the domestic market, inflationary trends and the like.

Reserve funds should be provided for both the fixed assets and the working capital. Unforeseen circumstances may arise. The consumption of raw materials may be greater than expected, and production may last longer because of low labour productivity and inadequate training of manpower, especially in the early periods of operation.

#### **THE IMPACT OF CHANGES IN ECONOMIC POLICY MEASURES**

In addition to unsatisfactory results caused by miscalculations and subjective weaknesses, errors may also result from changes in the economic policy of the Government. Although it may be assumed that the Government will not pursue an economic policy that will make the position of domestic industry difficult, the impact of measures it may take should be understood, as they are sometimes caused by external circumstances such as a foreign-exchange crisis. Some of the measures most frequently adopted are discussed briefly below.

#### *Changes in currency exchange rate*

The impact of a fall in the exchange rate, from the date of the evaluation of the project until the date when it is put into operation, may be manifested as follows:

- (a) Funds needed for importing equipment increase, and for the same equipment a larger amount of local currency must be spent; thus the project becomes more expensive;
- (b) If the raw materials are imported, the cost of production rises;
- (c) The proceeds from sales of the export-oriented industry increase in terms of local currency.

#### *Changes in tariffs*

Changes in tariffs reflect the economic policy of a country. Increases or decreases of the customs rate between the evaluation of the project and its realization will change both production costs and profits. In addition to its effect on production costs, an increase in the customs rate on imported raw materials can make it more difficult to secure additional working capital.

#### *Other changes in the economic system*

When a project is being evaluated, elements of the economic system that may affect the profitability of the project should be considered. Although investors cannot exert great influence on the economic policy of the government, they can take into account changes that are being prepared or are in sight. The reference here is to tax policies, the policy of administered prices etc. In project evaluation, it is risky to consider only the administered prices, if any, and not take into account what the price levels would be if these administrative barriers did not exist.

#### **SKILL AND PROFESSIONAL COMPETENCE OF KEY PERSONNEL WHO ARE EXPECTED TO OPERATE THE FACTORY**

#### *Preliminary measures necessary to secure adequate staffing*

Before the factory is put into operation, efforts should be made to secure the required personnel, especially the executive staff. Some employees should be sent for training in factories of the same kind, either in the country or abroad. The duration of the training depends on the complexity of the technological process and the skill of the personnel. When complicated technological processes are involved, foreign specialists should be engaged for the period required to instruct and train domestic personnel. This problem arises especially in industrially developing countries, which do not have at their disposal sufficient personnel.

With insufficiently trained personnel, production operates at below the normal rate, consumption of raw materials is higher and waste is greater. Unskilled personnel damage machines and installations. Training labour is a complex problem and cannot be solved easily or speedily.

When equipment is procured, care should be taken to ensure that the supplier will provide for the training

of personnel, either at his own factory (if he engages in such production) or in other factories to which he has supplied similar equipment.

One means of transmitting knowledge of the technological process is to have the future employees of the factory present during the assembly of the equipment, and, if possible, participating in it. They can thereby become acquainted with the machines they will be using. This may involve heavy initial expenditure but in the long run will create a substantial saving.

#### *Impact of the trial production period on the economic efficiency of the project*

Trial production covers the activity of the newly built factory during the testing of the new production units up to the starting of normal production when everything begins to run fairly smoothly with respect to both the volume and quality of production.

Regardless of the preliminary measures taken, the factory will not operate at full capacity immediately. Even in industrialized countries a period of running-in with an unevenness of production is to be expected. In developing countries, which have little or no technical experience, at least in certain branches of industry this running-in period will usually last longer.

In connexion with trial production, the following should be pointed out: in the investment programme, account must be taken of the trial production and the losses that are associated with it; when the project is evaluated the actual duration of the trial production must be established, bearing in mind the considerations pointed out above; and the losses must be estimated realistically so that sufficient investment will be provided in the initial plans.

Errors in this respect may be twofold. First, the period of trial production may last longer than expected, in which case the benefits counted upon from the new investment will be delayed. More serious consequences may arise if firm commitments have been made for the sale of output. Second, the loss may be higher than anticipated. This creates difficulties, for additional funds must be found to cover the loss.

#### **REDUCTION OF ERRORS IN DOMESTIC AND EXPORT MARKET ANALYSIS**

A project has a value only when the products that are to be fabricated have an assured market. For this reason, the project must contain a detailed analysis of the market in which the products are to be sold. It should be clearly indicated in the analysis whether the sale is intended for the domestic market or for export.

#### *How market analysis should be carried out*

The depth of a particular analysis of the market will depend to a large extent on the kind of product and on

the consumption area. One type of analysis will be called for when bakery products are to be sold and another when the products of a great aluminium factory are to be sold. Market research covering a wide area, that is, demand over a large region, is a complex undertaking, often beyond the means of the individual investor.

For many important products, special institutions should be entrusted with market research (domestic and world markets), and the results of such research should be made available to all who are interested, both the investors and those who evaluate the project. Unfortunately, in developing countries such institutions either do not exist or are inadequate for the purpose. One solution is to ask for advice from a foreign engineering firm or from specialized research institutes, but this can be extremely costly. Nevertheless, it is very important to appraise the sales element in a project to the fullest possible extent, since in essence this will be the major factor determining the profitability of the project.

An analysis of the domestic market usually begins with a survey of the trends in consumption of corresponding products over a period of years and how this consumption was met; that is, how much in this period was covered by domestic products and how much by imports. Other points to be considered are discussed below.

The utilization of existing capacities may be one of the indicators of the sale potential of the articles that the new factory will manufacture. Poor utilization of existing capacities is generally an indicator that the new products will have no sale. Full utilization of capacities, especially if the total demand cannot be satisfied, indicates that sales prospects are good.

Caution should be exercised in establishing the existing requirements (production and imports), because it may not be possible to satisfy the residual demand entirely through imports. Imports may be limited by the foreign exchange available; they would be far larger if more foreign exchange were available. To determine whether existing capacities are sufficient to meet domestic requirements, account must be taken of the assortment that domestic capacities can provide. Often the range of domestic production is limited, so that not all varieties of demand can be met.

A permanent shortage of some products in the domestic market is proof of unsatisfied requirements, but it is not easy to estimate the extent of additional needs. When unsatisfied requirements are evaluated, account must be taken of factories being constructed whose products, as substitutes, will be able to meet the ascertained needs. For example, prefabricated elements may replace full bricks; cardboard may replace wooden packing cases; and plastic materials may replace both wood and metal.

In some branches of industry, for example, the chemical industry (plastic materials, artificial fibres),



technical progress is very great. Inventions follow one another with such rapidity that the latest invention can make the preceding ones obsolete. Technological obsolescence must be taken into account in an evaluation of the future market.

An analysis of foreign markets is more complicated. On the basis of a knowledge of the world market as a whole and of its various branches, it must be determined whether it is possible to export the articles one wishes to export and where to export them. Since the evaluation of export possibilities is complicated, one should be conservative in evaluating sales through exports (on this point see the section on prices), especially if the bulk of the production, owing to a favourable raw material basis, is directed towards export. Account should be taken of all large factories under construction over the world that will contribute to an increase in supply of the products in question in the world market.

#### *General approach to the problem of selling abroad*

The best means of ensuring foreign sales is to have the sales secured by long-term contracts. Reliable foreign partners are needed for such contracts. The only question that arises is at what prices deliveries will be made. Two approaches to this question are possible: to fix in advance the selling prices that will be valid for the duration of the contract; or to make deliveries at world prices. Both methods involve risks. As there is little probability that prices will remain the same over a long period, stipulations at fixed prices are seldom used.

When the construction of the project is carried out with foreign credit, it is often stipulated that the repayment of the credit is to be through deliveries of the products of the new factory. In this way, the sale of products is in part secured (to the amount of repayment), but only for the period in which the credit is available. However, this method of repayment means penetration into the market of the country supplying the credit and creation of conditions for further sales.

Often in evaluating the possibilities for sales, only specific regions are considered. The foreign-exchange

position of some countries may not always permit them to make purchases in the most industrialized countries. Thus, exchanges between individual countries frequently make possible the sale of certain products at world prices, in spite of world competition.

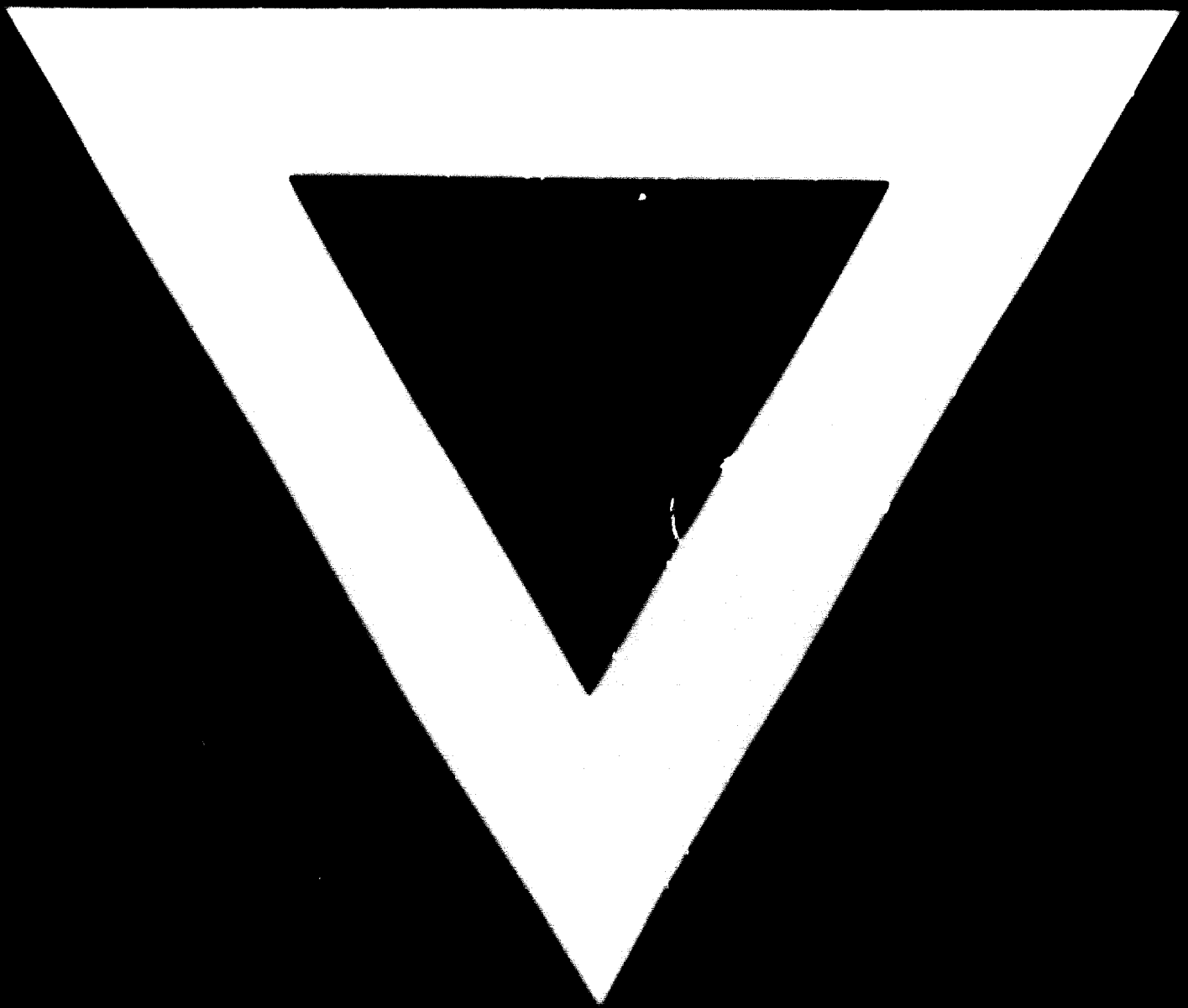
Failures of export-oriented industrial projects are not rare. One of their most frequent causes is an unrealistic evaluation of optimal or rational capacity. In view of the situation in the world market, capacities should have been larger; as it is, production costs are too high for sale at world market prices. High prices may also be the result of low productivity and inferior quality of the product. Another cause is misjudgement of sales potential. Although conditions in respect of quality, prices etc. have been fulfilled, the products cannot be sold, owing to the competition of firms from other countries.

#### CONCLUSIONS

The evaluation of industrial projects is a complex and responsible task. Those who undertake it should have wide experience, a good education, an acquaintance with the domestic and foreign markets, and the ability to forecast the situation that will exist at the time a project is put into operation. The evaluation should be based on solidly prepared documentation.

Errors in all kinds of calculations are a normal occurrence. They appear in estimates of capital expenses (both for fixed assets and working capital), of production costs and of selling prices. Errors in these elements (sometimes even of minor importance) may have distorted the planned effects to such an extent that, had they been known in advance, the project would not have been constructed. This is particularly important for developing countries, which lack capital, especially in relation to projects of export-oriented industry. Failures caused by misjudgement of the requirements for successful exporting should be studied especially.

This article has attempted to acquaint the reader with the errors in calculations and in judgement typically found in project evaluation. It may be possible to avoid most of these errors if the evaluator is forewarned.



**10.7.74**