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United Nations
Centre for Industrial Development

Original: English

Inter-Regional Symposium on Industrial
Project Evaluation

CID/IPE/B.3
Discussion Paper

Prague, Czechoslovakia
11 - 29 October 1965

07586

UNCERTAINTY IN INDUSTRIAL PROJECT EVALUATION
WITH SPECIAL REFERENCE TO EXPORT INDUSTRIES

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65-40722

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I. Introduction

Every investment is designed to achieve some results in the form of economic benefits. Types and volumes of these benefits, as planned categories, are considered in a documentation serving as a basis for making investment decisions. The documentation is in fact a realistic presentation of the ideas of the investor on the benefits he expects to achieve by the investment. On the basis of this, the investor should be able to discern the degree and volume of these benefits.

In some cases, however, the investor has only a wish to invest in order to achieve specified benefits, but has no definite idea regarding actual concrete projects in which to invest. In such cases, the availability of a great number of documentation on various projects, helps the investor to decide where to invest. Therefore, in these cases, the documentation serves not only for appraisal of the types and volume of the expected benefits, but also for selection of the most favourable project.

Actual benefits achieved by investment in a project, may be appraised only when the project is finished and when its production gives concrete results. It is only then that the investor can establish whether the planned benefits of his project and the relevant documentation have been achieved and to what extent.

Experience shows that great differences exist between the expected and the actual benefits in many cases, and unfortunately with negative effects in the main. There are several reasons for this discrepancy. Some are purely subjective in nature. In other words, both the investor and those who have helped him in making his decision (designing and consulting engineers, economists, financial analysts and other experts), have on the whole inadequately appraised the benefits (effects) to be obtained from the investment, underestimating the negative factors, and overestimating the positive factors influencing the planned results to be achieved. Others are objective in nature, that is outside the direct

interest of the investor himself. The role of the investor and of the economic planning authority preparing the project in those cases consists greatly in their ability to appraise the accuracy of the data on which they base their decisions.

Errors of appraisal may arise as a result of mistakes in relation to the planned benefits. Likewise errors may have completely negative effects and jeopardize the very existence of the constructed project, or wipe out the expected benefits, or worse still the project may show losses.

Errors, as negative factors, appear in many cases. Their effects, however, are particularly unkind in cases of industry oriented to export. The construction of industry oriented to export presupposes, that the whole or the greater part of the output will be exported. Practically it means that the sale of the products in foreign markets will exclusively depend on the competitiveness of the product, i.e. whether the price of the domestic product is competitive in relation to world market prices, and whether the quality of the product compares to the quality of the other products usually sold in the same markets. Errors relating to these elements, as well as errors in respect of other factors made in the course of construction, create great difficulties in the operation of newly constructed projects, and in some serious cases paralyze production altogether. The situation is all the more delicate in the case of developing countries. There the negative consequences of errors are reflected still more drastically retarding the planned economic development.

The object of this paper therefore is:

- to explore difficulties arising in the process of evaluation of industrial projects, in particular those oriented to export, and resulting mainly from the inaccuracy of data on the basis of which the evaluation is made;

- to point out possible errors in assessment of individual factors, which are necessary for getting a clear picture of the project, as well as to appraise the significance of individual errors and their order of magnitude;

- to indicate the consequences resulting from inaccurate data;

- to suggest measures for overcoming defects in projects and for possible elimination of errors.

This paper represents a summary of long experience acquired in the task of industrial project evaluation in Yugoslavia. It is designed chiefly for use as an annotated check list for the issues connected with uncertainties arising from misjudgment in project evaluation.

The contents of this paper do not apply to any single country but to all countries facing **largely** similar problems in the course of their industrial development, irrespective of their social systems and of whether they have a planned economy or not.

If this paper conveys the seriousness of the problem and draws the attention of all those concerned with evaluation of projects, namely investors, government, specialized agencies, or banks, to all the consequences arising from an inadequate evaluation of projects, it may be considered to have fulfilled its objective. This applies in particular to countries which do not have sufficient capital and which must not risk investment in bad projects. In this respect it should be stressed that investments once made cannot be withdrawn. Therefore bad investments in a factory will remain so long as the factory exists.

II. Basic Considerations on the Reliability of Data needed for Industrial Project Evaluation

For all those concerned with evaluation of industrial projects, irrespective of their motives (as investors, financiers or, government organs) it is necessary to have at their disposal economic and technical documentation and other data, from which it would be possible to obtain

a completely clear picture, with all the needed details of the project under consideration. In this respect it is necessary first to consider the available data on some basic factors, without which no project can be carried out. These data relate, in the main, to the raw material basis, power, water, transport and labour.

Other factors, which in evaluation of industrial projects must be taken into account and analyzed, are those which help to establish the economic justification and feasibility of the project, in other words, they are the factors determining the volume of benefits which the new project should afford. Here, project evaluation involves an examination of the cost estimate of the project, of raw material prices and their costs, of the sale price, market possibilities, financial analysis, etc.

The economic and technical documentation which serves as a basis for evaluation of an industrial project is referred to differently in different countries. But irrespective of its nomenclature, it must be such as to provide as realistic a picture of the industrial project as possible. We shall use the term investment programme (or investment project), to denote this type of documentation. It is preceded by feasibility studies and followed by engineer's designs.

In this section a basic consideration of some factors, primarily of the basic factors, will be included while other factors will be examined in more detail later.

1. Evaluation of the Reliability of Data Needed for the Determination of Basic Conditions

a) 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 from which the needs of the future project are to be supplied. The analysis of the raw material basis is of a twofold character: it is necessary, on the one hand, to check the statements made in this respect in the investment programme and

and on the other hand to establish, irrespective of the statement made in the investment programme, whether the required quantities of raw materials are actually available and for what period of time.

In order to make sure that the raw material basis has been secured, it is necessary first of all to establish precisely what kinds of raw materials are required for the planned production programme in what annual quantities. For this purpose it is desirable to ascertain exactly the productive capacity of the future project and the planned number of shifts.

To check the exactness of the calculation of the quantities of raw materials required we should first find out generally accepted technical norms for the quantity of raw material to be used per unit of finished product. The quality of the raw material is a most important consideration in the establishment of the standard norms for raw materials.

The next problem to be considered in connection with the evaluation of the raw material basis is the origin of the raw materials, that is to say, it must be seen whether the raw materials will be required on the domestic market or will have to be imported.

Domestic Sources of Raw Materials: The basic characteristics of the domestic raw material basis differ from those of raw materials imported. We shall state briefly a few of the basic characteristics in this connexion:

Mines and Oil Fields. The evaluation of the raw material basis in case of mines (all kinds of coal, metals, non-metals) consists of:

- determination of reserves. In connection with the survey of prospecting, different categories of reserves are distinguished. Only those reserves whose availability has been established beyond any doubt and such as can be immediately mined, may be taken into account for evaluation. The main objective here is to check the quantitative reserves

the existence of the reserves in question. In some countries special government agencies have been formed for carrying out geological prospecting and these agencies issue certificates confirming the availability of the ore reserves. Ore reserves which have not been fully prospected are not eligible for exploitation and may serve as orientational guidelines in estimating the perspectives of future exploitation.

- On the basis of the established ore reserves and the envisaged capacity of the mine, the working life of the mine is calculated by dividing the reserves by the capacity of the mine, and in this way the number of years of potential exploitation of the mine is obtained. Admittedly, it is assumed here that the ore deposit is compact and will permit utilization of the capacity of the mine to the full extent over the whole period of its life. On the other hand, it is extremely important to establish the dynamics of exploitation of the ore reserves, that is to find out how much ore can be extracted every year. It often happens that the quantity of ore extracted varies from year to year, particularly at the beginning and end of the potential exploitation period. At the beginning this is due to the large quantities of gangue which has to be extracted before the main part of the ore body is reached; at the end of the exploitation, it is occasioned by the reduction in concentration of the ore, while the percentage of worthless rock is increased. The crucial point here is to establish the number of years of full working capacity of the mine;

- Determination of the caloric value of coal, or the metal content of the ore, or of the quality of non-metals. Experience has shown that a mine should not be exploited at all if the caloric value of coal, the metal content of the ore, or the quality of the non-metal is below a certain given standard. In such cases it is not necessary to proceed with the profitability analysis; and it may in advance be established that the domestic sources do not assure the raw material basis.

Generally speaking, what has already been said as regards mines, applies mutatis mutandis also to exploitation of oil fields.

Metallurgy. When speaking of the raw material basis for projects in the sector of iron and steel, we must be clear about the type of investment project we have in mind. For project evaluation purposes at least the following production facilities must be considered individually: iron ore mines, iron furnaces, steel works, rolling mills, etc. These may constitute individual projects or they may be combined as a combined single project uniting all the facilities listed above, or at least the last four of them.

Raw materials for iron furnaces are iron ores, limestone and coke^{1/}. When establishing whether the iron ore supply is available for the blast furnaces it is necessary to see whether the iron ore mine or mines as the source of raw material can supply enough ore for the blast furnaces of the planned capacity and planned duration of operation. As regards coke, it is necessary to determine first whether domestic or imported coke will be required. If domestic coke is to be used, what has been said about iron mines applies here also.

Raw materials for steel mills are pig iron and scrap iron; raw materials for rolling mills are the products of steel mills, i.e. all kinds of steel.

If a combined project is envisaged, it should be ascertained whether the productive capacity of the blast furnaces is sufficient to supply the steel mill, and/or the rolling mill without impairing the requirements of old customers outside the projected combined works. If the respective productive capacities cannot be coordinated, then it must be determined how the shortage is to be covered.

^{1/} In certain contemporary technological processes electric power serves as a substitute for coke.

If the steel mill and/or the rolling mill are not included in the combined project, the source of iron and steel must be explicitly stated.

In non-ferrous metallurgy, the following types of projects must be distinguished: mines, smelters (electrolytic plants) and rolling mills.

All that has been said in this section in regard to steel applies to production of non-ferrous metals, and the primary raw material source is the raw material for the production of individual non-ferrous metals. Also, attention must be paid to the same side products which will be utilized for the recovery of a given metal. For example, the production of aluminum consists of two phases: the production of alumina and the recovery of aluminum in a reduction plant. The main raw material for the production of aluminum is bauxite and the auxiliary - alumina and electric power.

In the case of non-metals distinction should also be made between mining and industrial production, as for instance the manufacturing of refractories, glass, cement, etc.

Everything that has been said about iron and steel and non-ferrous metals, applies also to non-metals.

Chemicals. This is a very extensively ramified and complex field; one can, therefore, give only the most essential particulars. Mining products, oil and its derivatives, agricultural products, forestry products, etc. all serve as raw materials for chemical industry. Special care should be exercised when the raw material basis is determined for a chemical plant project. For it may happen that the raw material required is actually available but in such a form that it is impossible to use it for production purposes in the envisaged project. Namely, this raw material would previously have to pass through two or even more phases of manufacturing; and for these phases, which often require substantial investment outlays, productive capacities do not exist and new investment capital has not been provided.

Also, it should be carefully investigated whether domestically produced materials will meet the peculiar requirements of envisaged production.

Manufacturing industry. Raw materials for machine-building, metal-working, shipbuilding and the production of electrical equipment and accessories are mainly the products of the iron and steel and non-ferrous metallurgy. If the investment programme is oriented to 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 already operating manufacturing industries.

For food processing and other branches of processing industry, sources of raw material supply should be determined with a high degree of precision. Adequate analysis of the raw material availability for projects in food processing industry is particularly important.

Only surpluses of agricultural produce available with a considerable margin of safety may be accepted as raw material basis for this industry. The determination of surpluses for industrial processing is a very complicated procedure and utmost caution must be exercised.

In order to determine whether the supply of raw materials for a given kind of production is assured, the present level of production (according to statistical records) must be taken as a basis; only after this evaluation of the raw material basis for use by the investor can be made.

Evaluation of possibilities to obtain raw materials from abroad.

If the raw material is to be supplied from abroad, it should be stated in the investment programme - if possible, the country from which it is to be imported. If the foreign exchange situation or the desire to develop economic relations with a particular country dictate the necessity to import raw materials of inferior quality, it should be established in advance whether the processing of such inferior raw materials in the plant foreseen by the investor will be possible.

It is a very risky enterprise to build a factory relying on imported raw materials if the foreign supply possibilities have not been accurately appraised or if the supply has not been assured for a long period of time. If due care is not taken, such a factory may cease to operate or will work at a reduced capacity. Difficulties may arise for many reasons:

- the raw material in question may be in short supply in the world markets due to increased demand. That is why the first objective of such an analysis is to survey the movement of demand and supply of the raw material in question over a long period of time. Development of domestic processing industries in the primary producing country leads to a reduction in the quantities of that raw material offered for sale in the world markets, and this restricts the flow of supply;

- the availability of foreign exchange, particularly of the country from which the raw material is to be imported, must also be carefully investigated. It may happen that even though the raw material is actually available in the world markets, it is not possible to purchase it due to 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 cheap labour is available, or if there are close international linkages in the relations between firms in the primary producing country and firms in the country importing the raw material.

b) Power, Water, Transport and Labour

Power. Sources of energy may sometimes play an important role in the selection of location. An analysis of the sources of power carries the following phases:

- it is necessary to determine what kind of energy has been selected; then, it should be checked if a sufficient supply of it has been foreseen and, finally, it is important to know if its supply is absolutely assured. For large-scale projects consuming great quantities of electric power (for example electrolytic plants

for production of aluminum) it is necessary to build new hydroelectric stations. In such cases, it should also be verified if the necessary resources have been assured for this purpose.

- it should also be checked whether the transmission of energy to the project has been provided for (i. e. whether there are transmission lines or transformer stations, pipelines for the transport of natural gas, etc).

Water. Depending on the nature of the tasks to be solved, water is often a very important factor; sometimes it is even the decisive factor in the selection of a project location.

The analysis is here concerned with the establishment of the fact whether water is available in sufficient quantities and with the disposal of its source; further, the latter must be found for the disposal of waste water; it should also be verified whether the characteristics of the water to be used answer the requirements of the planned technological processes.

Transport. Transportation facilities may vary of considerable importance in the selection of a location. The term "transport" in this context covers both the in-come transport (transportation of raw materials) and the out-come transport (shipment of finished products).

Transport analysis covers the following investigations: that of the category of transport (railway, waterway, road), and the checking of transport facilities in order to find whether they can handle the required transport tonnage, the whole volume of raw materials and of the finished goods of the project. Here it must be taken into account whether the operation and maintenance of the given transport facility is adequate for the purpose, whether the necessary vehicles (trucks, refrigerated cars, navigation craft, etc.) are available, or if not, whether the necessary resources have been assured for their purchase.

Labour. The following points should be checked as regards labour:

- whether the foreseen total numbers and structure of labour is adequate to assure the production with the planned framework;
- what has been undertaken to train labour for the execution of the planned operations; this is particularly important in the cases in which the investor plans a new line of production in which he is not working at present.

2. Other important factors for the appraisal of justification of investment programmes

The economic and technical documentation must be so elaborated as to prove beyond all doubt the validity of these factors. It must contain adequate details and all vital calculations.

The estimated cost of the project must be arrived at on the basis of reliable documentation; for construction works it must be based on the bill of quantities and cost estimates, while for equipment a complete engineering, or other equivalent technical documentation should be provided. In addition, it must be evident from the documentation whether all construction materials and/or construction work may be obtained in the domestic market, or needs to be imported. In the latter case, it is important to establish whether these imports can be maintained on the basis of established channels or, conversely, to make special provision in order to assure the supply required for the project in question. 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. There is often a tendency for the domestic industry to participate in the execution of a project although there are reasonable doubts as to whether adequate production abilities are available. Here, also, it must be clarified whether the required reproduction materials are supplied to the local producers in the course of normal commodity exchanges, or will have to be assured by special arrangements for the construction of the project in question.

The presentation of raw material prices and of their costs is again an essential factor to which special attention must be paid in the preparation of the programme. In view of the variable character of this element, it should be clearly indicated for what year prices have been taken and by what safety factor they have been adjusted. A similar procedure should be followed to bring as far as possible the reasonableness in selling prices.

On the basis of the calculations of the profits of marketability, the calculations made in the programme, primarily in the project, show the degree of economic justification and feasibility of the proposed project.

Errors, and/or unrealistic presentation of the basic conditions and of the underlying factors mentioned above, lead to faulty evaluations of the economic justification and feasibility of the project. In any such situation, it is necessary to examine the elements in which miscalculations may have possibly occurred.

III. Cases where the actual results achieved fall short of the expected ones, due to miscalculations

1. General considerations

In the preceding section we have attempted to explain what kind of documentation is required for the evaluation of the project; we have also indicated what points are to be scrutinized with particular care when the validity of profits and of recosting is being appraised. The present section is concerned with cases in which the actual results fall short to a greater or lesser extent, of the expectations expressed in the documentation. Such shortfalls may be no longer immediately after the commencement of the operation of the new works, or it may emerge at a later time.

A faulty evaluation of the raw material basis may bring great difficulties for the new works. The cause of the shortfall in the level of production depends on the magnitude of the miscalculation

in the evaluation of the raw material basis. If such situation has arisen, every effort should be made to eliminate disturbances in the raw material supply as soon as possible. The shortfalls in case of the raw material basis may be different. Some of them are given below as examples:

- the raw material basis has been overestimated, i. e. it is impossible to obtain the required quantities of raw materials from the source chosen in the project or it is necessary to find additional sources;

- the construction works from which the raw material must be provided has been delayed and it has become necessary to provide for a deficiency in synchronization, to find a new temporary basis on the source of raw material supply;

- raw material prices are higher than the level chosen in the project;

- the quality of raw materials supplied does not correspond to standards chosen in the project, etc.

All these distortions in the raw material basis cause, in addition to disturbances in production, considerable shifts in production costs, for in such cases the raw material costs rise. Frequently, additional investment outlays are needed to cope with these distortions.

Similar causes with identical consequences are found to exist also on the side of shortfalls in the elements, which we have called here "general conditions", i. e. in the case of shortfalls in the supply of electric power, water, transportation facilities, or labour. Thus shortfalls in these elements are reflected both in the increased production cost and in the total volume of investment.

A special group of eventual miscalculations originates from errors in the estimated cost of the project. Any increase in the estimated cost of the project means additional investment outlays and these, in turn, result in an upgrading of the cost of production.

In the special group of miscalculations is connected with downward trends in selling prices, which may also introduce substantial distortions of expected results. In fact, all faulty calculations, no matter in which field they have occurred, are interrelated and exercise an influence on each other.

All these errors are of a subjective nature, that is to say they could have been avoided, or at least minimized, if care had been taken. This type of error will be discussed in the present section while miscalculations due to objective causes will be considered later.

2. Examination of cases where the results deviate from the expectations

On the grounds of what has been said in the preceding section, all the cases where the results deviate from the expectations may be classified according to the various subjective causes which lie at the root of the miscalculations. Generally speaking, miscalculations are mainly due to unrealistic valuations of the following nature, namely: (a) over-optimistic forecasts, (b) over-optimistic estimates of selling prices, (c) over-optimistic estimates of the costs, (d) over-optimistic forecasts of raw materials.

Detailed explanations will be given for each of these groups of cases and the causes that lead to unrealistic calculations will be outlined. Admittedly, difficulties are encountered in carrying out these calculations or substantiating them. To arrive at the most realistic calculations, which will not be very satisfactory, one requires broad experience and extensive knowledge. Utmost caution and moderation should be exercised in the determination of expected results, particularly as regards those elements which are variable and subject to fluctuations in the market.

The same difficulties are encountered in the valuation of the project. The project must be examined very critically, and all statements on which a basis for the calculation must be supportedly checked. When this is necessary but not available, calculations is an easy matter. The main task of the expert is when

the valuation of the project has been entrusted is to establish whether the estimate in which the calculations have been based is realistic or not. If project valuation is reduced to a mere numeric verification of figures, it will be worthless and will give rise to unacceptable results.

The situation becomes particularly grave in the case of "borderline" or "marginal" investment industrial projects or investments. Every error committed in this field may mean the ruin of the new industry. It is still more critical in the case of developing nations and "start-up" industries; developing countries, lacking capital resources cannot afford to start an investment finance, even if the loss concerns only a single investment project.

- c) Case studies where the results achieved are unsatisfactory due to limitations in occurrence of the capital expenditures calculations.

The level of investment outlays affects the profitability of the project to a very considerable extent. For this reason it is not irrelevant whether the project will cost as much as has been originally estimated, or much more. Also, in the former case will arise the need to obtain additional capital in the course of the construction of the project it is assumed that the required finance will be required than had originally been estimated.

Consequently, it is necessary for the primary task in valuation of industrial projects to establish whether the estimated cost of the project, both as regards fixed assets and working capital, is realistic or not. A few characteristic points in this field may thus be mentioned.

Appraisal of the reliability of the estimated cost of the project.

Unrealistic cost estimates, be they too high or too low, have an adverse effect on the realization of the investment project. The required investment outlays are sometimes estimated lower than would be realistic; this is done either because of a wish to show a higher

profitability of the project, may result from missing
in calculations. Yet, planning does not imply that
necessary in the normal course of construction and results
in losses to the investor and to the community as a whole. If the
estimated cost of the project is shown to be higher than
actually necessary, there is always a chance that the project will
be rejected at the time of evaluation, but that the error is of
profitability.

Evaluation of the level of investment in fixed assets. This
evaluation may be carried out in two ways:

- by checking whether the value of construction works and
of the domestic equipment has been calculated on the basis of market
prices and whether the value of the imported equipment has been
calculated on the basis of world market prices, etc. Previous experience
and current data for earlier projects (for example invoices for pur-
chases of identical or similar equipment) may serve as a basis
for this purpose, or

- 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
planned investment project belongs. Considerable divergences in
either direction indicate the necessity to investigate what has
caused them.

Besides appraising the total value of planned investment outlays,
it is also necessary to analyse their structure and to compare it
to the structure of similar projects now in operation. Quite often
such an analysis reveals lack of adjustment in the individual
structural elements.

Evaluation of the level of investment in working capital. This
evaluation can also be carried out by two different methods: either
by detailed checking of every phase of the utilization of working
capital, or by applying general parameters.

In the course of its transformations the working capital passes through a number of successive phases, starting from the beginning of the phase (stock of raw materials, working reserves, stocks of finished goods before marketing, and the circulation of ready-made goods - see 11). The number of days that the capital stays in each phase (for example the number of days for which the working capital has raw materials in stock) may be called the *turning time*.

A detailed phase-by-phase analysis can be made in the determination of the turning times for very individual phases separately. The number of turning days is established on the basis of earlier experience and facts for other 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 a year). The coefficient is then compared, for printing purposes, with corresponding coefficients for similar enterprises. If there are substantial differences in either direction, this is normally a warning that something is wrong; it is then necessary to re-check the calculations and possibly also review the basic data.

The determination of the level of the working capital with the help of the general parameter is done by applying to the total volume of production the coefficient of circulation which has been determined in advance. For example, let us assume that the coefficient has been established for certain groups of industries as that the total volume of production was one million dollars; in this case the required working capital should amount to 250,000 dollars ($1000:4 = 250$).

This is a simple method for determination of the amount of working capital needed, but difficulties may arise in connection with the determination of the coefficient in advance. Thus, the variations in the composition of fixed assets even in the case of similar enterprises, and the difference in the level of professional qualifications of the personnel, raise additional difficulties when such a general coefficient is applied.

Appraisal of the reality of the planned productive capacity. This analysis, which is of a technical nature, consists in checking whether the planned productive capacity can be realized by input of the estimated amount of capital. This is, in effect, the elementary counterpart of what has been said in the preceding section. It happens often that even though the estimated expenditure is not too realistic, it is actually in doubt if the surplus against the planned productive capacity. That is to say, with the planned capacity can yield a high measure of output than that for which in the project (which means that the productive capacity has not been fully utilized), or the planned capital investment is not sufficient for the realization of the planned volume of production.

The evaluation of the reality of the planned productive capacity is important not only from the point of view of capital expenditure required, but also from the standpoint of the investment risk basis and of marketing. For it may easily happen that a quantity of raw materials will be available for the surplus productive capacity, as a result of which the general supply of raw materials may be disrupted and increase the rhythm of production for existing enterprises. The marketing of production surpluses (over and above the planned level) may also cause serious trouble.

Appraisal of the feasibility of realization of the project within the prescribed period of time. The determination of the time of realization is an important point, because if the project is not completed in due time, it will have consequences for the investment. On the other hand, the prolongation of the realization period will be reflected in an increase in capital expenditure because of the increase in the interest payments in the course of construction; unfavorable effects may also arise in such a case as a result of fluctuations in the prices of building materials. On the other hand, the benefits of the project are delayed, because it was not put into operation in the prescribed time.

The situation is still worse if the investment finance has been borrowed and the repayment of the loan depends on the completion of the project. In such a case additional finance must be sought to assure the repayment of the loan.

In evaluating the reality of the project for construction, the cost must be taken into consideration: the state of realization of the technical equipment, the time required for the civil and industrial works, as well as the usual time needed for the manufacture of the equipment (the tender of the contractor may be a useful guide in this respect). Admittedly, the quality of the management of the investor plays a role in this respect to a certain extent.

Difficulties inherent in the financing of additional capital in case of shortfalls in the estimated cost of the project. The construction should ordinarily be started only if the needed investment capital has been assured in the full amount, whether it is provided out of the resources of the investor, or obtained from another source in the form of a loan.

The position of the investor will, however, be very embarrassing indeed if the planned finance does not suffice for the completion of the project but the overvaluation of the estimated cost of the project. In that case, he will be forced to find additional capital in a hurry. This is no easy matter; as a rule, the search for additional capital causes a slowing down of the rhythm of construction works and this, in turn affects adversely the level of the estimated cost, because of interest payments in the course of construction. Also, additional capital, mobilized hastily, is usually lent under less favourable conditions - at a higher interest rate and with a shorter repayment period.

What causes expenditures to rise above the estimated cost of the project. The limits of the estimated cost of the project are exceeded and differences between the planned and actual cost arise mainly for the following reasons:

- poor quality of investment documentation. The documentation has been prepared in a functional way, that is, not in the course of the construction. Inadequacy with the bill of quantities and the price taken as a basis for the calculation was unrealistic; an error in both the quantities and in the calculation. Errors in the calculations for the auxiliary services, for instance transport, electric power, water and so on, were material basis. For the error was limited to the size of the total fixed cost to be used for working capital;

- increase in the value of works. The documentation has been prepared in a satisfactory manner, but in the course of the construction the investment costs increase the value of works, either because the owner wants to expand the project or introduce artificial changes in the original concept (for example, the investment in a different type of equipment, a better quality than that planned in the investment documentation, and this is reflected in the increase in the value of construction work);

- unfavourable networks. In some cases, in spite of the superiority of the documentation and of the great precision in the carrying out of the necessary calculations, it may happen that certain kinds of works could not be carried out in the actually needed volume. Such cases occur in mainly in public construction works;

- price rises. This means rises in the value of prices of construction works (services) and of equipment, caused by increases in the prices of building materials and production materials and by rises in wages rates. It is a common phenomenon in all countries that prices are continually rising up, more or less rapidly, in accordance with the fluctuations of demand and supply and due to the impact of inflationary tendencies. Thus, it may happen that, in spite of a well-prepared documentation based on prices that could be accepted as realistic at the time when the documentation was being prepared,

the cost will still differ from the actual cost. This is quite usual occurrence when construction, by its very nature, requires rather long period of time for completion.

Equally, increases in the price of raw materials in the period of construction will work rather more to the disadvantage of the new industry, will affect the level of required working capital; the result may be such that the amount of working capital provided is insufficient to cover the needs of current production. The reason for this is that the amount available at the time of the preparation of the account takes into account the utilization of working capital being just before the new industry starts production.

and, needless to say, insufficiency of working capital prevents the start-up of the new industry and prevents it to work at full capacity. This is negatively reflected in the rate of profitability attained by the industry; if it is a export-oriented industry it is impossible for it to fulfill its obligations as regards commitments abroad.

b) The results achieved are unsatisfactory due to rise level of cost in the cost of raw materials and similar raw materials.

Every enterprise incurs certain expenditures when carrying out any kind of activity; they are called production costs. They comprise the price of the raw materials, energy, water, fuel, transportation costs for raw materials and expenditures for labour. It is not easy to estimate in advance the level of production costs for a project. Yet, a rise level of production costs may eventually distort the estimate of profitability of the future production.

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

- errors in the collection of the norms for raw materials and labour resulting either from using unrealistic norms, or although the norms are correct, the specific local conditions have

not been taken into account. (For example: the influence of local atmospheric conditions on the working capability of labour force - work).

- unrealistic prices of the basic and auxiliary raw materials. It is not easy to determine what the realistic price would be in a future period when the project will have to be put into operation. Therefore, the determination of realistic prices is discussed in the next section; all that has to be said in this section is related to the determination of raw material prices. It must be stressed that if the industry is export-oriented, the realistic price of raw materials cannot exceed the level of their price in the world market; otherwise the production cost of the new industry will be too high to allow it to compete with its products in foreign markets.

- increase in production costs due to other circumstances. It may happen, namely, that the price might have been estimated accurately, but an error occurred in some other aspect of the evaluation - for example, it may have been impossible to obtain raw materials from the planned source, so that it was necessary to purchase them from another place, as a result of which the transportation costs rise, the quality of the raw material was not up to the standard, etc. We shall elaborate on this point in a later section.

Miscalculations in costs of raw materials and similar expenses are due particularly to disastrous consequences in export-oriented industries: either their profit does not reach the planned level, or the industry becomes incapable of competing in the world market.

c) Difficulties in estimating market prices.

It is reasonable to make investment only for such undertakings where it can be expected that it will be possible to sell the new products in the market. And this is possible if the prices and quality of the goods offered are acceptable to the market.

But it is difficult to estimate whether the selling price is realistic, i. e. whether it will be sufficient to allow a given product to be profitable at the time of entering the new industry into production, and for a certain period of time after that. It is especially true in the case of export-oriented new industries.

Deakin's analysis proceeds as follows. First, it will be necessary to determine the price level to which the product will adjust with the level of prices in the market at the time of its introduction. If the product is introduced at a price level which is higher than the current level of the price level in the market, the new product will be profitable. This is the case for such products as... which are sold at a price higher than the current level of the price level in the market.

In the domestic market. The selling price of the product to be introduced must be compared with the current level of prices in the domestic market to determine whether it is profitable. On the basis of this comparison, the conclusion may be reached that the price level in the investment program is higher, equal, or lower than the currently prevailing level in the domestic market. Higher prices are not desirable, for it would lead to an unrealistic estimation of the profitability effect. The situation is favorable if the prices accepted in the investment program are higher than the current price level in the domestic market. The profitability ratio calculated on the basis of such prices will be favorable if the current price level is high, but it may become unfavorable if the price level falls. The acceptance of lower prices than those obtaining at the time in the domestic market is recommended particularly in those cases where the quality of the new products is not expected to reach the standards of the best manufacturers in the field.

The determination of the current domestic price level may be obtained from different sources depending on the nature of the products: from statistical and other economic publications, from invoices of industries already producing the same goods, from catalogues and

price-lists issued by domestic producers, etc.

The evaluation of the exact price level in the domestic market at the time when the new product will be offered for sale is primarily based on past experience and forecasting. The following aspects will also have to be taken into consideration: movement of prices in general and of the prices of the given product in particular, during the last few years; the degree of utilization of existing productive capacities for this line of production; the construction of new industries in this field; the extent of demand for the product in question, etc.

In foreign markets. A comparison with world prices is always made, no matter whether the investor intends to export the whole, or any part, of his output. The objective of this analysis is to establish whether the envisaged new production will be less or more expensive in relation to world market prices.

The comparison with world prices must be made even when it had been established that the prices accepted in the project of exportation are on the same level as the prices in the domestic market. For the fact that the prices accepted in the investment program are on the same level as domestic market prices, does not mean in itself that the domestic price level is favorable as compared to the world price level. If the existing industries in the country produce at a price which is excessive as compared to the world price level, this does not mean that it would be profitable to invest in new production of the same goods which would be as expensive as the existing production.

This analysis is absolutely obligatory in the case of export-oriented industries. Here, the most important thing is how to determine the world price. A certain number of products are quoted in world commodity exchanges; quotation lists are currently published and may be obtained with not much difficulty. Also it is comparatively easy to obtain data for goods for which, while they are not quoted in

...ity, exchange, production, and other economic activities (as in the case with business firms in New York and London); this is not the case with most other firms. Still, for very many kinds of firms, particularly for those in production, world prices do not exist. For such firms, prices result in different ways. The following are some of the purposes:

- different price lists for individual firms,
- different quantities of supplies at different times and in different markets,
- information on prices paid for materials,
- better knowledge of prices paid for raw materials and other inputs (including his own output),
- calculation of prices on the basis of firm's own statistical data where quantities are not fully known. This has been the case for some firms where it was possible, i.e., where the firm had the statistical data for its own production of specific products and not for other products or products of other firms, or, however, for other products.

In a production consisting of several different products, where each product has a different price, it is rather difficult to get a clear picture of the relationship between domestic and world prices, particularly where each firm is engaged in different quantities. Therefore, weighting must be applied. This can be achieved by multiplying the quantity of each product by its domestic and world prices, and by dividing the cumulative sum of values of all products at domestic prices by the cumulative sum of all products at world prices.

For example, a comparison between domestic and world prices for the products of a certain manufacturing firm could be as follows:

Type of product	unit measure	world price in \$	domestic price in \$	ratio
Product A	t	430	510	1:1.19
Product B	t	440	530	1:1.20
Product C	t	550	600	1:1.09

Calculation of the weighted relation will be made in the following way:

Type of product	quantity in tons	World price in \$	Value at world price in \$	Domestic price in \$	Value at domestic price in \$
Product A	3,400	430	1,462.000	510	1,734.000
Product B	8,600	440	3,784.000	530	4,558.000
Product C	6,500	550	3,575.000	600	3,900.000
Total:			8,821.000		9,867.000

Consequently, the weighted relation will be:

$$\frac{9,867.000}{8,821.000} = 1.12$$

It means that the world and domestic prices are in the ratio of 1:1.12.

On the basis of such an analysis a conclusion may be drawn as to whether planned production is extensive or not. From the case in point we can see that production is extensive in comparison to world prices both as regards individual products and taken as a whole.

It is even more difficult to anticipate future prices which will prevail in the world market at the time the production will start and we must rely on experience and forecast to an even greater extent.

In establishing world prices at the time of sale of products, the trends of price movements must also be taken into account. Here, 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, on the territory where it is intended to market own products, should be borne in mind. This will be explained in more detail in the section of this paper dealing with sale in the domestic and foreign markets.

3. Measures for avoiding significant deficiencies in project evaluation

In the light of the preceding discussion we can see the reasons that account for an increase in the estimated cost of investment. A universal measure capable of eliminating all the mistakes could hardly be proposed. The appropriate measures will follow from the nature of the overrun of the estimated cost of investment.

It is reasonable, however, that attempts should be made to escape all mistakes resulting from a superficial and poorly prepared economic and technical documentation. It follows, therefore, that the preparation of this documentation should be entrusted to those who are qualified to do it. If such facilities are not available at home, then the documentation must be procured from abroad, i.e. from renowned world firms, provided however, that the latter has a thorough knowledge of the market conditions in the country of the investor.

Changes in the project during the execution of construction are not too desirable and are to be avoided as much as possible. It is better to prolong the period of preliminary studies and to make various analyses while preparing for the construction and then, proceed speedily to the construction without making any changes.

Mistakes in establishing the cost of the project resulting from higher prices and contingencies are eliminated by adding a certain amount as a reserve to the already established cost of the project computed on the basis of current prices. In this way, it is counted at the very outset with an increased cost, i.e. the value of the project when it is completed and not the estimated value of the project at the moment of the preparation of the investment programme is estimated. The value so calculated is then

used during the whole period. The necessary funds are secured bearing in mind this amount, and all calculations are made taking such an additional cost of the project. If the calculations show that the project is a profitable one and provides specific benefits notwithstanding the expenditure for its construction, then the construction is started and the possibility of experiencing unpleasant surprises in this respect is substantially reduced.

Calculation of the reserve is by no means an easy job. The experience gained so far has shown that the amount of reserves ranges from 10 per cent 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 will be started immediately), which depends on the type of project, duration of construction, stability of the domestic market, inflationary trends, and the like.

Reserve funds should also be provided both for the fixed assets and the working capital. There can be no unforeseen works in respect to the working capital, however, some other uncertain moments may occur, such as greater consumption of raw materials, longer process of production, etc.; all these factors may arise on account of low labour productivity and inadequate training of manpower.

4. Reduced dependability of cost calculations encountered in projects due to accuracy limitations of capital investment and material input estimates

As the amount of capital investment and of costs of raw materials and similar expenses cannot be determined accurately, therefore the total costs of production (cost price) cannot be established with certainty. If some uncertainty is taken into account as regards the actual selling price at the same time of sale of products, it can be seen that the calculations included in the projects are not entirely reliable.

Two problems are easily distinguished here. The first one is how to ascertain in what way the changes in individual items affect the profitability of the project, or the planned return from the investment. The second and the more important problem is, what measures should be taken to reduce possible unpleasant surprises in this respect to a minimum.

To insure a better understanding of the later considerations we shall use a rough generalized example. In view of differing social and economic systems in individual countries, the details and specific characteristics as regards the arrangement and position of individual items of costs should not be given. We believe that this will not hamper the comprehension of the basic intention of these considerations. Let us suppose that the preliminary calculations from the investment programme which served for the project appraisal is as follows (the terminology is also generalized):

	in terms of \$
I <u>Value of output</u>	21,000.000
II <u>Expenditures</u>	
Material costs	13,000.000
Production wages	2,000.000
Overhead expenses (material costs and salaries)	600.000
Depreciation allowances	1,400.000
Cost price	<u>17,000.000</u>
Profit	<u>4,000.000</u>
Total:	<u>21,000.000</u>

The fixed assets amount to 16,000.000 dollars, whereas the working capital is 1,000.000 dollars.

The depreciation has been computed as follows:

	Principal	Rate of Depreciation	Amount of Depreciation
Building structures	\$ 4,000.000	5%	\$ 200.000
Equipment	\$12,000.000	10%	\$1,200.000
	<u>\$16,000.000</u>		<u>\$1,400.000</u>

It is assumed that the following is paid out of the profit: repayment of loans obtained (for the fixed assets and the working capital) and contributions (taxes) to the community. Supposing that these two

items are, for example:

Taxes	\$ 1,000.000
Repayment installment	\$ 500.000
the net profit will amount to:	
	\$ 4,000.000
	- \$ 1,000.000
	<u> </u>
	\$ 3,000.000

(out of which repayment installment is to be paid); it follows that the rate of profit on the total capital investment is:

$$\frac{3,000,000 \times 100}{17,000,000} = 17.65\%$$

whereas the net profit remaining in the hands of the investor is \$ 2,500.000.

a) Influence of changes on the planned effects of investment. The degree of inaccuracy will depend on the greater or lesser intensity of the changes in individual items.

Influence of increased cost estimate of fixed assets. If we assume that during the implementation of the project an increase in the estimated cost of the fixed assets came about by, say, 20% for the construction work and by 10% for the equipment, the corresponding increase in the depreciation will be as follows:

	(in terms of \$)		
Building structures	4,800.000	5%	240.000
Equipment	13,200.000	10%	<u>1,320.000</u>
			1,560.000
			<u>-1,400.000</u>
	amount of increase		160,000

It means that the profit has been diminished by \$160.000 and that it amounts to \$3,840.000, i.e. the net profit is \$2,880.000 (taxes have been reduced proportionately).

Effects of higher prices of raw materials and of other expenses. Higher prices of raw materials and other expenses are felt in a more drastic way. For example, if the increase during the whole period of preparation and

construction amounts to 10% and if this period is, say, 4 years, the increase will be 2.5% per annum and the item material costs (cost price) will increase by \$1,560,000 (10% of 13 + 2 + 0.6 millions), or the profit will diminish accordingly and amount to:

	(in terms of \$)
Total profit	4,000,000
Increase in costs of production	- <u>1,560,000</u>
	2,440,000
Taxes	- <u>610,000</u>
	1,830,000
Repayment installment	- <u>500,000</u>
	1,330,000

Therefore, the position is as follows:

$$\text{Rate of profit} = \frac{1,830,000}{17,000,000} \times 100 = 10.7\%$$

instead of 17.65% as planned.

The net profit remaining in the hands of the investor is diminished from \$2,500,000 to \$1,330,000.

Effects of reduced selling price. The development is very much alike with the reduction of selling prices. For example, if the prices drop by 6% (say, by 1.5% per annum), then the value of output will diminish by \$1,260,000 and will be followed by a concurrent diminution of profit by this amount.

In this case the position will be as follows:

	(in terms of \$)
Planned value of output	21,000,000
Diminution due to drop in selling price	- <u>1,260,000</u>
	19,740,000

Consequently, the profit will be:

	4,000,000
	- <u>1,260,000</u>
	2,740,000
Taxes	- <u>685,000</u>
	2,055,000
Repayment installment	- <u>500,000</u>
	1,555,000

It comes out from the foregoing that:

$$\text{Rate of profit} = \frac{2,055,000}{17,000,000} \times 100 = 12.09\%$$

in lieu of 17.65% as planned.

The net profit remaining in the hands of the investor is reduced from \$ 2,500,000 to \$ 1,555,000.

Total changes resulting from the action of all items. In the previous subsections the individual effect has been observed of each particular item. However, in further consideration an attempt will be made to establish the all round effect produced by changes in every item concurrently. Starting from the changes indicated in the above examples as to what could be the deficiencies that may occur, bearing in mind the four-year period, our model of calculation will be as follows:

	(in terms of \$)
I <u>Value of output</u>	<u>19,740,000</u>
II <u>Expenditures</u>	
Material costs	14,300,000
Production wages	2,200,000
Overhead expenses (material costs and salaries)	660,000
Depreciation	<u>1,560,000</u>
Cost price	\$ 18,720,000
Profit	<u>1,020,000</u>
Total	<u>19,740,000</u>

The distribution of the profit will be the following:

Profit	1,020,000
Taxes	- <u>255,000</u>
	765,000
Repayment installment	- <u>500,000</u>
	265,000

On the basis of this actual calculation made after the completion of the project, it may be stated that:

Rate of profit amounts only to:

$$\frac{765,000 \times 100}{17,000,000} = 4.50\%$$

Net profit remaining in the hands of the investor is only \$ 265,000.

From the foregoing it may be concluded almost with certainty that, had we known at the time of making the appraisal of the project that the effects would be as low as this in all probability the project would not be entered into at all.

It should be emphasized once more here that the above calculation and examples are generalized, and the results obtained should in no case be considered as definite findings, but as probable relations under specified conditions. Consequently, in ascertaining the degree of dependability in the above calculations, it is of no decisive importance whether the profit is computed in the above manner or by some other method, whether the tax rate is proportional or progressive, whether it is high or not, and whether the percentage of the rate of profit is big or not, namely, does it correspond to the prevailing market conditions in a certain milieu. The analyses made were intended only to show serious consequences, due to wrong evaluation of some essential elements, as a result of which large shortfalls or even complete failures may originate.

b) Measures for eliminating unrealistic calculations. In the preceding section we have attempted to show what procedure should be followed to achieve as realistic a cost estimate of investment project as possible and also, what measures should be taken for eliminating the effects of possible cost overrun. The starting point should be anticipation of an increase in the estimated cost to a specified percentage and all calculations should be made bearing this in mind. It should be taken into account also that the capital resources so computed will be required in actual fact and, consequently, should be secured to that amount.

However, the increased costs of production and drop in selling prices are to be considered as calculative items only. This is to say that it is essential to ascertain as realistically as possible the old prices at the moment of appraising the project and add thereupon a certain reserve. This

can be done in two ways:

- prices of raw materials should be increased by a certain percentage, whereas the selling prices should be reduced. Since the estimated cost of investment includes the increase, consequently, the depreciation in the production costs is automatically increased and should not be increased once more. The amount of increase in prices of raw materials and in other expenses, and the reduction in selling prices will depend on the concrete situation. Such estimation must be based on experience supported by background knowledge and, to a considerable degree, on forecast, or,

- calculations based on actual prices should be made in advance and the profit established, and then it should be ascertained to what limit the envisaged profitability or profit allow an overall aggravation, taking all items into consideration. This means that in this case the starting point should be the lower limit of profitability, i.e. the limit beyond which we should not go in any case, and then, the amount should be established of the overall aggravation which is permissible within the limits of the difference in profitability or profit. The project would be approved only if it is appraised that this amount will be sufficient to cover all possible aggravation. This manner of computing the reserve is suitable insofar as the reserve is considered on the whole and it is of no significance at that stage to go into detailed analysis as to where the aggravation will actually occur.

IV. The Impact of Changes in Economic Policy Measures on the Expected Economic Effect laid down in the Project

In addition to cases where the results achieved were not satisfactory owing to miscalculations and subjective weaknesses, errors may also appear as a result of changes in economic policy measures. Although it may be assumed that economic policy measures of any country will not be such as to make the position of domestic industry difficult, especially not so in the countries with planned economy, the impact of possible measures must be understood, as they sometimes are due to actual circumstances. We shall discuss briefly some of those measures which have so far appeared most frequently.

1) Changes in Currency Exchange Rate

The impact of changes in exchange rate, in the sense of its fall, taking place from the date of the evaluation of project till the day when it

is put into operation may be manifested as follows:

- funds in terms of local currency needed for procurement of import equipment increase, and for the same equipment a larger amount of local currency must be spent. As a consequence, the project becomes more expensive. This is reflected upon production cost as higher depreciation allowances must be provided,

- if the raw materials necessary for production are imported, the cost of production rises,

- the proceeds of sale of the export-oriented industry in terms of local currency increase.

It may be concluded from this that imported equipment, owing to such change in the currency exchange rate, has negative effects both on the cost of the project and on the cost of its production. However, in case of production oriented to domestic market, production cost rises because of the increased raw material prices and the result may be either a diminished profitability or an increase in selling prices. As for the export oriented production, although the production cost rises owing to the favourable effect of the exchange rate on selling prices, the profitability does not change, provided that in the meantime no change in the raw material prices occurred, on the one hand, and in the final product prices, on the other. The impact of changes in the exchange rate, in the sense of its improvement, has an effect in the opposite direction. Developing countries, especially those with a planned economy, endeavour by means of special measures to neutralize the negative effect of the changes in the currency exchange rate.

2) Changes in Custom Tariffs. Changes in the custom tariffs are a reflex of the economic policy of a country. However, the increase or decrease of the customs rate over the period from the evaluation of the project until its realization, are reflected both on the estimate and on the production cost.

The increase in the custom rate acts on the rise in value of import equipment, which brings an increase in the estimate value of the project, and this has a repercussion also on the increase of production cost through depreciation. Likewise, the increase in the custom rate for industrial raw materials and building materials, procured from export, acts so as to make

the domestic equipment and the construction work more costly. The consequences are the same as with the import equipment, that is the estimate value and the cost of production increase.

The increase in the custom rate on raw materials, necessary for production, which come from imports, causes a rise in prices, and also in production cost. In addition to its effect on the increase of production cost, the increase in the estimate value of the project creates difficulties for the securing of additional funds. The increase in production cost, either owing to increased depreciation or to the increase of raw material prices, acts in the sense of a diminution of profit and profitability. The decrease of the custom rate on import goods acts in the opposite direction.

On the other hand, however, the changes in custom tariffs on products exported, impairs or improves the competitive power of the enterprise in the foreign market, since the increased custom tariff brings an increase in cost prices and, vice versa, the decreased tariff lowers the cost prices. When changes in the custom tariff occur simultaneously with changes in the currency exchange rate, then usually both changes are mutually complemented and corrected, as with the increase of the exchange rate, as a rule, the custom rates decrease.

3) Sensibility to inflation. Inflationary tendencies, as is known, act on prices in the sense of their increase. How great the rise in prices will be in the period of preparation and construction of the planned project, will depend on the intensity of inflationary pressures. We have seen above how the rise in prices reflect on the estimate value, the production cost and the selling prices.

Taking into consideration the intensity of inflationary pressures, an evaluation should be made of the situation which will arise in respect of prices in the period of construction, as well as of the situation when the project is put into operation. On a correct realization of this occurrence will greatly depend the realistic appreciation of the project itself. The miscalculated evaluation which results from the change in prices and which include also the changes brought about by inflationary tendencies, have been discussed earlier in this paper.

4) Other changes in the economic system. Likewise, in evaluating the project there should be considered also all those elements of the economic system which may have an influence on the evaluation of the project. Of course, the investors cannot have great influence on the economic policy of the country, but if certain changes are being prepared or are in sight, they must be taken into account. The reference here is to tax policies, the policy of administered prices, etc. Apart from the above, it is very risky in evaluating the project to consider only the administered prices, if any, and not to take into account how they would be formed if these administrative barriers did not exist.

V. Skill and Professional Competence of Key Personnel, who are expected to operate the Factory

In order that a newly built factory might function and produce, in quantities and quality as provided by the project, it must have, in addition to the above said, not only a trained technical personnel, which will do specified jobs in the technological process, but also executives who are entirely familiar with the technological process on the whole and who will effectively run the factory. In certain cases, where no experience at all is available for carrying out a specified technological process, it will be necessary to procure the relevant documentation required, that is the so-called "know-how".

In close connection with this is the need to appraise the influence of the period of the trial run on the economic efficiency of the project.

1) Preliminary measures necessary to secure adequate staffing. All measures in this respect relate to the training of the personnel in the period of construction (perhaps this should be started earlier), in order that the factory may run smoothly. As suggested earlier, the evaluation in this respect should consider the numbers and structure of personnel. If it is assumed that trained labour cannot be engaged, the project should provide for the training of personnel.

The estimate and then the realization in this respect move in several directions, as for example:

- efforts should be made, before the factory is put into operation, toward securing the personnel required, especially the executive staff,

- that a specified number of such personnel be sent for training at factories of same kind, either in the country or abroad. The duration of the training should depend on the complexity of the technological process and the skill of the personnel,

- foreign specialists should be engaged, when it is a question of dealing with more complicated technological process, for a specified period of time, required for the initiation and training of domestic personnel. This question arises especially in industrially developing countries which do not have at their disposal sufficient personnel and for which it is more difficult to train their men rapidly for the managing staff.

In this matter it would be an error to be exceedingly sparing and self-assured that all can be achieved with one's own forces, as from an insufficiently trained labour double damage may result. First, the production will not run at the rate which is normal, consumption of raw materials will be higher, waste greater, etc. Second, unskilled personnel will spoil the machines and installations and this will have in consequence new investments and stoppages in production.

Training labour is a complex problem and is not solved either easily or speedily.

When proceeding to procure equipment care should be taken that the supplier makes possible the training of personnel, either at his own factory (if he engages in such production) or in other factories, to which he had supplied the equipment earlier.

A means of acquiring the best possible knowledge of the technological process is that the future personnel of the factory be present, and, if possible, participate in the assembly of the equipment. Thus it will, before the factory is put into operation, acquaint them in detail with the machines on which they shall work.

All this involves heavy initial expenditure but proves ultimately advantageous to the new factory.

2) Impact of the trial production period on the economic efficiency of the project. Trial production is understood to cover the activity of the newly built factory during the testing of the functioning of the new plants,

and this only up to the starting of normal production. Normal production starts when everything begins to run normally in the production, both in respect of the volume of production and in respect of quality.

Regardless of all the preliminary measures taken, it should not be expected that the factory will start production immediately with the date of its being put into operation, in the volume and quality provided by the project. Even in industrialized countries it must reckon with a certain period of running in and an unevenness of production. This especially must happen in the industrially developing countries, which either have none or only a poor technical experience, at least in certain economic branches. The period of trial production varies according to the kind of production and the level of the industrial development of the country.

The period of trial production often ends with a negative result, that is with a loss, particularly so if this period lasts longer than what is considered as normal.

In connection with trial production the following should be pointed out: in the investment programme account must be taken of the trial production as well as of the loss that appears therein; when evaluating the project, the true period of duration of the trial production must be established, bearing thereby in mind all the considerations pointed out above. Also, the reality of the amount of loss which is forecast must be established; in providing funds for investment, those for the planned loss during the trial production must also be secured. If funds have not been secured, then in case of a loss difficulties appear in the working of the factory.

Errors in this respect may be twofold. On the one hand, the period of trial production may last longer. In such case the benefits reckoned with from new investment are delayed. This, however, may have more serious consequences if some firm commitments have in advance been entered into in respect of the new production. On the other hand, a higher loss than planned creates difficulties for finding new funds for covering the loss. All that taken together has a result that the increased loss diminishes the benefit expected from the investment in proportion to the increased loss.

VI. Requirements for Domestic and Export Market Analysis with a particular view on project evaluation

As has been pointed out above, the construction of a project has a value only when the sale of the products that will be fabricated is entirely secured. That is why the project must contain a detailed analysis of the market where the products will be sold. And it should be clearly indicated whether the sale is intended for the domestic market or for export.

1) How market analysis should be carried out considering the above-mentioned limitations. In evaluating the project, full attention should be given to the market, since the sale of products is one of the essential factors for the existence of the enterprise. To make investments in projects for the products of which sales are problematic means to wreck definitively the funds invested or, in case of partially secured sales, to diminish considerably the profits from the funds invested.

The extent of explanation will depend a good deal on the kind of product and the consumption area. Namely, a different explanation will be given, for instance, of the sale of bakery products and a different one of the sale of a great aluminium factory. The narrower the consumption area, the easier it is to appraise market requirements.

Research of a market with a wider area, that is of demand over a larger region, is a complex problem, often beyond the reach of the investor's possibilities. Of course, the investor should within the limits of his possibilities tend to deal with the question of sales as best as he can.

For many important products special institutions should be responsible for market research (domestic and world market) and the results of such research should be available to all those interested, both to investors and those who carry out the evaluation of the project. Unfortunately, in developing countries such institutions as a rule either do not exist or are not able too often to accomplish successfully such a difficult task. The way out is to ask for advice of a foreign engineering firm or of specialised research institutes, which is a costly venture of course. Nevertheless, it is very important to appraise the sales element in a project to the fullest.

Analysis of sales resulting from an investment programme moves in several directions, and it should distinguish the domestic market from the foreign market. An analysis of the domestic market usually covers:

- in countries with a planned economy, an examination of how the foreseen production fits in with the long-term and annual economic development plans,

- survey of the trends in consumption of corresponding products for several past years, as well as how this consumption has been met. Namely, how much in that period of time was covered by domestic products and how much from imports,

- the utilization of the existing capacities may also be one of the indicators of the possibility of sale of articles which will be manufactured by the new factory. Poor utilization of the existing capacities is generally an indicator that the new products will have no sale. On the other hand, however, the full use of capacities especially if the total demand could not be satisfied, may be taken as a good evaluation of sales of future production,

- in establishing the existing requirements (production and imports) caution is called for because it may not be possible to wholly satisfy by imports the residual demand not met by domestic production. Very often, imports are limited by the foreign exchange available, and they would be far larger if at the given time more foreign exchange were available,

- in making the decision as to whether the existing capacities are sufficient to meet domestic requirements, account must be taken of the assortment that domestic capacities could provide. It very often happens that some domestic production is limited in its assortment, so that it does not meet the demand of all its variations,

- when the demand in the domestic market is examined, not only existing requirements should be considered, but account must be taken also of the tendency of demand to rise, which will come as a result of the increase in needs. In evaluating the tendency of the demands to rise, caution is again recommended. The increase in the national income will certainly in principle influence the growth in demands. Now, where this demand will be channelled, that is to what products, depends on various causes. The provision of funds

for certain investments, as well as the construction of the projects, may be a good indicator for the sale of products which are in close connection with such construction. For example, an intensive housing construction, construction of hotels and other tourist establishments, increases the demand for some building materials and certain articles for sanitary installations (e.g. radiators, baths, wash-hand basins, etc.)

- permanent shortage of some products in the domestic market is a proof of unsatisfied requirements, but it is not easy to evaluate the extent of needs that are not covered,

- in evaluating the unsatisfied requirements, account must be taken also of the factories in process of construction whose products, as substitutes, can meet the ascertained needs. For example, prefabricated elements may replace full bricks, cardboard may replace wooden packing-cases, plastic materials may replace both wood and metal, etc.

- in some branches of industry, as for example, in the chemical industry (plastic materials, artificial fibres - nylon, perlon, terylene and the like), the technical progress is very great, inventions follow one another, whereby the latest one makes the preceding inventions, howsoever perfect, obsolete. Hence this circumstance must also be taken into account in evaluating whether a product will have a ready market.

Matters are still more complicated if the question is of sale through export in foreign markets. In such a case, the analysis is conditioned by the knowledge of the world market, both as a whole and in its several parts. It is on the basis of this knowledge that the conclusion should be made as to whether it is possible to export the respective articles, and where to export them. Since the evaluation of the possibility of exporting is complicated and also a relative matter, in evaluating sales through exports one should not be too optimistic (on this point see the section on prices). This is more so if the bulk of the production, owing to a favourable raw material basis, is directed to exports.

It should be noted here that if the new capacity is oriented toward one or several products, but in large quantities, whereas the bulk of the production is designed for export, particular attention should be given to

the long term tendency of consumption of this product in the world, that is to evaluate whether in the long run consumption will grow permanently or whether there are signs that it will decline. In making this evaluation, account should be taken of all the great factories which are under construction all over the world for the manufacture of the respective articles and which will to a large extent contribute to the increase in supply in the world market.

Products which are dependent on constant technical improvement or products subject to the fancies of fashion while the equipment for their production is not able to follow the fashion are not particularly suitable for export. Hence in establishing factories for these purposes, caution is recommended.

2) Overall approach to the problem and partial solutions. With regard to the difficulties dealt with above, it can never be affirmed, with a hundred per cent certainty, that the sale of the product will be secured. The situation is slightly easier if only the domestic market is in question, especially in countries with planned economy. Of course, here also the situation changes according to the kind of product. The matter is, however, far more complicated if sale in foreign markets is considered.

The best solution is when the sale is secured by long-term contracts. There is no need to point out that only reliable foreign partners come into consideration for such a contract. In this way, the sale is secured, and the longer the contract the better the situation. The question arises here only at what prices deliveries will be made. Two solutions are possible: to fix in advance the selling prices which will be valid for the whole life of the contract or to make deliveries at world prices. Practically both methods have negative aspects, as in both cases there is a risk (indeed for both partners). In case of stipulated fixed prices neither of the partners loses, if prices do not change. If prices fall, it is the buyer who loses, if prices rise it is the seller (investor) who bears the loss. If deliveries are stipulated at world prices, the rise in prices profits the seller, while the fall in prices affects the seller. With the buyer the case is, of course, the reverse. Since there is little probability that prices will remain the same over a longer period, stipulations at fixed prices are not used.

When the construction of the project is carried out with credits provided from abroad, the repayment of the credit is often stipulated by deliveries of products, which will be obtained from the new project. In this way, the sale of products is in part secured (to the amount of repayment), but in fact only for the period of the availability of the credit. At the same time, however, it means penetration in the market of the country supplying the credit, and creation of conditions for further deliveries by way of sales.

Very often in evaluating the possibilities for sales, only specified areas abroad are taken into consideration. The foreign exchange position of several countries does not always allow to make purchases in the most industrialized countries. The mutual exchanges between individual countries makes frequently possible the sale of some products, certainly at world prices, in spite of world competition.

VII. How to evaluate the economically optimum degree of processing

From the raw material to the final product there are often several successive processing stages, each stage being accomplished in a separate factory, either within an integrated organization or in independent factories at different locations. For example, in the aluminium industry there are the following stages: bauxite mines, alumina factories, aluminium factories (reduction plant), processing of crude aluminium (sheet metal, strips, tubes, foils, etc.); for meat processing, the stages are as follows: slaughter houses, refrigerating plants, meat processing factories, canning industry, etc.; in the chemical industry likewise there are many such stages.

1) Reasons for manufacturing products with a maximum degree of processing. Experience so far has shown that any further stage toward finalization of production offers an increasing benefit. This is of particular importance for the export-oriented industries, which have a favourable effect on the balance of payments of the country. In order to illustrate this, we give the following as an example: the price of a ton of bauxite is \$ 7, of a ton of alumina \$ 70, and of a ton of aluminium \$ 520, while the price of a ton of aluminium products is \$ 1000 (of better assortment). If it is taken that two tons and half of bauxite are required for a ton of alumina, two tons of

alumina for a ton of aluminium, that waste in processing of crude aluminium is minimum, it follows that if 5 tons of bauxite are exported, \$ 35 are obtained, and if 1 ton of aluminium products is exported (for which 5 tons of bauxite have been used), \$ 1000 are obtained. In other words, in order to obtain \$1,000 it is necessary to export more than 140 tons of bauxite. Of course, for producing aluminium, in addition to bauxite, also other raw materials and electric power are required, as well as labour, but independently from that, the example given above shows clearly the benefits resulting from a high finalization of products. Or let us take another example: the price of a cubic meter of cellulose wood is \$ 10, of a ton of bleached sulphate cellulose \$ 150, the price of a ton of woodless writing paper is \$ 200 (of better quality). If it is taken that for a ton of bleached cellulose 5.2 cu.m. of wood are required and 1.070 kg of cellulose for a ton of woodless paper, it follows that if 5.7 cu.m. of wood are exported, \$57 are obtained and if a ton of paper is exported (for which 5.7 cu.m. of wood were used), \$200 will be obtained. In order, however, to obtain \$200, through export of wood, it is necessary to export 20 cu.m. of wood. A similar case appears in the finalization of production in other economic branches, while in some, like the chemical industry, this is still more pronounced.

For this reason, there is a tendency in developing countries to achieve the largest possible degree of processing and then to export such products.

2) Integration tendencies toward raw materials. In addition to forward integration tendencies from raw materials to final product, general economic and profitability considerations may dictate reverse integration tendencies. This applies to all those cases where a factory with a higher degree of processing already exists, while the preliminary stages of processing, i.e. the supply of raw materials is not available. For example, there exists an enterprise as an electrolysis and zinc rolling mill, but the zinc concentrate is procured from another enterprise (from domestic market or from abroad). In this case, the tendency will be the opening of an ore mine with flotation equipment for obtaining concentrates.

Reduction of cost of production, especially through reduction of transport costs, a greater security in the supply of raw materials or semi-manufactures, as well as elimination of difficulties connected with the availability of foreign exchange, if such procurements are made abroad, etc. are among the most important motives for backward integration. These advantages, however, must be substantiated by previous calculations.

Integration movements toward raw materials may have two forms:

- merger with the already existing enterprises, and
- setting up of new departments or factories for preliminary stages, or opening of new mines.

It should be noted here that integration movements toward raw materials are also possible between different economic sectors. For example, between industry and agriculture, or between industry and forestry.

3) Economic impediments to the complete cycle of processing. When it is a question of production which may consist of several successive processing stages, then, depending on the degree of processing, the economic situation of each particular stage should be appraised. This practically means that the programme must examine in detail both the technological and economical aspects of each stage. Of course, the realization of the project itself may be achieved successively, according to possibilities, and according to the ability of eliminating economic impediments, which momentarily stand in the way of operating the optimal cycle of processing.

As principal economic impediments to a complete, economically justified, processing cycle, may be noted:

a) insufficient financial resources. The advantages of an integral cycle, for which as a rule, high investments are required cannot be utilized if the respective investment funds are not available. In connection with this problem, two factors must be emphasized:

- if it has been evaluated that a complete processing cycle in a production has an indubitable economic significance, the funds available should not be scattered over the construction of various projects, but should be concentrated on an integral production and the rest postponed. This applies especially to developing countries and in particular to those

with planned economy, in order that the advantages of the integral production could be secured, especially in regard to export industry.

- in spite of the difficulties due to the shortage of funds, it is mostly not economically opportune to limit the project only to the stages of a low degree of processing, since here the accumulation is low, but the first phase of the project should include at least one higher stage of processing, in order to increase the profitability and thereby the accumulation also:

b) deficiency of skilled personnel. It is certainly more difficult to secure all the personnel and to master the technological process for all stages of a complete cycle, than for individual stages. The training of personnel has been referred to earlier;

c) difficulties in connection with civil engineering contractors. If plants for all stages of production are set up at the same time and the same location, it will be difficult to find a domestic contractor who would be able to undertake the construction of the whole project concurrently.

From the above it may be concluded that efforts should be made toward achieving the optimal degree of processing, but within the limits of possibilities. In this, if the construction by stages is the way out, each stage must form a whole, with clear economic effects, which later will be increased by further development. It means that the whole is appraised, but that construction will go, by stages economically justified, according to possibilities.

VIII. Evaluation of Export Oriented Industrial Projects.

The discussion so far on the evaluation of industrial projects has been general and relates to all industrial projects. In this section, however, we shall be specific and deal exclusively with the export oriented industrial projects.

1) Reasons for export orientation in economies with accelerated industrial development. In the course of industrialization developing countries are compelled to orient some projects to export. There are multiple factors that account for it which may be summarized thus: need to develop optimal capacities and achieve a favourable effect on the balance of payments,

to improve the quality of their products and through exposure to international competition, increase the economic efficiency of the production.

a) Development of Optimal Capacities as Reason for Orientation to Export

The industrially developing countries, as a rule, do not have a particularly developed market.

The possibility of sale to a smaller extent tells that factories which would be established only for meeting the requirements of the domestic market, could not be of a large capacity. It is known, however, that in some industries economy of scale plays a great role. In a majority of industrial undertakings, the value of investment per unit of capacity declines with the increase of scale. This may be illustrated by a rough example taken from the field of iron and steel industry (figures expressed in dollars):

Size of capacity	Investment per ton	Total investment in capital equipment
500,000	400	200,000.000
1,500.000	255	382,500.000

It may be seen from the above that, although the capacity is three times larger, total investment costs only 1.9 times more. In addition to advantages in smaller investments, the size of the capacity influences the cost of production. This influence is both direct and indirect. The amount of investment affects directly the production cost, through depreciation and repayment of credits. In other words, the larger the capacity, the smaller the investments per unit of capacity, and, consequently, also the production cost is smaller (per unit of capacity).

Larger capacities allow application of a greater automation and more modern technological processes, which results in a fall in production cost through a reduction of workers, employment of less skilled labour and larger saving of raw materials (better utilization, less waste).

In addition to direct influence, the size of the capacity influences indirectly in various ways the reproduction cost, e.g., through the raw material prices, transport cost, overhead expenses, etc. Larger capacities allow to realize, say, less expensive procurements, easier supply, better use of transport facilities, proportionately lower overhead expenses, etc.

On the basis of the above discussion, the following may be stated:

- limited sale in the domestic market does not allow the setting up of factories of large capacities, and

- the larger the capacity, the lower, per unit of capacity, both the investments and production costs.

All these circumstances act in opposite directions, that is the one excludes the other.

From this we may conclude that larger capacities should be preferred, while for the sale of products which the domestic market cannot absorb, another solution must be sought. And this solution is to be found in export.

In this way, domestic consumption and export are complementary and enable the setting of larger capacities for the purpose of benefiting from the advantages that such capacities offer. This will benefit the domestic market, because the lower production costs will result in lower selling prices. Alongside with this lower prices create possibilities of sale in foreign markets, and help the industry stand international competition.

Simultaneous combination of domestic consumption and export, makes it possible to establish optimal capacities, that is such capacities where investment outlays and production costs are the lowest. Whether an optimal capacity will be erected, depends, of course, also on the available resources. The advantages of optimal capacities are of no use if the available resources are not sufficient for its setting up. In any case, however, it must endeavour to build rational capacities. These are not optimal ones (i.e. the best possible), but still large capacities, which give the above mentioned advantages, but only to a certain degree.

Automation and modern technology simultaneously make possible a production of better quality. Consequently, from optimal capacities products of high quality are obtained, this being one of the conditions for ready sale, both in the domestic and foreign market.

b) Favourable effect on balance of payments as reason for orientation to export. In the preceding section we have attempted to show that the higher the degree of processing the greater the possibility of achieving the economic optimum. This especially holds true in respect of products designed for export. Besides export of industrial products of a high degree of processing will mostly have a more favourable effect on the balance of payments of the country than the export of raw materials (products of mining, agriculture, forests, etc.)

One should not pretend, however, that with the date of putting the project into operation all will be running well and that exports will be realized to the full extent. Besides the period of trial production, additional time is required for mastering the quality of production and overcoming difficulties relative to exports. To anticipate the inflow of foreign exchange immediately to the full extent, is too optimistic and risky, as this may have undesired consequences, if on that basis some commitments have been made. In this respect it must be said that, until the requirements of the foreign market have been entirely satisfied, there is no need to hurry with exports. Once the confidence of the foreign markets is lost, it becomes very difficult to capture that same market again.

c) Cases of failures due to misjudgement of assumptions justifying orientation to export. The planned optimal capacity of the industrial project should enable the prices of the products to be on the level of world prices, and the planned exports to have a favourable effect on the balance of payments of the country. The industrial project will, considering its orientation, be able to exist only if exports develop smoothly. Failure in this respect (if assumptions do not materialize), may have very serious consequences.

Failures are not rare. Most frequently the reasons for failure are:

- the evaluation of optimal or rational capacity was unrealistic. In view of the situation in the world market or at least in a part of this market, where the export is channelled, these capacities should have been larger; as it is, their production costs turn out to be too high for sale at the world market prices. High prices are not always the result of insufficient size of capacity, but may be the result of low productivity and quality of the product, of the fact that the factory does not deliver the production, which the capacity makes possible, etc.

- misjudgement in respect of sales. 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, already introduced in the market,

- misjudgement of the actual impact on the balance of payments. Here, errors in calculations are possible in respect of the volume of possible export, of the selling prices, of the amount of tariffs (which are prescribed

by the importing country), of the cost of import equipment, etc. And the consequence of all this is the failure to achieve the effect on the balance of payments that had been anticipated.

2) Development of Export Oriented Industries.

a) Evaluation of preconditions for development. In the preceding section we have tried to explain why some industry must be export-oriented. Here we shall delineate some preconditions which make it possible for industry to be oriented to export. The success of the orientation depends, of course, on the extent of fulfilment of these preconditions. These preconditions apply in the first place to the industrially developing countries, whereas for the industrialized countries, such orientation is, in certain cases, possible also without fulfilment of these preconditions. Preconditions for the development of the industry which intends to orient itself to export, are as follows: availability of domestic raw material and available skill.

The role of indigenous raw material resources

The first precondition for development of industry designed to produce for export is that the raw materials required for its production should be supplied economically from domestic sources for a longer period of time. Thus, the industry will not need to secure foreign exchange for procurement of raw materials.

How the availability of raw materials would be appraised, has been briefly explained earlier. In evaluating a project, a particular attention must be given to this problem.

If such raw materials in unprocessed form had been exported until now, it is necessary to be cautious so that the new industrial production does not immediately liquidate the old exports of raw materials as that could have negative impact on the balance of payments of the country. It would be best if such raw materials could be obtained in quantities sufficient to cover both the requirements of export and of the new industry.

In addition to determining the raw material resources, in the form of ore reserves, it should be appraised whether the raw materials are accessible to operation (for example, the mine is opened, transport is secured), or new investments are required for the purpose. In the latter case, in calculating the impact on the balance of payments, this should be taken into account.

The role of available skill

Another factor, as precondition for development of the export oriented industry, is the availability of skilled labour, and trained personnel which

will be able to work on more complicated technological processes. Such facilities for training should be provided in due time.

As a consequence of lower wages in the industrially developing countries, in comparison to remuneration of labour in the industrialized countries, production costs are lower, which is a great advantage in favour of the domestic export industries.

If a great variety of raw material is available, which more or less secure through further industrial processing, a favorable effect on the balance of payments of the country then, when establishing the priorities for the construction of industrial projects, first priority should probably be given to projects, which require less investments but at the same time employ the largest possible number of labour, primarily unskilled and semi-skilled. The advantages of this are: first, because it helps to resolve the problem of unemployment, and, second, because for the training of such labour neither much time nor much money are required.

b) Cases of failure due to misjudgment of preconditions for development of export oriented industry. Failures in this respect do happen if the two above preconditions have not been well evaluated. The extent of the failure will depend on the degree of the misjudgment of these factors. Several such cases can be given as examples:

a) the evidence of the raw material resources has not been realistic, so that there are not sufficient domestic raw materials, or the ore reserves do not warrant a long life of exploitation. In such cases, three ways out are possible:

- the deficient raw materials must be imported, for which foreign exchange must be provided. Owing to transport expenses, production costs increase,

- the industrial capacity, owing to deficiency of raw materials, will not be operated to the full extent. This will reflect on production cost which will therefore be higher,

- urgent necessary measures must be taken (further prospecting carried) in order to operate the raw material resources as soon as possible. This will require new investments, which (inasmuch as the funds are provided) will result in an increase of the raw material prices and consequently in an

increase of production costs of the industry.

b) the analysis of the quality of raw materials has not been correct. In some districts, the quality responds to the analysis, but on the whole the ore is of poorer quality. The consequence is an increase in production costs,

c) prospection has shown that there are ore reserves, but mines have not been opened or the existing mechanization is not sufficient for the production of the quantities required. In this case, additional funds must be provided for investment.

d) transport has not been well evaluated, e.g. the capacity of the railways does not allow the transport of the whole quantity of the raw materials, the means of transport are insufficient, etc. Therefore, new funds must be provided,

e) labour is available in the country, but not in adequate numbers within the area of the new factory. This calls for expenses of construction of social housing projects, for accommodation of workers who will come from other regions.

f) difficulties in adjusting labour to industrial work, while the rate of adjustment is slower than expected,

g) labour turnover is greater than expected.

Finally, in addition to difficulties of a general nature which should be appraised in an overall evaluation of the project, the assessor in case of export oriented industries, is faced with special difficulties in respect of a correct appraisal of whether the assumptions which had been the starting basis for orientation to export will materialize, as well as the assumptions relating to the preconditions for development of that industry.

Errors in respect of both the elements which relate to all projects and of these specific elements, are possible in such a large number and intensity, that when the project is completed they may entirely paralyze the benefits which were expected from the new project. That is why the evaluation of the export oriented projects is more complex and needs to be more responsible, since if made superficially, it may have as a result not the acceleration of the industrial development of the country, but its impediment and economic disorganization.

IX. Conclusions

On the basis of all that has been set forth above, the following general conclusions may be drawn:

1) The evaluation of industrial projects is a very complex and responsible operation. It requires wide experience, a thorough theoretical knowledge, an acquaintance with the domestic and foreign markets, as well as the ability of forecasting the situation that will exist at the time of putting the project into operation.

2) The basis for making the evaluation must be a solidly prepared documentation and firm proofs concerning the fundamental elements.

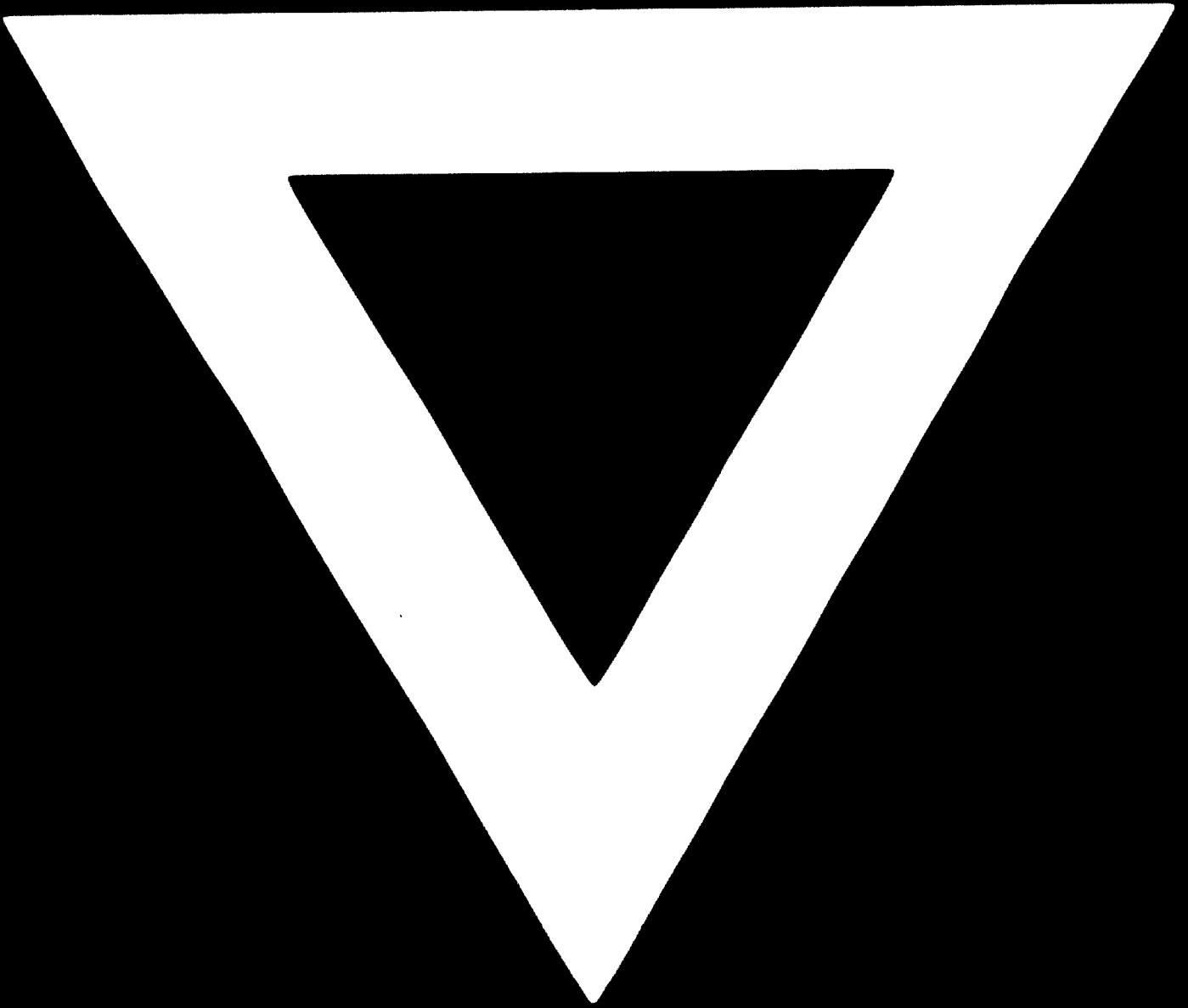
3) Errors in all kinds of calculations are possible and often a normal occurrence. They appear in estimates of capital expenses (both for fixed assets and working capital), of production costs, as well as of selling prices. Errors in these elements (sometimes even of minor importance) may have distorted the planned effects so much, that the project would not have been constructed had they been known in advance.

This is particularly important for developing countries, which lack capital, especially in relation to projects of the export oriented industry.

4) Failures due to misjudgement of factors justifying orientation to export, as well as cases of failures due to misjudgement of preconditions for development should be specially studied. Failures of this kind bring the export oriented industry to a difficult position, sometimes even without a way out. It is a matter of common knowledge that developing countries cannot allow their investments to be lost even in a single project.

5) This paper was intended to acquaint the reader with the errors in calculations and misjudgements typically found in the work of project evaluation. It may be possible to avoid most of these errors and misjudgement if the evaluator is forewarned about them.

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